ENVIRONMENTAL ASSESSMENT
FOR THE
BEDDOWN OF C-17 AIRCRAFT
AT
MARCH AIR RESERVE BASE, CALIFORNIA

Headquarters
Air Force Reserve Command
Environmental Division

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Abbreviations and Acronyms

°F	degrees Fahrenheit
163 ARW	163rd Air Refueling Wing
452 AMW	452nd Air Mobility Wing
ACHP	Advisory Council on Historic Preservation
ACM	Asbestos Containing Material
ACRB	Architectural Compatibility Review Board
AFB	Air Force Base
AFI	Air Force Instruction
AFMAN	Air Force Manual
AFOSH	Air Force Occupational and Environmental Safety, Fire Protection, and Health
AFPD	Air Force Policy Directive
AFRC	Air Force Reserve Command
AFSC	Air Force Safety Center
AGE	Aerospace Ground Equipment
AGL	Above Ground Level
AGS	Aircraft Generation Squadron
AICUZ	Air Installation Compatible Use Zone
ALZ	Assault Landing Zone
AMW	Air Mobility Wing
ANG	Air National Guard
ANGB	Air National Guard Base
AOC	Area of Concern
APZ	Accident Potential Zone
AQCR	Air Quality Control Region
ARB	Air Reserve Base
ARW	Air Refueling Wing
ATC	Air Traffic Control
AZFGD	Arizona Fish and Game Department
BAM	Bird Avoidance Model
BASH	Bird/Wildlife Aircraft Strike Hazard
BCE	Base Civil Engineer
BHWG	Bird Hazard Working Group
BLM	Bureau of Land Management
Btu	British thermal unit
C&D	construction and demolition
CA ANG	California Air National Guard
CAA	Clean Air Act
CADFG	California Department of Fish and Game
Cal/EPA	California Environmental Protection Agency
CARB	California Air Resources Board
CCAA	California Clean Air Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CNEL	Community Noise Equivalent Level
CO	Carbon Monoxide
CSC	California Special Concern
CWA	Clean Water Act
CY	Calendar Year
dB	decibel
dBA	A-weighted decibel
DERP	Defense Environmental Restoration Program
DNL	Day-Night Average Sound Level
DoD	Department of Defense
DZ	Drop Zone
EA	Environmental Assessment
EIAP	Environmental Impact Analysis Process
EIS	Environmental Impact Statement
EO	Executive Order
ERP	Environmental Restoration Program
ESA	Endangered Species Act
ESQD	Explosive Safety Quantity Distance
ESZ	Explosive Safety Zone
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulation
FEMA	Federal Emergency Management Agency
FICON	Federal Interagency Committee on Noise
FIP	Federal Implementation Plan
FLIP	Flight Information Publication
FONSI	Finding of No Significant Impact
ft^2	square feet
FY	Fiscal Year
GOV	Government-owned Vehicle
gpm	gallons per minute
HAPs	High Accident Potential
hr	hour
HUD	U.S. Department of Housing and Urban Development
HVLP	high volume low pressure
I/M	Inspection and Maintenance
IC	internal combustion
IFR	Instrument Flight Rules
IICEP	Interagency and Intergovernmental Coordination for Environmental Planning

Finding of No Significant Impact for the Beddown of C-17 Aircraft at March Air Reserve Base, California

Introduction

The U.S. Air Force (USAF) has determined that it is necessary to replace the aging C-141C Starlifter aircraft with the more modern C-17 Globemaster III aircraft. The USAF has also determined that it is operationally prudent to maintain strategic airlift capability on the West Coast in order to continue meeting present and future air mobility requirements. The U.S. Air Force Reserve Command (AFRC) is proposing an aircraft replacement for the 452nd Air Mobility Wing (452 AMW) based at March Air Reserve Base (ARB), California. The 452 AMW currently possesses 16 C-141C Primary Assigned Aircraft (PAA) and 10 KC-135R PAA. The sixteen C-141C aircraft would be replaced by eight C-17 PAA. The 10 KC-135R PAA would be reduced to eight KC-135R PAA. The 16 C-141C aircraft will be retired over the next several years. The draw-down of C-141Cs is scheduled to begin toward the end of Fiscal Year 2003 (FY 03). The aircraft conversion, if implemented, would begin in FY 05 and end in FY 06.

Purpose of and Need for the Proposed Action

An airlift fleet with new capabilities, able to move forces over intercontinental distances and deliver them directly to where they are required, is needed to provide rapid deployment of personnel and equipment. The replacement of the C-141C with the C-17 aircraft would satisfy two major needs: provide a means of maintaining and operating the latest strategic airlifter at a lower cost without sacrificing its readiness capabilities; and provide AFRC with a replacement for the existing airlifter (the C-141C aircraft), which is scheduled for retirement in the near future.

Proposed Action

The Proposed Action consists of three parts: 1) aircraft changes at March ARB; 2) construction activities at March ARB; and 3) changes of operations at March ARB, within military training airspace, and at an aircraft training area. The Proposed Action is further detailed in the following subsections.

The Proposed Action includes the replacement of the 452 AMW's 16 retiring C-141C PAA at March ARB with eight C-17 PAA. The proposal is for the 452 AMW to operate eight C-17 aircraft after transferring or retiring 16 C-141C aircraft. The number of C-141C aircraft would steadily draw-down from FY 03 through FY 05. C-17 aircraft would beddown from the end of FY 05 through FY 06. The 452 AMW would also draw-down the number of KC-135R assigned to the Wing from 10 PAA to eight PAA. The draw-down of two KC-135R aircraft is the result of the establishment of the 939th Air Refueling Wing (ARW) at Portland Air National Guard Base (ANGB) located on the Portland

International Airport, Oregon. The activation of the 939 ARW was assessed in a September 2002 EA entitled, *Environmental Assessment of Conversion of the 939th Rescue Wing, Portland Air National Guard Base, Oregon*. The Finding of No Significant Impact (FONSI) was signed on September 11, 2002. The two KC-135R aircraft will be transferred to Portland ANGB in FY 03.

AFRC has identified the need for eight construction projects to support the proposed beddown of C-17 aircraft at March ARB. The construction projects would replace existing inadequate facilities and upgrade capabilities necessary to perform required activities.

Seven existing Military Training Routes (MTRs) on the West Coast have been identified for use by the C-17 aircraft that would be based at March ARB to support low-altitude flight and navigation training requirements. These are: Instrument Routes (IRs) 214 and 217, and Visual Routes (VRs) 289, 296, 1217, 1257, and 1265. The following discussion describes FY 02 (or the most current 12-month period) and FY 06 proposed sortie utilization for the airspace included as part of the Proposed Action. The Desert Center Drop Zone (DZ) is currently being used by C-141C, C-130, and C-17 aircraft. It would continue to be used by C-17s under the Proposed Action; however, the utilization would decrease. In addition, C-17 aircraft require the use of an Assault Landing Zone (ALZ) for training purposes. There are no ALZs located within 30 minutes flying time of March ARB. As a result, an ALZ would need to be constructed; however, a location for the ALZ has yet to be determined. Due to the lack of availability of complete information, the proposed construction of an ALZ will undergo analysis for decision-making at a later time (40 Code of Federal Regulations [CFR] 1502.22(b)). In this particular case, the basing of the C-17s is ripe for decision, but the decisions to support the proposed construction of an ALZ have not been resolved and are therefore, not ripe for decision at this time. As a result, analyses specific to the proposed ALZ will be presented in a separate National Environmental Policy Act (NEPA) document that will include a cumulative impacts analysis of the entire Proposed Action (32 CFR 989.10).

Alternatives to the Proposed Action

As part of the NEPA process, potential alternatives to the Proposed Action must be evaluated. Two alternatives to the Proposed Action were considered to determine their feasibility as a viable alternative to beddown of C-17 aircraft at March ARB. These alternatives are as follows:

Conversion to C-130E Aircraft. The C-130 Hercules is one of the USAF's most versatile tactical airlift aircraft. The C-130E is an extended-range development of the C-130B with large under-wing fuel tanks. It can perform a large range of missions, but is primarily used for the tactical portion of the airlift mission. There are no C-130E aircraft available in the USAF inventory that could be relocated to March ARB.

Therefore, the conversion to C-130E aircraft at March ARB will not be carried forward for further analysis.

Conversion to the C-5 Aircraft. The C-5 Galaxy, with its tremendous payload capability, provides the USAF with inter-theater airlift in support. The aircraft is capable of carrying fully equipped combat-ready military units to any point in the world on short notice and then provide field support required to help sustain the fighting force. There are no C-5 aircraft available in the USAF inventory that could be relocated to March ARB. Therefore, the conversion to C-5 aircraft at March ARB will not be carried forward for further analysis.

No Action Alternative

Under the No Action Alternative, the strategic airlift mission at March ARB would continue until the remaining C-141C aircraft are retired or their useful life is extended. Replacement of these aircraft by C-17 aircraft would not occur. The C-141C operations at March ARB would continue until FY 06. By that time, the C-141C may no longer be able to be supported with spare parts, and the C-141C fleet at March ARB would be retired. All other missions operating at March ARB would remain. AFRC would support West Coast airlift mission requirements using other AFRC airlift assets. These aircraft would require increased flying time to make up for the lost capability once supported by the C-141C aircraft at March ARB.

Summary of Anticipated Environmental Impacts Associated with the Proposed Action

Analyses performed in the Environmental Assessment addressed potential effects on airspace management, air quality, noise, land use, safety, geological resources, water resources, biological resources, cultural resources, socioeconomics and environmental justice, infrastructure, and hazardous materials and wastes. The analyses revealed that implementation of the Proposed Action would have no significant direct, indirect, or cumulative effects on the quality of the natural or human environment.

Finding of No Significant Impact

I conclude that the environmental effects of the proposed beddown of C-17 aircraft at March ARB are not significant, that preparation of an Environmental Impact Statement is unnecessary, and that a Finding of No Significant Impact is appropriate. The preparation of this EA is in accordance with NEPA, Council on Environmental Quality regulations, and 32 CFR 989, as amended, *Environmental Impact Analysis Process*.

Timothy J. Wrighton — 31 MAR 03

TIMOTHY J. WRIGHTON, Col, USAFR — Date
Commander

ENVIRONMENTAL ASSESSMENT OF THE BEDDOWN OF C-17 AIRCRAFT AT MARCH AIR RESERVE BASE, CALIFORNIA

Headquarters, Air Force Reserve Command
Environmental Division
255 Richard Ray Boulevard
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FEBRUARY 2003

COVER SHEET

ENVIRONMENTAL ASSESSMENT
BEDDOWN OF C-17 AIRCRAFT
MARCH AIR RESERVE BASE, CALIFORNIA

Responsible Agencies: U.S. Air Force (USAF), Air Force Reserve Command (AFRC), 452nd Air Mobility Wing (452 AMW), March Air Reserve Base (ARB), California.

Affected Location: March ARB and Desert Center Drop Zone (DZ) and portions of Fresno, Imperial, Kern, Kings, Los Angeles, Monterey, Riverside, San Benito, San Bernardino, San Diego, San Luis Obispo, Santa Barbara, and Ventura counties, California; La Paz, Mohave, and Yavapai counties, Arizona; and Clark County, Nevada underlying military training airspace.

Report Designation: Environmental Assessment (EA)

Proposed Action: AFRC is proposing an aircraft replacement for the 452 AMW based at March ARB, California. The 452 AMW currently possesses 16 C-141C Primary Assigned Aircraft (PAA) and 10 KC-135R PAA. The 16 C-141C aircraft would be replaced with eight C-17 PAA. The 10 KC-135R PAA would be reduced to eight KC-135R PAA. The 16 C-141C aircraft will be retired over the next several years. The draw-down of C-141Cs is scheduled to begin toward the end of Fiscal Year 2003 (FY 03). The aircraft conversion, if implemented, would begin in FY 05 and end in FY 06. The Proposed Action would provide the necessary base infrastructure modifications, military airspace, and training areas to enable 452 AMW aircrews to perform readiness training operations and ensure that tactical low-altitude, airdrop, and re-supply mission requirements for C-17 aircraft are met and sustained.

This EA has been prepared to evaluate the Proposed Action and the No Action Alternative. Resources that are considered in the impact analysis are: airspace management, safety, air quality, noise, land use, geological resources, water resources, biological resources, cultural resources, socioeconomics and environmental justice, infrastructure, and hazardous materials and wastes. The EA will be made available to the public upon completion.

ENVIRONMENTAL ASSESSMENT OF THE BEDDOWN OF C-17 AIRCRAFT AT MARCH AIR RESERVE BASE, CALIFORNIA

CONTENTS

SECTION PAGE

CONTENTS (CONTINUED)

CONTENTS (CONTINUED)

CONTENTS (CONTINUED)

LIST OF FIGURES

LIST OF TABLES

LIST OF TABLES (CONTINUED)

TABLE **PAGE**

LIST OF TABLES (CONTINUED)

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1. Purpose of and Need for Proposed Action

This section includes five subsections: a brief background description of the Proposed Action, a statement of the purpose of and need for the Proposed Action, the location of the Proposed Action, a summary of the key environmental compliance requirements, and an overview of the organization of this Environmental Assessment (EA).

1.1 Background

The U.S. Air Force (USAF) has determined that it is necessary to replace the aging C-141C Starlifter aircraft with the more modern C-17 Globemaster III aircraft. The USAF has also determined that it is operationally prudent to maintain strategic airlift capability on the West Coast in order to continue meeting present and future air mobility requirements. The U.S. Air Force Reserve Command (AFRC) is proposing an aircraft replacement for the 452nd Air Mobility Wing (452 AMW) based at March Air Reserve Base (ARB), California. The 452 AMW currently possesses 16 C-141C Primary Assigned Aircraft (PAA) and 10 KC-135R PAA. The sixteen C-141C aircraft would be replaced by eight C-17 PAA. The 10 KC-135R PAA would be reduced to eight KC-135R PAA. The 16 C-141C aircraft will be retired over the next several years. The draw-down of C-141Cs is scheduled to begin toward the end of Fiscal Year 2003 (FY 03). The aircraft conversion, if implemented, would begin in FY 05 and end in FY 06.

This EA analyzes AFRC's Proposed Action and the No Action Alternative. If the analyses presented in the EA indicate that implementation of the Proposed Action would not result in significant environmental impacts, a Finding of No Significant Impact (FONSI) would be prepared. A FONSI briefly presents reasons why a Proposed Action would not have a significant effect on the human environment and why an Environmental Impact Statement (EIS) is unnecessary. If significant environmental issues result that cannot be mitigated to insignificant, an EIS will be required, or the Proposed Action will be abandoned and no action will be taken.

1.2 Purpose of and Need for the Proposed Action

An airlift fleet with new capabilities, able to move forces over intercontinental distances and deliver them directly to where they are required, is needed to provide rapid deployment of personnel and equipment. The replacement of the C-141C with the C-17 aircraft would satisfy two major needs: provide a means of maintaining and operating the latest strategic airlifter at a lower cost without sacrificing its readiness capabilities; and provide AFRC with a replacement for the existing airlifter (the C-141C aircraft), which is scheduled for retirement in the near future.

1.3 Location of the Proposed Action

March ARB is located in western Riverside County, California, approximately 70 miles east of Los Angeles (see Figure 1-1). The base, which is composed of an airfield and associated support facilities, occupies approximately 2,300 acres of contiguous property. The communities of Riverside, Moreno Valley, and Perris, California surround the base. The military training airspace components proposed for C-17 aircraft utilization overlies portions of Fresno, Imperial, Kern, Kings, Los Angeles, Monterey, Riverside, San Benito, San Bernardino, San Diego, San Luis Obispo, Santa Barbara, and Ventura counties, California; La Paz, Mohave, and Yavapai counties, Arizona; and Clark County, Nevada. The military aircraft training areas proposed for C-17 aircraft utilization includes seven Military Training Routes (MTRs) and the Desert Center Drop Zone (DZ) located near Desert Center, California.

1.4 Summary of Key Environmental Compliance Requirements

1.4.1 National Environmental Policy Act

The National Environmental Policy Act (NEPA) (42 United States Code [U.S.C.] §§ 4321-4347) is a Federal statute requiring the identification and analysis of potential environmental impacts of proposed Federal actions before those actions are taken. NEPA legislated a structured approach to environmental impact analysis that requires Federal agencies to use an interdisciplinary and systematic approach in their decision-making process. This process evaluates potential environmental consequences associated with a proposed action and considers alternative courses of action. The intent of NEPA is to protect, restore, or enhance the environment through well-informed Federal decisions.

The process for implementing NEPA is codified in Title 40 of the Code of Federal Regulations (CFR), Parts 1500-1508, *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act*. The Council on Environmental Quality (CEQ) was established under NEPA to implement and oversee Federal policy in this process. CEQ regulations specify the reasons to prepare an EA:

Figure 1-1. Location of March ARB and Surrounding Areas

- Briefly provide evidence and analysis for determining whether to prepare an EIS or a FONSI
- Aid in an agency's compliance with NEPA when an EIS is unnecessary
- Facilitate preparation of an EIS when one is necessary

Air Force Policy Directive (AFPD) 32-70, *Environmental Quality,* states that the USAF will comply with applicable Federal, state, and local environmental laws and regulations, including NEPA. The USAF's implementing regulation for NEPA is *The Environmental Impact Analysis Process (EIAP)*, 32 CFR Part 989, as amended.

1.4.2 Integration of Other Environmental Statutes and Regulations

To comply with NEPA, the planning and decision-making process for actions proposed by Federal agencies involves a study of other relevant environmental statutes and regulations. The NEPA process, however, does not replace procedural or substantive requirements of other environmental statues and regulations. It addresses them collectively in the form of an EA or EIS, which enables the decision-maker to have a comprehensive view of major environmental issues and requirements associated with the Proposed Action. According to CEQ regulations, the requirements of NEPA must be integrated "with other planning and environmental review procedures required by law or by agency so that all such procedures run concurrently rather than consecutively."

The EA examines potential effects of the Proposed Action and alternatives on twelve resource areas, including airspace management, safety, air quality, noise, land use, geological resources, water resources, biological resources, cultural resources, socioeconomics and environmental justice, infrastructure, and hazardous materials and waste. The following paragraphs present examples of relevant laws, regulations, and other requirements that are often considered as part of the analysis.

Safety

Air Force Instruction (AFI) 91-202, *The USAF Mishap Prevention Program*, implements AFPD 91-2, *Safety Programs*. It establishes mishap prevention program requirements (including the Bird/Wildlife Aircraft Strike Hazard [BASH] Program), assigns responsibilities for program elements, and contains program management information. This instruction applies to all USAF personnel, including AFRC and Air National Guard (ANG) members.

AFI 91-301, *Air Force Occupational and Environmental Safety, Fire Protection, and Health (AFOSH) Program*, implements AFPD 91-3, *Occupational Safety and Health*, by outlining the AFOSH Program. The purpose of the AFOSH Program is to minimize loss of USAF resources and to protect USAF personnel from occupational deaths, injuries, or illnesses by managing risks. In conjunction with AFI 91-202, *The USAF Mishap Prevention Program*, these standards ensure all USAF workplaces meet Federal safety and health requirements. This instruction applies to all USAF activities, including those of the AFRC and ANG.

Air Quality

The *Clean Air Act* (CAA) (42 U.S.C. §§ 7401-7671g) establishes Federal policy to protect and enhance the quality of the nation's air resources to protect human health and the environment. The CAA requires that adequate steps be implemented to control the release of air pollutants and prevent significant deterioration in air quality. The 1990 amendments to the CAA require Federal agencies to determine the conformity of proposed actions with respect to State Implementation Plans (SIPs) for attainment of air quality goals.

Noise

Land use guidelines established by the U.S. Department of Housing and Urban Development (HUD) and based on findings of the Federal Interagency Committee on Noise (FICON) recommend acceptable levels of noise exposure for land use.

Land Use

AFI 32-7063, the *Air Installation Compatible Use Zone (AICUZ) Program*, provides guidance to air bases and local communities in planning land uses compatible with airfield operations. The AICUZ program describes existing aircraft noise and flight safety zones on and near USAF installations.

Water Resources

The *Clean Water Act of 1977* and the *Water Quality Act of 1987* (33 U.S.C. 1251, et seq., as amended) establish Federal policy to restore and maintain the chemical, physical, and biological integrity of the nation's waters and, where attainable, to achieve a level of water quality that provides for the protection and propagation of fish, shellfish, and wildlife, and recreation in and on the water.

Executive Order (EO) 11988, Floodplain Management, requires Federal agencies to take action to reduce the risk of flood damage; minimize the impacts of floods on human safety, health, and welfare; and restore and preserve the natural and beneficial values served by floodplains. Federal agencies are directed to consider the proximity of their actions to or within floodplains. Where information is unavailable, agencies are encouraged to delineate the extent of floodplains at their site.

Biological Resources

The *Endangered Species Act (ESA)* (16 U.S.C. §§ 1531 et seq.) requires Federal agencies that fund, authorize, or implement actions to avoid jeopardizing the continued existence of federally listed threatened or endangered species, or destroying or adversely affecting their critical habitat. Federal agencies must evaluate the effects of their actions through a set of defined procedures, which can include preparation of a Biological Assessment and formal consultation with the U.S. Fish and Wildlife Service (USFWS).

EO 11990, Protection of Wetlands, requires that Federal agencies provide leadership and take actions to minimize or avoid the destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands.

The *Clean Water Act*, under Section 404, contains provisions for protection of wetlands and establishes a permitting process for activities having potential effects in wetland areas. Wetlands, riverine, and open water systems are considered waters of the U.S. and, as such, fall under the regulatory jurisdiction of the U.S. Army Corps of Engineers (USACE).

Cultural Resources

The *National Historic Preservation Act of 1966* (NHPA) (16 U.S.C. §§ 470 et seq.) provides the principal authority used to protect historic properties, establishes the National Register of Historic Places (NRHP), and defines, in Section 106, the requirements for Federal agencies to consider the effects of an action on properties on or eligible for the NRHP.

Protection of Historic and Cultural Properties (36 CFR 800 [1986]) provides an explicit set of procedures for Federal agencies to meet their obligations under the NHPA, including inventorying of resources and consultation with State Historic Preservation Offices (SHPOs).

The *Archeological Resources Protection Act of 1979* (16 U.S.C. §§ 470 et seq.) ensures that Federal agencies protect and preserve archeological resources on Federal or Native American lands and establishes a permitting system to allow legitimate scientific study of such resources.

EO 13007, Indian Sacred Sites, requires that, to the extent practicable, Federal agencies accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners and avoid adversely affecting the physical integrity of such sacred sites.

EO 13084, Consultation and Coordination with Indian Tribal Governments, requires that each Federal agency has an effective process to permit elected officials and other representatives of Indian tribal governments to provide meaningful and timely input in the development of regulatory policies on matters that significantly or uniquely affect their communities.

Socioeconomics and Environmental Justice

EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, directs Federal agencies to assess the effects of their actions on minority and low-income populations within their region of influence. Agencies are encouraged to include demographic information related to race and income in their analysis of the environmental and economic effects associated with their actions.

1.4.3 Interagency and Intergovernmental Coordination for Environmental Planning and Community Involvement

NEPA requirements help ensure that environmental information is made available to the public during the decision-making process and prior to actions being taken. The premise of NEPA is that the quality of Federal decisions will be enhanced if proponents provide information to the public and involve the public in the planning process. CEQ regulations implementing NEPA specifically state, "There shall be an early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action. This process shall be termed scoping." The Intergovernmental Coordination Act and EO 12372, *Intergovernmental Review of Federal Programs*, require Federal agencies to cooperate with and consider state and local views in implementing a Federal proposal. AFI 32-7060 requires AFRC to implement a process known as Interagency and Intergovernmental Coordination for Environmental Planning (IICEP), which is used for the purpose of agency coordination and implements scoping requirements.

Through the IICEP process, AFRC notified relevant Federal, state, and local agencies of the action proposed and provided them sufficient time to make known their environmental concerns specific to the action. The IICEP process provided AFRC the opportunity to cooperate with and consider state and local views in implementing the Federal proposal. Upon receipt, agency responses were provided to AFRC and incorporated into the analysis of potential environmental impacts performed as part of this EA. AFRC coordinated with agencies such as the Federal Aviation Administration (FAA), U.S. Environmental Protection Agency (USEPA), USFWS, SHPOs, and other Federal, state, and local agencies. Appendix A includes a copy of the IICEP letter mailed to the agencies for this action, the IICEP distribution list, and agency responses.

1.5 Introduction to the Organization of this Document

The EA is organized into seven chapters. Chapter 1 contains background information, a description of the purpose of and need for the Proposed Action, the location of the Proposed Action, a listing of applicable regulatory requirements, and an introduction to the organization of the EA. Chapter 2 provides an introduction to the Proposed Action, a detailed description of the Proposed Action, a description of the No Action Alternative, identification of alternatives eliminated from further consideration, identification of other actions announced for the base and the military aircraft training areas, a description of the decision to be made, and identification of the preferred alternative. Chapter 3 contains a general description of the biophysical resources and baseline conditions that potentially could be affected by the Proposed Action or the No Action Alternative. Chapter 4 presents an analysis of the environmental consequences analysis of the potential cumulative impacts on March ARB. Chapter 5 presents an analysis of cumulative impacts. Chapter 6 lists the preparers of the document. Chapter 7 lists the sources of information used in the preparation of the document.

2. Description of Proposed Action and Alternatives

This section has six subsections: an introduction to the Proposed Action, a detailed description of the Proposed Action, a description of the No Action Alternative, identification of alternatives eliminated from further consideration, identification of other actions announced for the base and the military aircraft training areas, and an identification of the preferred alternative.

2.1 Introduction

A Site Activation Task Force (SATAF) meeting was conducted at March ARB in July 2002 to identify all of the necessary actions to support the proposed C-17 aircraft at March ARB. This section describes the alternatives AFRC is analyzing to accomplish the Proposed Action and presents the No Action Alternative, as prescribed by CEQ regulations. The Proposed Action would provide the necessary base infrastructure modifications, military airspace, and training areas that would enable 452 AMW aircrews to perform readiness training operations and ensure that tactical low-altitude, airdrop, and re-supply mission requirements for C-17 aircraft are met and sustained.

2.1.1 Current March ARB Mission

Several military missions are supported by the aircraft and personnel at March ARB. The mission of the 452 AMW is to provide airlift support for the USAF in peacetime and to train for tactical combat airlift and airdrop of personnel and supplies in wartime. The 452 AMW operates 16 C-141C aircraft and 10 KC-135R aircraft. The California Air National Guard (CA ANG) is the primary tenant organization assigned to March ARB. The 163rd Air Refueling Wing (163 ARW) of the CA ANG operates ten KC-135R aircraft. In addition, the 144th Fighter Wing, Fresno, CA ANG operates four F-16 aircraft at March AFB. Two F-16 aircraft are used for training exercises, and two are kept on 24-hour alert in support of the North American Air Defense (NOAD) mission. In addition, several other tenant organizations are located on Base, including the U.S. Customs Service.

As the host unit at March ARB, the 452 AMW is responsible for providing certain on-base services and facilities that are common to the Wing and tenant organizations. These include the law enforcement, fire department, fuel storage area, base operations, and service for transient aircraft.

2.2 Detailed Description of the Proposed Action

The Proposed Action consists of three parts: 1) aircraft changes at March ARB; 2) construction activities at March ARB; and 3) changes of operations at March ARB, within military training airspace, and at an aircraft training area. The Proposed Action is further detailed in the following subsections.

2.2.1 Aircraft Changes at March ARB

The Proposed Action includes the replacement of the 452 AMW's 16 retiring C-141C PAA at March ARB with eight C-17 PAA. The proposal is for the 452 AMW to operate eight C-17 aircraft after transferring or retiring 16 C-141C aircraft. The number of C-141C aircraft would steadily draw-down from FY 03 through FY 05. C-17 aircraft would be beddown from the end of FY 05 through FY 06. Table 2-1 presents the proposed C-141C draw-down and C-17 beddown schedule. The 452 AMW would also draw-down the number of KC-135R assigned to the Wing from 10 PAA to eight PAA. The draw-down of two KC-135R aircraft is the result of the establishment of the 939 ARW at Portland Air National Guard Base (ANGB) located on the Portland International Airport, Oregon. The activation of the 939 ARW was assessed in a September 2002 EA entitled, *Environmental Assessment of Conversion of the 939th Rescue Wing, Portland Air National Guard Base, Oregon*. The FONSI was signed on September 11, 2002. The two KC-135R aircraft will be transferred to Portland ANGB in FY 03.

Characteristics of the C-17, C-141C, and KC-135R Aircraft

The C-141C Starlifter fulfills the vast spectrum of airlift requirements through its ability to airlift combat forces over long distances; deliver those forces and their equipment either by air, land, or airdrop; re-supply forces; and transport the sick and wounded from a hostile area to advanced medical facilities. The first C-141, delivered to Tinker AFB, Oklahoma in October 1964, began squadron operations in April 1965. The C-141, with its changeable cargo compartment, can transition from rollers on the floor for palletized cargo to a smooth floor for wheeled vehicles to aft facing seats or sidewall canvas seats for passengers, quickly and easily, to handle over 30 different missions. The C-141 was the first jet transport from which U.S. Army paratroopers jumped, and the first to land in the Antarctic. A universal air refueling receptacle on the C-141C, with the ability to transfer 23,592 gallons (89,649.6 liters) in about 26 minutes, allows for longer non-stop flights and fewer fuel stops at overseas bases during worldwide airlift missions. Four Pratt & Whitney TF33-P-7 turbofan engines power the C-141, rated at 20,250 pounds thrust each.

The C-141 force, nearing 11 million flying hours, has a proven reliability and long-range capability. In addition to training, worldwide airlift, and combat support missions, the C-141 has amassed an admiring record in response to humanitarian crises.

Table 2-1. Proposed C-141C Draw-down and C-17 Beddown Schedule

FY/Quarter	Total No. of C-141C PAA	Total No. of C-17 PAA
FY 03/4	16	0
FY 04/1	12	0
FY 04/2	12	0
FY 04/3	10	0
FY 04/4	8	0
FY 05/1	8	0
FY 05/2	8	0
FY 05/3	4	1
FY 05/4	0	5
FY 06/1	0	8

Note: The U.S. Government FY is from October 1st through September 30th. The first Quarter is from October 1st through December 31st; the second Quarter is from January 1st through March 31st; the third Quarter is from April 1st through June 30th; and the fourth Quarter is from July 1st through September 30th.

The C-17 Globemaster III is a heavy-lift, air-refuelable, cargo and troop transport aircraft. Designed to support both inter- and intra-theater operations, the aircraft affords direct delivery airlift of all classes of military cargo, including outsized items, such as armored vehicles. It is the first aircraft capable of air-landing or air-dropping outsized cargo in the tactical environment. Four Pratt and Whitney F117-PW-100 turbofan engines power the aircraft. Each engine develops 40,440 pounds of thrust, enabling the aircraft to operate from small, austere airfields (3,000 feet by 90 feet) and cruise at greater than 500 miles per hour. Design features of the aircraft provide reduced takeoff and landing distances, improved lift, and reduced risk of stall. Thrust reversers on the engines afford enhanced ground maneuverability. The aircraft is capable of backing up a two percent grade with 160,000 pounds of cargo, and has enough fuel to fly 2,500 nautical miles. On the ground, the C-17 can make a 180-degree "U-Turn" in 114 feet, and a 180-degree "Star Turn" (with backing) in 80 feet. With a 130,000-pound payload, the C-17 has an unrefueled range of 3,200 miles. The aircraft's maximum payload is 170,900 pounds.

The KC-135 Stratotanker is the mainstay of USAF aerial refueling. Over 730 aircraft were built of which 546 remain in the USAF inventory. Some of those have been upgraded to keep them in service until 2020. The KC-135R Stratotanker is capable of refueling fixed-wing and rotary-wing aircraft. Fixed-wing aircraft are refueled with the refueling boom that extends from the bottom of the plane near the tail section. Rotary-wing aircraft and fixed-wing aircraft fitted with a probe are refueled using a hose and drogue system that extends from the wings of the airplane. The KC-135 is approximately 136 feet long, 38 feet high, and has a wingspan of almost 131 feet. It is capable of carrying just over 200,000 pounds of fuel. Depending on the fuel load configuration, the aircraft is capable of carrying up to 83,000 pounds of cargo and 37 troops.

KC-135A aircraft were delivered to the USAF between 1957 and 1965. In 1984 a major KC-135A renovation program began resulting in the KC-135R. The renovation program continues today. Many major systems of the aircraft were improved in the renovation program. The most notable improvement is the new CFM-56 engine. Addition of the new engine allows the KC-135R to offload 50 percent more fuel, makes the aircraft 25 percent more fuel efficient, reduces operating costs by 25 percent, and makes the aircraft 96 percent quieter than the KC-135A. The FAA classifies aircraft into three noise categories: Stage 1, Stage 2, and Stage 3 in order from loudest to the quietest. The KC-135R meets the standards for classification as a Stage 3 aircraft.

Figures 2-1, 2-2, and 2-3 show the general characteristics of the C-141C, C-17, and KC-135R aircraft, respectively.

2.2.2 Proposed Construction Program at March ARB

The Proposed Action would also involve the construction, modification, and removal of several facilities and buildings at March ARB to support C-17 aircraft. The base planning staff examined various potential sites for each project. Project siting was chosen based on accepted criteria and best professional judgment to identify feasible, realistic scenarios for meeting mission objectives, and facility requirements:

- Consistency with the land use designation of the site
- Adequately sized area to support required operational functions
- Access to necessary base infrastructure
- Suitability of the site for construction and support of operations

Primary Function:	Cargo and troop transport
Engine:	4 Pratt & Whitney TF33-P-7 turbofan engines
Thrust:	20,250 pounds/engine
Wingspan:	160 feet
Length:	168 feet, 4 inches
Height:	39 feet, 3 inches
Maximum Takeoff Weight:	323,100 pounds
Crew:	6 (2 pilots, 2 flight engineers, 1 loadmaster, and 1 navigator)
Cargo Compartment:	
Length:	93 feet, 4 inches
Width:	10 feet, 3 inches
Height:	9 feet, 1 inch

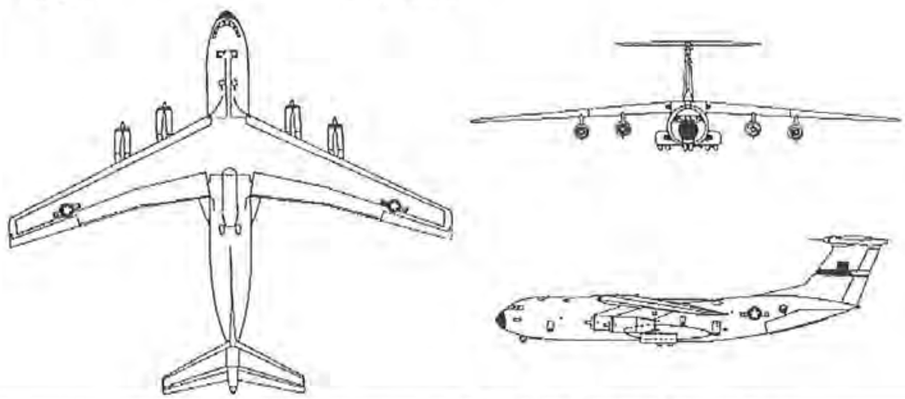


Figure 2-1. Characteristics of the C-141C Starlifter

Primary Function:	Cargo and troop transport
Engine:	4 Pratt & Whitney F117-PW-100 turbofan engines
Thrust:	40,440 pounds/engine
Wingspan:	169 feet,10 inches
Length:	174 feet
Height:	55 feet, 1 inch
Maximum Takeoff Weight:	585,000 pounds
Crew:	3 (2 pilots and 1 loadmaster)
Cargo Compartment:	
Length:	88 feet
Width:	18 feet
Height:	12 feet, 4 inches

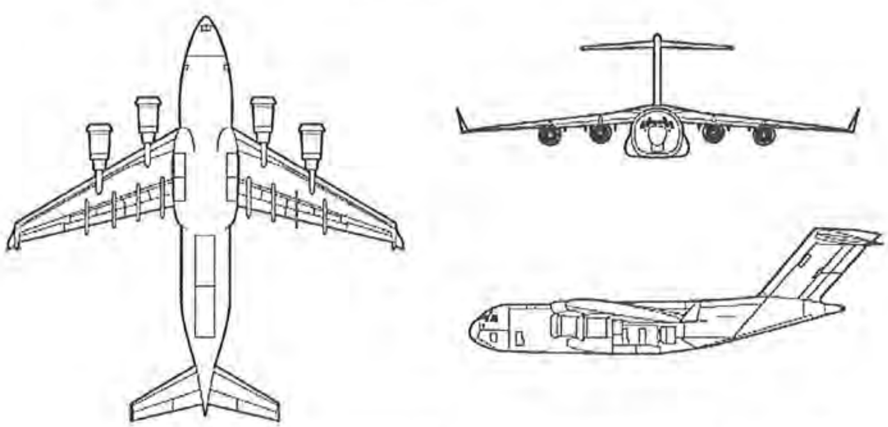


Figure 2-2. Characteristics of the C-17 Globemaster III

Primary Function:	Aerial Refueling
Engine:	4 CFM-International F108-CF-100 turbofans
Thrust:	22,224 pounds/engine
Wingspan:	130 feet, 10 inches
Length:	136 feet, 3 inches
Height (at Tail):	41 feet, 8 inches
Maximum Takeoff Weight:	322,500 pounds
Crew:	4 (2 pilots, navigator, boom operator)
Cargo Compartment:	
Length:	84 feet, 4 inches
Width:	10 feet, 9 inches
Height:	6 feet, 6 inches

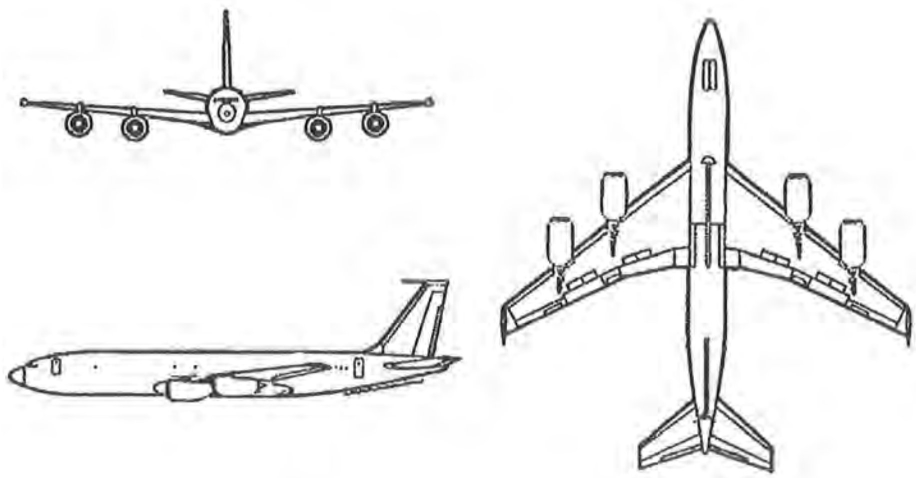


Figure 2-3. Characteristics of KC-135R

AFRC has identified the need for eight construction projects to support the proposed beddown of C-17 aircraft at March ARB. The construction projects would replace existing inadequate facilities and upgrade capabilities necessary to perform required activities. Table 2-2 presents the proposed construction projects. Figure 2-4 shows a map of March ARB and Figure 2-5 shows the location of proposed construction projects. Each project is discussed in greater detail below.

- *Project No. 1 – Alter Squadron Operations Facility.* The existing Squadrons Operations Facility, Building 2240, has adequate square footage, but the interior configuration of the building would not sufficiently accommodate C-17 aircrew and the increase in full time personnel. Building 2240 would be reconfigured to provide more working space. In addition, the current parking area would be expanded.
- *Project No. 2 – Alter Maintenance Shops.* Alter existing maintenance shops (Avionics in Building 2328, Hydraulics in Building 2327, Survival Equipment in Building 355, and Aircraft Generation Squadron [AGS] storage in Building 1221) to accommodate the requirements of the C-17 aircraft.

Table 2-2. Proposed Construction Projects

Project No.	Project Title	Buildings and Actions	FY
1	Alter Squadron Operations Facility	Interior renovation to **Building 2240** Expansion of existing parking lot	FY 03
2	Alter Maintenance Shops	Interior renovation to **Building 2328** (Avionics) Interior renovation to **Building 2327** (Hydraulics) Interior renovation to **Building 355** (Survival Equipment) Interior renovation to **Building 1221** (AGS Storage)	FY 03
3	Alter Building 420 to Accommodate Life Support	Interior renovation to **Building 420** New asphalt overlay to extend vehicle parking	FY 03
4	Construct C-17 Maintenance and Inspection Hangar (Phase I)	Demolish **Building 2307** (50,332 square feet [ft^2]) Construct new hangar (80,686 ft^2) on former site of Building 2307	FY 03
5	Alter Flight Simulator Facility	Interior renovations to **Building 600**	FY 03
6	Construct C-17 Maintenance and Inspection Hangar (Phase II)	Continuation of interior build-out of proposed hangar (Project No. 4)	FY 05
7	Alter Buildings 429 and 453 to Accommodate Mobility Equipment Storage Facility	Interior renovations to **Buildings 429 and 453**	FY 05
8	Alter General Maintenance Hangars	Modifications to hangar doors and interior renovations to **Building 423** Modifications to hangar doors and interior renovations to **Building 2303** Interior renovation to **Building 2306**	FY 06

- *Project No. 3 – Alter Building 420 to Accommodate Life Support.* Alter Building 420 to co-locate life support functions. March ARB life support functions are currently housed in three separate facilities. The co-location of these functions would increase efficiency by allowing the sharing of equipment and materials.
- *Project No. 4 – Construct C-17 Maintenance and Inspection Hangar (Phase I).* A maintenance training and inspection facility would be required as part of the C-17 maintenance training program. The facility would provide tools and classrooms for

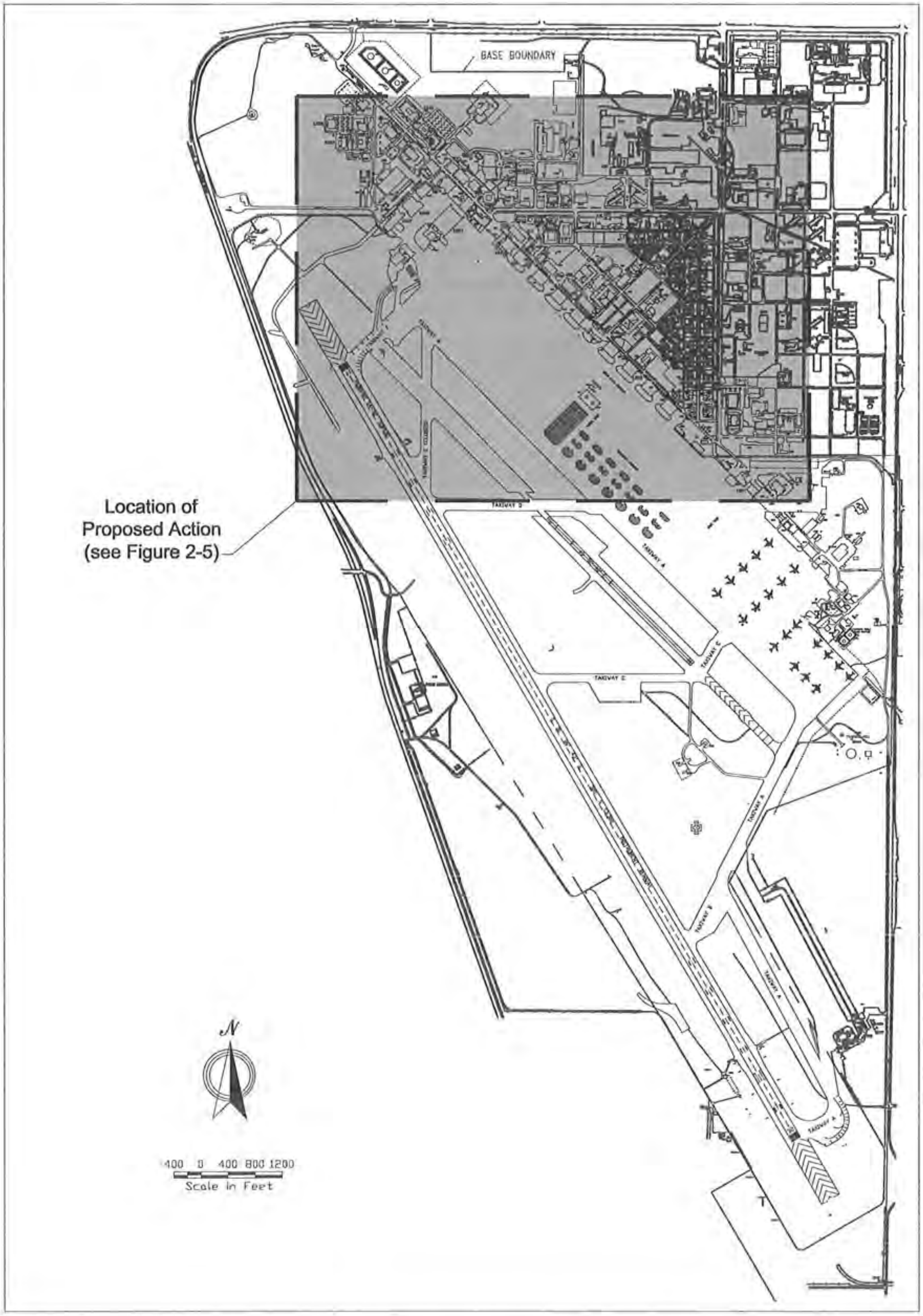


Figure 2-4. Map of March ARB

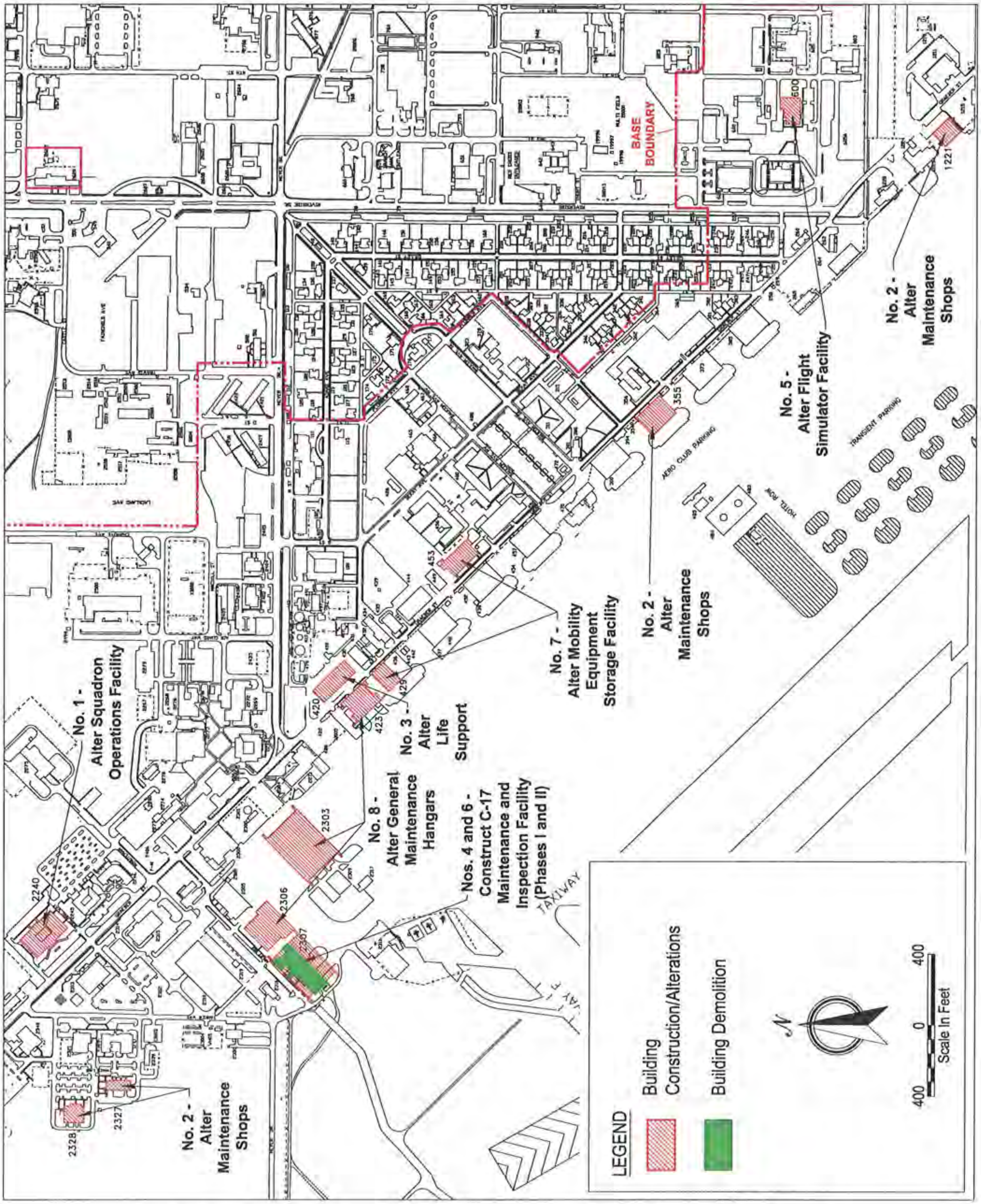


Figure 2-5. Locations of Proposed Construction Projects at March ARB

specialized hands-on instruction for C-17 maintenance and corrosion control, and would accommodate instructors, maintenance support, and administrative personnel. A metal fabrication and a composite components repair and fabrication shop would be constructed inside the hangar. Currently, there is not a facility that could accommodate the specialized height and bay size requirements of the C-17 aircraft at March ARB. Building 2307 (50,322 ft^2) would be demolished. A new 80,686 ft^2 hangar would be constructed on the former site of Building 2307.

- *Project No. 5 – Alter Flight Simulator Facility.* Modification of the existing C-141 flight simulator facility, Building 600, would be required to adequately house the new C-17 simulator. The simulator would provide initial training, qualification proficiency, and effective mission procedures training. It would provide hazardous emergency training procedures that otherwise could not be provided.

- *Project No. 6 – Construct C-17 Maintenance and Inspection Hangar (Phase II).* Interior construction of classrooms and shops started during Project No. 4 – Construct C-17 Maintenance and Inspection Hangar (Phase I) would be completed.

- *Project No. 7 – Alter Buildings 429 and 453 to Accommodate Mobility Equipment Storage Facility.* A contractor operated forward supply point to include improved forklift access and an environmentally controlled storage space would be required to support the C-17 aircraft. Modification of Buildings 429 and 453 from maintenance shops to warehouse storage and material processing facilities would be required to support the C-17 operations at March ARB.

- *Project No. 8 – Alter General Maintenance Hangars.* The existing C-141 dock, Building 2306, is adequately sized to accommodate C-17 aircraft; however, the facility would require modifications to accommodate the C-17 general maintenance operations. The towers of Building 2303 would require alteration. Hangar doors on Building 2303 would require new tracks and electrical service to improve operational safety. In addition, the hangar doors on Building 2306 would be modified to accommodate the C-17 airframe. Administrative space in all three facilities would be modified to accommodate C-17 administrative functions.

2.2.3 Changes in Aircraft Operations

Upon full implementation of the Proposed Action (FY 06), the number of operations conducted at March ARB, within several military airspace components, and at the Desert Center DZ would change.

Three terms are used to describe aircraft operations: *sortie*, *airfield operation*, and *sortie-operation*. Each has a distinct meaning and commonly applies to a specific set of activities in particular airspace areas:

- A *sortie* consists of a single military aircraft flight from takeoff through landing. One sortie can consist of multiple airfield operations and/or sortie-operations as depicted in the examples below.
- An *airfield operation* represents the single movement or individual portion of a flight in the base airfield airspace environment, such as one departure, one arrival, or one transit of the airport traffic area. Thus, a single sortie generates at least two airfield operations (takeoff and landing).
- A *sortie-operation* is defined as the use of one airspace unit (e.g., MTR) by one aircraft. Sortie-operation applies to flight activities outside the airfield or origin airspace environment. Each time a single aircraft conducting a sortie flies in a different airspace unit, one sortie-operation is counted for that unit.

The following examples depict sorties with various operations.

- Sortie with airfield operations only: A given sortie may remain in the airfield vicinity and not use an airspace unit (e.g., MTR). The aircraft can depart the airfield, complete a touch-and-go (TGO) operation, and land while staying within the airfield traffic area. This sortie counts as four airfield operations: one for the departure, two for the TGO, and one for the landing.
- Sortie with sortie-operations only: After departing the airfield, another sortie may involve only the use of multiple airspace units before landing back at the airfield. In this example, the aircraft would depart the airfield directly to one of the MTRs. The aircraft would operate in the MTR, transition to DZ, and then fly to another MTR before landing at the airfield. During this sortie, the aircraft would log two airfield operations (one for a departure and one for a landing at the airfield) and three sortie-operations (one time for each MTR and one time on the DZ).

March ARB

March ARB currently provides support for approximately 70,770 annual airfield operations. Airfield operations consist of landings and takeoffs (LTO), TGO, and closed pattern flights. Since a pilot performing a TGO or a closed pattern flight essentially performs a landing and a takeoff, TGOs and closed pattern flights are each counted as two airfield operations. Table 2-3 shows current and proposed airfield operations at March ARB.

Military Training Routes (MTRs)

MTRs are flight corridors established for low-altitude navigation and training. There are two primary types of MTRs: Instrument Routes (IRs) and Visual Routes (VRs). An MTR consists of an initial point, turning points, and an exit point. A route centerline connects these points. From

Table 2-3. Current and Proposed Airfield Operations at March ARB

Operations	Current Aircraft Operations/Year				Proposed Aircraft Operations/Year				Percent Change
	C-141C	KC-135R	Other Aircraft	March ARB	C-17	KC-135R	Other Aircraft	March ARB	
Annual Arrival/ Departure Operations (LTOs)	3,532	1,676	24,770	29,978	1,440	1,509	24,770	27,719	-7.5%
Annual Closed Pattern Operations (TGOs)	22,644	17,828	320	40,792	2,160	16,405	320	18,885	-53.7%
Total Annual Aircraft Operations	26,176	19,504	25,090	70,770	3,600	17,914	25,090	46,604	-34.1%

Note: As part of the joint use of the March ARB runway, approximately 21,000 airfield operations are anticipated and have been set-aside for allocation by the March Joint Powers Authority and are included as part of the "Other Aircraft" totals in the Table above. These additional airfield operations will be assessed as part of the cumulative impacts analysis within the EA.

the centerline, the MTR extends laterally, typically four nautical miles (NM) (3.48 statute miles [mi]) to eight NM (6.96 mi) left and right of that center line, although the route may not be laterally symmetrical. That is, it may be wider to one side than the other, often to avoid noise-sensitive or flight hazard areas along one side of the route. The route can also vary in its vertical dimensions. It has both a floor and a ceiling, which can change for each segment of the route. Often these variations also are established to avoid low-level overflight of sensitive or hazardous areas along the route. The route centerline, lateral, and vertical extensions are collectively referred to as an MTR corridor. MTRs currently flown and proposed to be flown by the 452 AMW are depicted on aeronautical charts, and detailed descriptions of these routes are provided in the U.S. Department of Defense (DoD) Flight Information Publication AP/1B. USAF planners try to align routes so that disturbances to people and property are minimized. Flight Information Publication AP/1B contains special operating instructions regarding avoidance of airports, noise-sensitive areas, and some wildlife areas. For example, charted public use airports are avoided laterally by 3 NM or vertically by 1,500 feet above ground level (AGL). IRs and VRs offer flexibility to aircrews in that they can be flown at high airspeeds and are separated from other commercial airspace. IRs may be flown under Instrument Flight Rules (IFR). These routes are operated under FAA-issued waivers to DoD to permit operation of an aircraft below 10,000 feet mean sea level (MSL), in excess of 250 knots indicated airspeed along DoD/FAA mutually developed and published routes. VRs are flown under Visual Flight Rules (VFR) and are operated under a FAA-issued waiver similar to those granted for IRs.

Seven existing MTRs on the West Coast have been identified for use by the C-17 aircraft that would be based at March ARB to support low-altitude flight and navigation training requirements. These are: IRs 214 and 217, and VRs 289, 296, 1217, 1257, and 1265. The following discussion describes FY 02 (or the most current 12-month period) and FY 06 proposed sortie utilization for the airspace included as part of the Proposed Action. As previously mentioned, an aircraft typically uses more than one type of airspace on a single training flight.

Under the Proposed Action, the 452 AMW would fly an estimated 396 sortie-operations on the MTRs annually. The current and proposed utilization of the MTRs are shown in Table 2-4. Details on these routes are provided in Appendix B. Figures 2-6 through 2-8 show the location of these routes.

Figure 2-6. Instrument Routes 214 and 217

Figure 2-7. Visual Routes 289, 296, and 1217

Figure 2-8. Visual Routes 1257 and 1265

Table 2-4. Summary of Current and Proposed Annual Sortie-Operations within the MTRs

MTR	Current			Proposed	
	Sortie-Operations/ Year	452 AMW C-141C Sortie-Operations/ Year	Sortie-Operations/ Year Minus C-141C Aircraft	452 AMW C-17 Sortie-Operations/ Year	Total Sortie-Operations/ Year
IR 214	27	0	27	26	53
IR 217	337	0	337	79	416
VR 289	1,517	220	1,297	27	1,324
VR 296	756	432	324	27	351
VR 1217	3	0	3	79	82
VR 1257	104	0	104	79	183
VR 1265	0	0	0	79	79

As previously discussed, the sortie-operation totals shown in Table 2-4 for each airspace component and training area cannot be added together to produce a total sortie count for the overall Proposed Action. Doing so would erroneously inflate the sortie totals. Sorties are compiled in this manner, by airspace component and training area, because environmental analyses are quantified by each individual airspace component and training area based on the total numbers of sortie operations conducted within that airspace unit.

Assault Landing Zone (ALZ)

As stated in Section 1.3, C-17 aircraft require the use of an Assault Landing Zone (ALZ) for training purposes. There are no ALZs located within 30 minutes flying time of March ARB. As a result, an ALZ would need to be constructed; however, a location for the ALZ has yet to be determined. Due to the lack of availability of complete information, the proposed construction of an ALZ will undergo analysis for decision-making at a later time (40 CFR 1502.22(b)). In this particular case, the basing of the C-17s is ripe for decision, but the decisions to support the proposed construction of an ALZ have not been resolved and are therefore, not ripe for decision at this time. As a result, analyses specific to the proposed ALZ will be presented in a separate NEPA document that will include a cumulative impacts analysis of the entire Proposed Action (32 CFR 989.10).

Drop Zone (DZ)

The Desert Center DZ is currently being used by C-141C, C-130, and C-17 aircraft. This DZ would continue to be used by C-17s under the Proposed Action; however, the utilization of the Desert Center DZ would decrease. As part of the C-17 aircraft training, DZs are used to drop pallets and boxes to simulate cargo drops for humanitarian relief projects and wartime missions. The Desert Center DZ is located in Riverside County in southeastern California, approximately 2.5 miles north of Interstate 10 and 45 miles west of the Arizona border (see Figure 2-9). The geographic coordinates of the center point of the Desert Center DZ are 33°43.5'N 115°16.0'W. The DZ consists of a single, surveyed circular point of impact with one primary attack axis of 290 degrees. The secondary and tertiary attack headings are 172 and 212 degrees. The radius of the DZ is 1,000 yards.

The 452 AMW would continue to use the Desert Center DZ to perform several types of airdrop training with different materials in order to increase and maintain the proficiency of aircrews in preparation for a deployment. It is estimated that aircrews from the 452 AMW would accomplish 192 airdrops annually on the Desert Center DZ. Levels of current and anticipated activity are shown in Table 2-5. Operations at the Desert Center DZ would be conducted during daylight hours only.

Table 2-5. Summary of Current and Proposed Sortie-Operations at Desert Center DZ

Current			Proposed							
			Sorties/Year				Airdrop Passes/Year			
Aircraft Type	**Sorties/ Year**	**Airdrop Passes/Year**	**Day**	**Evening**	**Night**	**Total**	**Day**	**Evening**	**Night**	**Total**
C-141C	150	600	0	0	0	0	0	0	0	0
C-130	18	36	18	0	0	18	36	0	0	36
C-17	6	12	46	17	3	66	134	48	10	192
TOTALS	174	648	59	21	4	84	160	57	11	228

Summary of Special Operating Procedures and Flying Restrictions

AFRC routinely employs a variety of special operating procedures (SOPs) designed to minimize potential impacts on communities and other sensitive noise receptors (e.g., hospitals, schools, churches, and livestock farms) that lie beneath the military airspace that AFRC uses. These SOPs

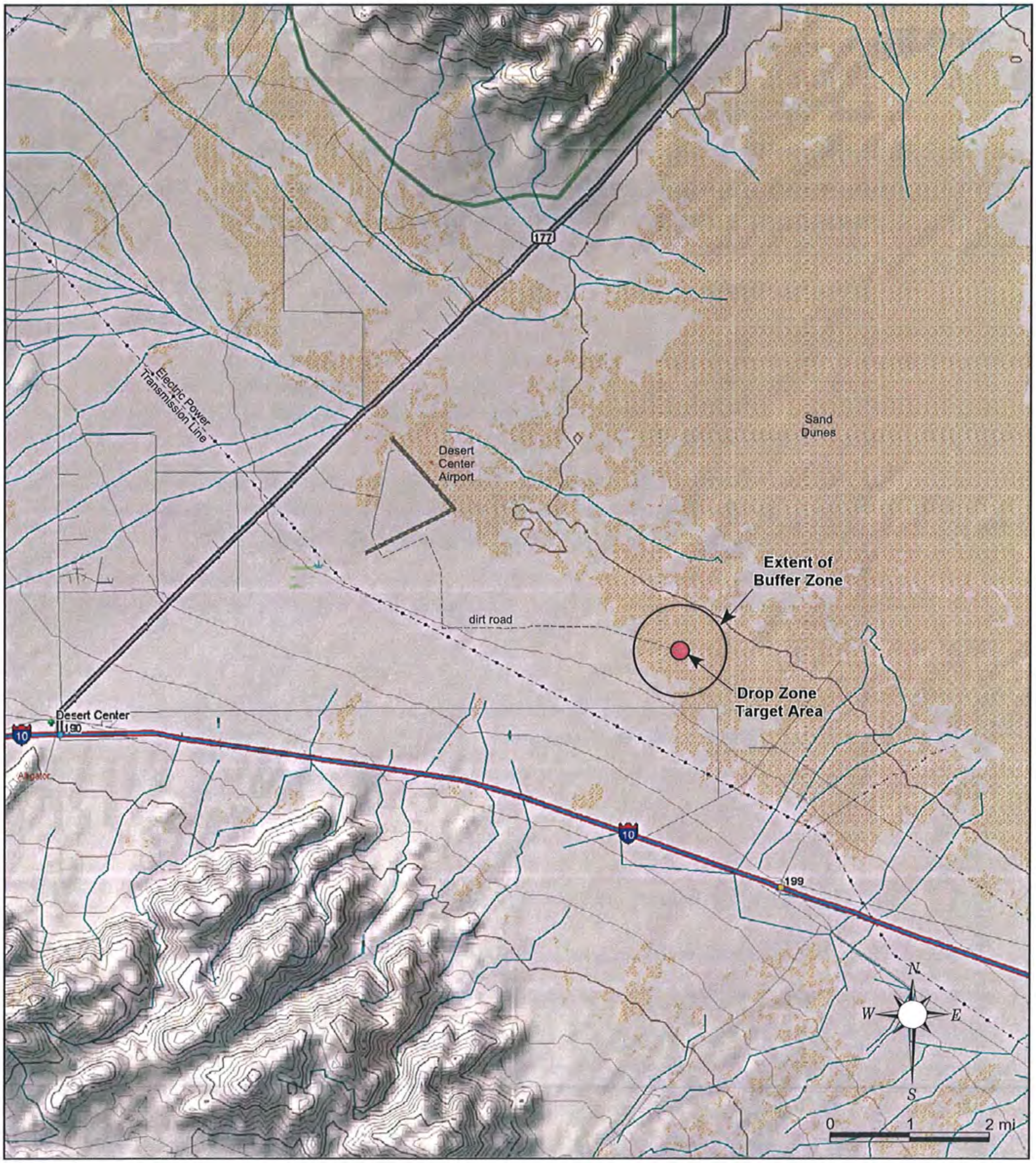


Figure 2-9. Desert Center DZ

are currently being implemented and would apply to any alternative selected for implementation. AFRC implements the following SOPs, where practicable, when operating near areas sensitive to low-altitude flight:

- Avoid sensitive areas under military airspace laterally and/or vertically.
- Avoid sensitive areas around DZs and ALZs laterally and/or vertically.
- Based on AFRC policy, restrict C-17 aircraft to fly no lower than 500 feet AGL unless routes or training areas have been environmentally assessed and surveyed for 300-foot AGL operations.
- Routes should not be planned or flown below 1000 feet AGL within a 2000 feet radius over cities or towns shown as magenta shaded areas on 1:500,000 (Tactical Pilotage Charts) scale charts.
- Routes should not be planned or flown with less than 1 NM separation (3 NMs when in excess of 250 knots indicated airspeed) when below 2000 feet AGL from known sensitive environmental areas.
- Avoid areas known to be populated by potentially sensitive species by increasing separation distances determined through appropriate discussions with Federal and state agencies (consistent with allowances permitted at other locales).

The following are examples of other relevant FAA and military flying restrictions that are applicable to the proposal.

- Avoid structures or persons in isolated areas by 500 feet and maintain a minimum altitude of 1,000 feet over populated areas.
- Avoid charted, uncontrolled airports by at least 1,500 feet vertically when within 3 NM.

2.3 Detailed Description of the No Action Alternative

Under the No Action Alternative, the strategic airlift mission at March ARB would continue until the remaining C-141C aircraft are retired or their useful life is extended. Replacement of these aircraft by C-17 aircraft would not occur. The C-141C aircraft would draw-down as set by the current schedule. The C-141C operations at March ARB would continue flying until FY 06. By that time, the C-141C may no longer be able to be supported with spare parts, and the C-141C fleet at March ARB would be retired. All other missions operating at March ARB would remain. AFRC would support West Coast airlift mission requirements using other AFRC airlift assets. These aircraft would require increased flying time to make up for the lost capability once supported by the C-141C aircraft at March ARB.

2.4 Alternatives Eliminated from Further Consideration

As part of the NEPA process, potential alternatives to the Proposed Action must be evaluated. Two alternatives to the Proposed Action were considered to determine their feasibility as a viable alternative to beddown of C-17 aircraft at March ARB. These alternatives are as follows:

- Conversion to C-130E aircraft
- Conversion to C-5 aircraft

A preliminary and subjective analysis was conducted to aid in determining the feasibility of the alternatives. A detailed discussion of the feasibility of converting the existing C-141C aircraft to the C-130E and the C-5 are presented in Sections 2.4.1 and 2.4.2, respectively.

2.4.1 Conversion to C-130E Aircraft

The C-130 Hercules is one of the USAF's most versatile tactical airlift aircraft. Over 2,000 C-130s have been built since the aircraft first flew in 1954. The C-130E is an extended-range development of the C-130B with large under-wing fuel tanks. The first C-130E was delivered to the USAF in April 1962, and 389 were eventually delivered. There were several modifications to the avionics aboard the aircraft. It can perform a large range of missions, but is primarily used for the tactical portion of the airlift mission. The aircraft is approximately 98 feet long, 38 feet high, and has a wingspan of nearly 133 feet. It is capable of carrying approximately 45,000 pounds of cargo, 92 troops, 64 paratroops, or 74 stretchers. The crew of a C-130E is made up of two pilots, one navigator, one flight engineer, and one loadmaster. There are no C-130E aircraft available in the USAF inventory that could be relocated to March ARB. Therefore, the conversion to C-130E aircraft at March ARB will not be carried forward for further analysis.

2.4.2 Conversion to the C-5 Aircraft

The C-5 Galaxy, with its tremendous payload capability, provides the USAF with inter-theater airlift in support. The aircraft is capable of carrying fully equipped combat-ready military units to any point in the world on short notice and then provide field support required to help sustain the fighting force. The C-5 is one of the largest aircraft in the world. It can carry outsized cargo intercontinental ranges and can takeoff or land in relatively short distances. Nose and aft doors of the C-5 open the full width and height of the cargo compartment to permit faster and easier loading simultaneously at the front and rear of the aircraft. C-5 aircraft are able to take off fully loaded within 8,300 feet (2,530 meters) and land within 4,900 feet (1,493 meters). The C-5 is similar in appearance to the smaller C-141 Starlifter, although the C-5 is much larger. Both aircraft have the distinctive high T-tail, 25-degree wing sweep, and four turbofan engines mounted on pylons beneath the wings. The C-5 Galaxy carries nearly all of the Army's combat equipment, including such bulky items as its 74-ton mobile scissors bridge, from the U.S. to any theater of combat on the globe. A C-5 with a cargo load of 270,000 pounds (122,472 kilograms) can fly 2,150 NMs, offload, and fly to a second base 500 NMs away from the original destination without aerial refueling. There are no C-5 aircraft available in the USAF inventory that could be relocated to March ARB. Therefore, the conversion to C-5 aircraft at March ARB will not be carried forward for further analysis.

2.5 Other Actions Announced for March ARB and the Military Aircraft Training Areas

A cumulative impact, as defined by the CEQ (40 CFR 1508.7), is the "impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of which agency (Federal or non-Federal) or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time." There are other known actions anticipated at March ARB during the same period as the Proposed Action:

- Joint Use of March ARB by commercial aircraft associated with March Joint Powers Authority land transfer activities

Although not an element of this EA's Proposed Action, this action will be assessed cumulatively with the Proposed Action as part of the EA.

2.6 Decision to be Made and Identification of Preferred Alternative

AFRC would make one of the following decisions:

- Implement the Proposed Action
- Not implement the Proposed Action (No Action Alternative)

The Preferred Alternative is the implementation of the Proposed Action as selected by AFRC.

3. Affected Environment

This section describes the environmental and socioeconomic conditions most likely to be affected by the Proposed Action and provides information to serve as a baseline from which to identify and evaluate environmental and socioeconomic changes likely to result from implementation of the Proposed Action. Baseline conditions represent current conditions.

In compliance with NEPA, CEQ guidelines, and 32 CFR Part 989, the description of the affected environment focuses on those resources and conditions potentially subject to impacts. These resources and conditions include airspace management, air quality, noise, land use, safety, geological resources, water resources, biological resources, cultural resources, socioeconomics and environmental justice, infrastructure, and hazardous materials and wastes.

Resource Areas. The term "resource areas" refers to those aspects of the human environment that may be affected by a proposed action. Resource areas are organized into broad groupings of environmental assets, such as water resources or biological resources. Some aspects of the environment reflect conditions imposed by humans. These include land use and hazardous waste sites.

Principal Resource Areas. Analysis of potential environmental effects focuses on those resource areas that are appropriate for consideration in light of a proposed action. All resource areas are initially considered, but some may be eliminated from detailed examination because of their inapplicability to a particular proposal. When detailed analysis within a principal resource area is eliminated, the "Definition of the Resource" will describe the portion of the proposal from which the analysis is excluded and rational for its exclusion. The following discussions identify major aspects of the resources areas and conditions and indicate environmental aspects typically grouped under the major headings.

3.1 Airspace Management

3.1.1 Definition of the Resource

The USAF describes airspace management as the coordination, integration, and regulation of the use of airspace of defined dimensions. The objective of airspace management is to meet military training requirements through the safe and efficient use of available navigable airspace. This is to be accomplished in a peacetime environment, while minimizing the impact on other aviation users and the public (AFI 13-201).

There are two categories of airspace, or airspace areas; regulatory and non-regulatory. Within these two categories, further classifications include controlled, uncontrolled, special use, and airspace for special use. The categories and types of airspace are dictated by:

- The complexity or density of aircraft movement
- The nature of the operations conducted within the airspace
- The level of safety required
- National and public interest in the airspace

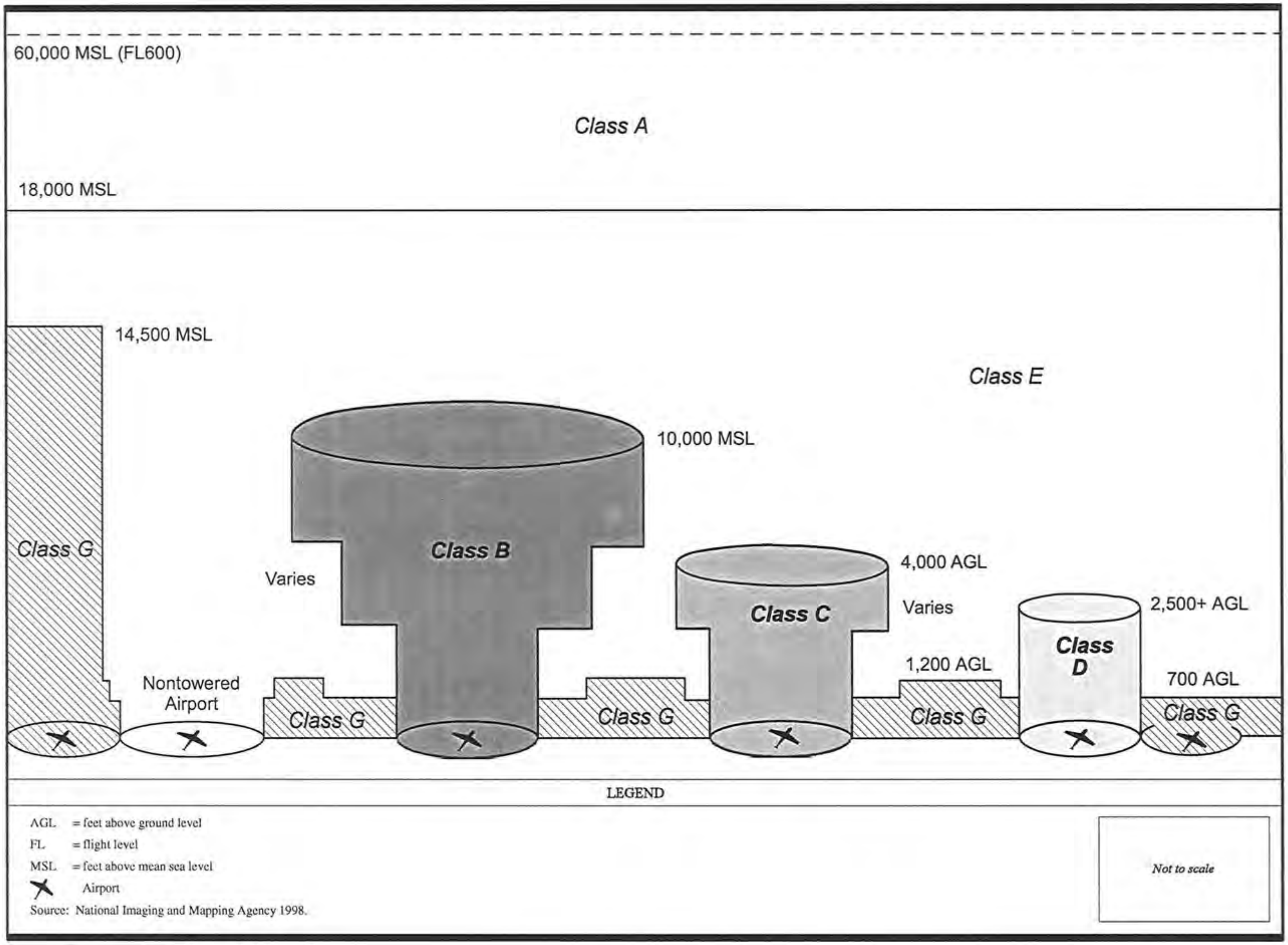
Controlled Airspace. Controlled airspace is a generic term that encompasses the different classifications (Class A, B, C, D, and E) of airspace and defines dimensions within which air traffic control service is provided to flight under instrument meteorological conditions (IMC), and to flights under visual meteorological conditions (VMC) (see Figure 3-1). All military and civilian aircraft are subject to Federal Aviation Regulations (FARs).

Class A Airspace includes all operating altitudes of 18,000 feet MSL and above. Class A airspace is most frequently utilized by commercial aircraft using altitudes between 18,000 and 45,000 feet MSL.

Class B Airspace typically comprises contiguous cylinders of airspace, stacked one upon another and extending from the surface up to 10,000 feet AGL. To operate in Class B airspace, pilots must contact appropriate controlling agencies and receive clearance to enter the airspace. Additionally, aircraft operating within Class B airspace must be equipped with specialized electronics that allow air traffic controllers to accurately track aircraft speed, altitude, and position. Class B airspace is typically associated with major airport complexes, such as Los Angeles International Airport, California.

Class C Airspace can generally be described as controlled airspace that extends from the surface or a given altitude to a specified higher altitude. Class C airspace is designed and implemented to provide additional air traffic control into and out of primary airports where aircraft operations are periodically at high density levels, such as March ARB, California. All aircraft operating within Class C airspace are required to maintain two-way radio communication with local air traffic control (ATC) facilities.

Figure 3-1. Federal Aviation Administration Controlled Airspace Classifications



Class D Airspace encompasses a five-statute-mile radius of an operating ATC-controlled airport. It extends from the ground to 2,500 feet AGL or higher. All aircraft operating within Class D airspace must be in two-way communication with the ATC facility.

Class E Airspace can be described as general controlled airspace. It includes designated Federal airways consisting of the high altitude (J or "Jet" Route) system and low altitude (V or "Victor" Route) system. Federal airways have a width of four statute miles on either wide of the airway centerline, and can be structured between the altitudes of 700 feet AGL and 18,000 feet MSL. These airways frequently intersect approach and departure paths from both military and civilian airfields. Class E airspace may range from ground level at non-towered airfields up to 18,000 feet MSL. The majority of Class E airspace is where more stringent airspace control has not been established.

Uncontrolled Airspace. Uncontrolled airspace (Class G) is not subject to restrictions that apply to controlled airspace. Limits of uncontrolled airspace typically extend from the surface to 700 feet AGL in urban areas, and from the surface to 1,200 feet AGL in rural areas. Uncontrolled airspace can extend above these altitudes to as high as 14,500 feet MSL if no other types of controlled airspace have been assigned. ATC does not have authority to exercise control over aircraft operations within uncontrolled airspace. Primary users of uncontrolled airspace are general aviation aircraft operating under VMC.

Special Use Airspace. Special Use Airspace consists of airspace within which specific activities must be confined, or wherein limitations are imposed on aircraft not participating in those activities. With the exception of Controlled Firing Areas, special use airspace is depicted on aeronautical charts. Chart depictions include hours of operation, altitudes, and the agency controlling the airspace. All special use airspace descriptions are contained in FAA Order 7400.8. Examples of special use airspace in the local flying area of March ARB are restricted areas (R-2501), military operations areas (MOAs) (Turtle MOA), and warning areas (W-291).

Airspace for Special Use. Airspace for Special Use are areas used by military aircraft but do not put restrictions on non-participating aircraft. They are designated as such for informational purposes for general aviation. Examples of airspace for special use are MTRs and air-to-air refueling tracks.

MTRs are flight paths that provide a corridor for low-altitude navigation and training. Low altitude navigation training is important because aircrews may be required to fly at low altitudes for tens or hundreds of miles to avoid detection in combat conditions. To train realistically and safely, the military and the FAA have developed MTRs. This allows the military to train for low-altitude navigation at airspeeds in excess of 250 knots indicated airspeed (KIAS) (approximately 285 miles per hour [mph]). There are two types of MTRs: IRs and VRs. Typical MTRs are from four to 10 NMs wide, and have altitude structures from 100 feet AGL to 5,000 feet MSL or higher. The centerline of MTRs are depicted on aeronautical charts.

The region of influence (ROI) for airspace management includes March ARB, existing MTRs, and the existing Desert Center DZ. The MTR ROI encompasses the centerline, lateral, and vertical confines of the route. The Desert Center DZ ROI encompasses the lateral dimensions of the DZ.

3.1.2 March ARB

March ARB currently provides support for approximately 70,770 annual aircraft operations. Aircraft operations consist of takeoffs, touch-and-gos, and closed pattern flights. Since a pilot performing a touch-and-go or a closed pattern flight essentially performs a landing and a takeoff, touch-and-gos and closed pattern flights are each counted as two operations. Table 3-1 shows current aircraft operations at March ARB.

Table 3-1. Current Aircraft Operations at March ARB

Operations	Current Aircraft Operations/Year			
	C-141C	KC-135R	Other Aircraft	Total March ARB
Annual Arrival/ Departure Operations (LTOs)	3,532	1,676	24,770	29,978
Annual Closed Pattern Operations (TGOs)	22,644	17,828	320	40,792
Total Annual Aircraft Operations	26,176	19,504	25,090	70,770

3.1.3 Training Areas

Desert Center Drop Zone (DZ)

As part of the C-17 training, DZs are used to drop pallets and boxes to simulate cargo drops for humanitarian relief projects and wartime missions. The Proposed Action includes the continued use of Desert Center DZ. Figure 2-9 shows the location of the DZ.

The Desert Center DZ is situated within Riverside County in southeastern California, approximately 2.5 NM north of Interstate Highway 10 and 35 NM west of the Arizona border (see Figure 2-9). The geographical coordinates of the center point of the DZ are 33°43.5'N 115°16.0'W. The DZ consists of a single, surveyed circular point of impact with one primary attack axis of 290 degrees. The secondary and tertiary attack headings are 172 and 212 degrees. The radius of the DZ is 1,000 yards. Levels of current activity are shown in Table 3-2.

Table 3-2. Current Sortie-Operations at Desert Center DZ

Aircraft Type	Sorties/Year	Airdrop, Passes/Year
C-141C	150	600
C-130	18	36
C-17	6	12
Totals	174	648

Military Training Routes (MTRs)

Training requirements associated with the C-17 mission involve the use of MTRs. Seven existing MTRs have been identified to support the requirement for training in low-altitude flight and navigation. These include IRs 214 and 217; VRs 289, 296, 1217, 1257 and 1265. Both VRs and IRs are flown under VMC, but IRs may also be flown under IMC. These routes are operated under FAA-issued waivers to the DoD to permit operation of an aircraft below 10,000 feet MSL in excess of 250 KIAS along DoD/FAA mutually developed and published routes.

Existing MTRs proposed for routine use by the C-17 aircraft overlie portions of California, Nevada, and Arizona. Data used for this analysis was obtained from the DoD Flight Information Publication (FLIP) AP/1B, IFR Enroute Low Altitude – U.S. charts, and Aeronautical Sectional Charts, dated March 21, 2002 to October 31, 2002. The Special Operating Procedures section of FLIP provides notification, operational procedures, and avoidance criteria for noise-sensitive receptors, airfields, environmentally sensitive areas, flight safety considerations, obstructions, and other areas of concern within each MTR.

IR 214. IR 214 originates 11 NM north-northwest of Desert Center DZ, in Riverside County. It proceeds northeast, then north, then southwest to terminate 20 NM west of Parker, AZ in San Bernardino County, CA (see Figure 2-6). Published minimum and maximum altitudes can be found in Appendix B. Table 3-3 shows other airspace in the region (Victor Airways and MTRs) and airports underlying the MTR.

Table 3-3. ROI for IR 214

Route Segment	Victor Airways (With MEA[1])	MTRs	Airports
A-B	V 432 (7,900), V 135 (3,100)	IR 217, IR 250, IR 252, IR 255, VR 1265	
B-C		IR 283, VR 296, VR 299, VR 1220, VR 1267	
C-D		IR 272, IR 283, VR 225, VR 242, VR 1203, VR 1220, VR 1267, VR 1268	
D-E		IR 254, VR 225, VR 1220, VR 1268	
E-F	V 12 (9,900), V 105 (14,000)	IR 254, VR 225, VR 1220, VR 1268	Yolo (Pvt[2])
F-G		VR 1268	
G-H		IR 213, IR 254, VR 1203, VR 1268	
H-I	V 135 (4,100)	IR 213, IR 283, VR 299, VR 1220, VR 1268	Gene Wash (Pvt)

Source: DoD FLIP AP/1B, IFR Enroute Low Altitude – U.S. charts, and Aeronautical Sectional Charts dated July 11, 2002 to October 31, 2002.

Notes: [1] MEAs are the lowest published altitudes that assure acceptable navigational signal coverage and meet obstacle clearance requirements. They apply to the entire width of the airway.
[2] Pvt - Private

IR 217. IR 217 originates eight NM north of Yucca Valley, CA in San Bernardino County. It proceeds northwest, then northeast, then southeast, then southwest to terminate 10 NM southwest of the Salton Sea in Imperial County, CA (see Figure 2-6). Published minimum and maximum altitudes can be found in Appendix B. Table 3-4 shows other airspace in the region (Victor Airways and MTRs) and airports underlying the MTR.

VR 289. VR 289 originates at Goffs, CA, in San Bernardino County. It proceeds southwest, then south, then northwest, then south to terminate nine NM southwest of the Salton Sea in Imperial County, CA (see Figure 2-7). Published minimum and maximum altitudes can be found in Appendix B. Table 3-5 shows other airspace in the region (Victor Airways and MTRs) and airports underlying the MTR.

Table 3-4. ROI for IR 217

Route Segment	Victor Airways (With MEA[1])	MTRs	Airports
A-B	V 386, V 8-21 (7,500), V283-587 (7,500), V 12 (9,800), V 442, V 210 (6,700)	IR 212, IR 213, VR 1217, VR 1218	
B-C	V 8-21 (7,500), V 283-587 (7,500), V 12 (9,800), V 442, V 210 (6,700)	IR 212, IR 213, VR 1217, VR 1265	
C-D	V 21-283 (10,600), V 587, V 135 (12,600)	IR 213, VR 1218, VR 1225,VR 1265	
D-E	V 587, V 135 (12,600), V 8-514, V 538 (5,700)	IR 213	Hart Mine (Pvt[2])
E-F	V 8-514, V 210 (8,500)	IR 213, VR 1265	
F-G	V 135, V 12 (9,800), V 442, V 208	IR 252, VR 1225, VR 1265	
G-H	V 264 (5,400), V 432 (7,900)	IR 214, IR 248, IR 255, VR 1265	Iron Mountain (Pvt)
H-I	V 16-372 (8,500), V 64 (7,000), V 460	IR 216, IR 218, IR 248, VR 296, VR 1266	Desert Center
I-J	V 137, V 460	IR 288, VR 289	Desert Air (Pvt)
J-K		IR 288, VR 289	Salton Sea, Ocotillo

Source: DoD FLIP AP/1B, IFR Enroute Low Altitude – U.S. charts, and Aeronautical Sectional Charts dated July 11, 2002.

Notes: [1] MEAs are the lowest published altitudes that assure acceptable navigational signal coverage and meet obstacle clearance requirements. They apply to the entire width of the airway.
[2] Pvt - Private

Table 3-5. ROI for VR 289

Route Segment	Victor Airways (With MEA[1])	MTRs	Airports
A-B	V 514-538	IR 252, VR 222, VR 296	
B-C	V 12 (9,800), V 442, V 514-538	IR 250, VR 1218	Cadiz (Pvt[2])
C-D	V 514-538, V 208 (7,500)	IR 216, VR 1265	Cadiz (Pvt)
D-E	V 264 (5,400), V 432 (7,900)	IR 214, IR 216, VR 1265	
E-F	V 432 (7,900), V 16-372	IR 216, VR 1265	Julian Hinds (Pvt)
F-G	V 64 (7,000)	IR 217, IR 218, VR 288, VR 296, VR 1266	Julian Hinds (Pvt), Chiriaco Summit
G-H	V 137, V 460, V 64 (7,000)	VR 1257	Desert Air (Pvt), Desert Resorts Regional
H-I	V 137, V 460	IR 217, VR 288, VR 1257	Salton Sea, Ocotillo
I-J		VR 1257, VR 1266	

Source: DoD FLIP AP/1B, IFR Enroute Low Altitude – U.S. charts, and Aeronautical Sectional Charts dated July 11, 2002.

Notes: [1] MEAs are the lowest published altitudes that assure acceptable navigational signal coverage and meet obstacle clearance requirements. They apply to the entire width of the airway.
[2] Pvt - Private

VR 296. VR 296 originates at Goffs, CA, in San Bernardino County. It proceeds south, then southeast, then southwest, then northwest, then south to terminate six NM south of the Salton Sea in Imperial County, CA (see Figure 2-7). Published minimum and maximum altitudes can be found in Appendix B. Table 3-6 shows other airspace in the region (Victor Airways and MTRs) and airports underlying the MTR.

VR 1217. VR 1217 originates 10 NM south of Victorville, CA, in San Bernardino County. It proceeds east, then northeast, then northwest to terminate 10 NM north of Barstow, CA, in San Bernardino County (see Figure 2-7). Published minimum and maximum altitudes can be found in Appendix B. Table 3-7 shows other airspace in the region (Victor Airways and MTRs) and airports underlying the MTR.

Table 3-6. ROI for VR 296

Route Segment	Victor Airways (With MEA[1])	MTRs	Airports
A-B	V 12 (9,800), V 442, V 208 (7,500)	IR 217, IR 250, IR 252, VR 222, VR 289, VR 1265	Camino (Pvt[2])
B-C	V 264 (5,400), V 135 (4,100) V 442, V 432 (7,900), V 135 (3,100)	IR 214	
C-D	V 135 (3,100)	IR 213, IR 214, VR 299, VR 1266, VR 1268	
D-E	V 94, V 135 (5,000)	VR 299	Quail Mesa (Pvt), Blythe
E-F	V 135 (5,000), V 460, V 16-372 (8,500)	IR 214, IR 217, IR 218, VR 289, VR 1266, VR 1267	Desert Center
F-G	V 16-372 (8,500)	IR 216	Desert Center, Julian Hinds (Pvt)
G-H	V 64 (7,000), V 460	IR 218, VR 289	Julian Hinds (Pvt), Chiriaco Summit
H-I	V 137	VR 299	
I-J	V 137	VR 1211	
J-K	V 137	VR 288, VR 289, VR 1211	

Source: DoD FLIP AP/1B, IFR Enroute Low Altitude – U.S. charts, and Aeronautical Sectional Charts dated July 11, 2002.

Notes: [1] MEAs are the lowest published altitudes that assure acceptable navigational signal coverage and meet obstacle clearance requirements. They apply to the entire width of the airway.
[2] Pvt - Private

Table 3-7. ROI for VR 1217

Route Segment	Victor Airways (With MEA[1])	MTRs	Airports
A-B	V 137, V 442, V 8-21 (7,500), V 283-587	VR 1218, VR 1257, VR 1265	
B-C	V 386, V 8-21 (7,500, V 283-587, V 442, V 210, V 12 (9,800)	IR 212, IR 213, IR 217, VR 1218, VR 1257	
C-D	V 12 (9,800), V 442, V 21-283 (10,600)	IR 212, IR 213, IR 217, VR 1218, VR 1265	
D-E	V 21-283 (10,600), V 587, V 394 (9,600), V 210	IR 212, IR 213, IR 217, VR 1214, VR 1215, VR 1218, VR 1265	Harvard (Pvt[2])
E-F		VR 1218	

Source: DoD FLIP AP/1B, IFR Enroute Low Altitude – U.S. charts, and Aeronautical Sectional Charts dated July 11, 2002.

Note: [1]MEAs are the lowest published altitudes that assure acceptable navigational signal coverage and meet obstacle clearance requirements. They apply to the entire width of the airway.
[2]Pvt - Private

VR 1257. VR 1257 originates two NM west of Lucia, CA, in Monterey County. It proceeds east, then southeast, then southwest, then south, then east to terminate 11 NM southwest of the Salton Sea in Imperial County, CA (see Figure 2-8). Published minimum and maximum altitudes can be found in Appendix B. Table 3-8 shows other airspace in the region (Victor Airways and MTRs) and airports underlying the MTR.

Table 3-8. ROI for VR 1257

Route Segment	Victor Airways (With MEA[1])	MTRs	Airports
A-B	V 27	VR 249	
B-C	V 25 (7,600)	IR 203	
C-D	V 248, V 137 (5,500), V 485, V 113 (3,500)		
D-E	V 137 (5,500), V 485, V 113 (3,500), V 248, V 107 (9,400)	IR 203, VR 1262, VR 1256	
E-F	V 107 (9,400), V 163 (6,700)	VR 1256	
F-G	V 107 (9,400), V 137 (7,500), V 23 (4200)	IR 211, VR 1265	
G-H	V 165	IR 200, IR 425, VR 1206, VR 1293	
H-I	V 137 (4,100), V 12 (8,500)		
I-J	V 386 (4,400), V 518, V 201 (4,600)	VR 1265	
J-K	V 197 (3,600), V 137 (9,300), V 210, V 394 (8,000), V 442	VR 1265	
K-L	V 442, V 8-21 (7,500), V 283-587	VR 1214, VR 1217	
L-M	V 386, V 264 (10,100)		
M-N	V 386, V 370 (3,600), V 16-372 (8,500)		
N-O	V 208-514 (3,500), V 432 (7,900)		
O-P	V 64 (7,000), V 460, V-137, V 208-514 (3,600)	IR 217, VR 289, VR 1266	
P-Q	V 208-514 (3,600), V 460, V 458	VR 1266	
Q-R	V 458	VR 288, VR 289, VR 1266	Hunts (Pvt[2])

Source: DoD FLIP AP/1B, IFR Enroute Low Altitude – U.S. charts, and Aeronautical Sectional Charts dated July 11, 2002.

Notes: [1] MEAs are the lowest published altitudes that assure acceptable navigational signal coverage and meet obstacle clearance requirements. They apply to the entire width of the airway.
[2] Pvt - Private

VR 1265. VR 1265 originates 22 NM northeast of Santa Barbara, CA, in Ventura County. It proceeds east, then southeast, then northeast, then southeast, then southwest, then southeast to terminate 20 NM southwest of Blythe, CA, in Imperial County (see Figure 2-8). Published minimum and maximum altitudes can be found in Appendix B. Table 3-9 shows other airspace in the region (Victor Airways and MTRs) and airports underlying the MTR.

Table 3-9. ROI for VR 1265

Route Segment	Victor Airways (With MEA[1])	MTRs	Airports
A-B	V 107 (9,400), V 299 (2,700), V 23 (5,600), V 137 (4,100)	IR 211	Quail Lake (Pvt[2])
B-C	V 137 (4,100), V 165	IR 211, VR 232, VR 1206, VR 1257, VR 1262	Quail Lake (Pvt)
C-D	V 165, V 12 (8,500), V 386 (4,400), V 137 (4,100)	IR 200, IR 425, VR 1217, VR 1257	
D-E	V 386 (4,400), V 518, V 201 (4,600), V 197 (3,600)	VR 1257	
E-F	V 197 (3,600), V 137 (9,300), V 210, V 394 (8,000), V 442	VR 1217, VR 1218, VR 1257	
F-G	V 442, V 8-21 (7,500), V 283-587	VR 1217, VR 1218, VR 1257	Rabbit (Pvt)
G-H	V 386, V 442, V 210, V 8-21 (7,500), V 283-587	IR 212, IR 213, IR 217, VR 1214, VR 1215, VR 1218	
H-I	V 21-283 (10,600), V8-120 (6,700)	IR 212, IR 213, IR 217, VR 1217, VR 1218	
I-J	V 8-210 (6,700), V 135 (12,600), V 21-283 (10,600), V 587	IR 212, IR 213, IR 217, IR 252, VR 222, VR 1218, VR 1225	
J-K	V 135 (12,600), V 538 (5,700), V 8-514, V 210 (8,500), V 133 (4,100)	IR 213, IR 217, VR 222	Hart Mine (Pvt)
K-L	V 135, V 442, V 12 (9,800), V 514-538, V 208 (7,500)	IR 216, IR 217, IR 250, IR 252, VR 289, VR 296, VR 1225	Camino (Pvt)
L-M	V 264 (5,400), V 432 (7,900)	IR 214, IR 216, IR 217, IR 248, VR 289	
M-N	V 16-372 (8,500), V 64 (7,000), V 460	IR 217, IR 218, IR 252, VR 1267, VR 1268	

Source: DoD FLIP AP/1B, IFR Enroute Low Altitude – U.S. charts, and Aeronautical Sectional Charts dated March 21, 2002 to July 11, 2002.

Notes: [1] MEAs are the lowest published altitudes that assure acceptable navigational signal coverage and meet obstacle clearance requirements. They apply to the entire width of the airway.
[2] Pvt - Private

3.2 Noise

3.2.1 Definition of the Resource

Physically, there is no distinction between sound and noise. Sound is a sensory perception and the complex pattern of sound waves is labeled noise, music, speech, etc. Thus, noise is defined as any sound that is undesirable because it interferes with communication, is intense enough to damage hearing, or is otherwise annoying. Human response to noise varies according to the source type, characteristics of the noise source, distance between source and receptor, receptor sensitivity, and time of day.

Sound is measured with instruments that record instantaneous sound levels in decibels (dB). A-weighted sound level measurements (dBA) are used to characterize sound levels that can be sensed by the human ear. "A-weighted" denotes the adjustment of the frequency content of a noise event to represent the way in which the average human ear responds to the noise event. All sound levels analyzed in this EA are A-weighted; thus, the term dB implies dBA unless otherwise noted.

In this EA, single-event noise such as an overflight is described by the sound exposure level (SEL). Noise levels, resulting from multiple single-events, are used to characterize community noise effects from aircraft or airfield environment, and are measured in Day-Night Average A-weighted Sound Level (DNL). In the State of California, the standard for the evaluation of community noise effects from aircraft is the Community Noise Equivalent Level (CNEL). Aircraft operations in military airspaces (i.e., DZ and MTRs) generate a noise environment somewhat different from community noise environments around airfields. Overflights are sporadic, occurring at random times and varying from day to day and week to week. Individual military overflight events also differ from typical community noise events, meaning noise from a low-altitude high-airspeed flyover can have a rather sudden onset. To represent these differences, the conventional DNL metric is adjusted to account for the "surprise" effect of the sudden onset of aircraft noise events on humans (Plotkin et al.1987; Stusnick et al. 1992; Stusnick et al. 1993). Thus, onset rate adjusted for monthly day-night average A-weighted sound level (L_{dnmr}) is used for areas underlying the airspace. SEL, DNL, CNEL, and L_{dnmr} employ A-weighted sound levels. A general discussion of these metrics is provided below and a more thorough explanation is provided in Appendix C.

Sound Exposure Level. The SEL measurement describes a noise event such as an aircraft overflight, comprising a period of time when an aircraft is approaching a receptor and noise levels are increasing; the instant when the aircraft is closest to the receptor and the maximum noise level is experienced; and the period of time when the aircraft moves away from the receptor resulting in decreased noise levels. SEL is a measure that accounts for both loudness and duration of a noise event.

The SEL metric incorporates a single event, which is useful when calculating aircraft flyovers. Frequency, magnitude, and duration vary according to aircraft type, engine type, and power setting. Therefore, individual aircraft noise data are collected for various types of aircraft and engines at different power settings at various phases of flight. These values form the basis for the individual-event noise descriptors at any location, and are adjusted to the location by applying appropriate corrections for temperature, humidity, altitude, and variations from standard aircraft operating profiles and power settings. Table 3-10 provides SEL values at various altitudes for C-141C, C-17, and KC-135R aircraft operating directly overhead at various speeds and power settings depending on aircraft type (values in the table represent averages).

Table 3-10. SEL dB Values for C-141C, C-17, and KC-135R Aircraft

Altitude	C-141C [1]	C-17 [1]	KC-135R [1]
200	115.4	109.8	102.2
500	108.3	102.1	95.8
1,000	102.1	95.1	90.6
2,000	94.9	87.1	84.9
3,150	89.8	81.8	80.7
5,000	84.8	76.5	76.1

[1] Based on steady, level flight and using Omega 108 aircraft profile data from actual overflight noise measurements. Omega 108 is a stand-alone DoD noise modeling program that allows the user to retrieve data from the NOISEMAP database.

Day-Night Average A-weighted Sound Level. Both DNL and L_{dnmr} noise metrics incorporate a "penalty" for evening and nighttime noise events to account for increased annoyance. DNL is the energy-averaged sound level measured over a 24-hour period, with a 10 dB penalty assigned to noise events occurring between 10:00 p.m. and 7:00 a.m. DNL values are obtained by averaging SEL values for a given 24–hour period. DNL is the preferred noise metric of HUD, FAA, USEPA, and DoD for modeling airport environs.

Community Noise Equivalent Level (CNEL). The definition of CNEL is similar to DNL except that the daytime hours are defined from 7:00 a.m. to 7:00 p.m. and evening hours are introduced and defined from 7:00 p.m. to 10 p.m., with a five decibel adjustment added to those noise events which occur during the evening hours. The nighttime hours, 10:00 p.m. to 7:00 a.m., adjustment of 10 dB is identical to that of DNL.

Onset Rate Adjusted Day-Night Average Sound Level. Aircraft operations along MTRs generate noise levels different from airport noise environments. Aircraft operations at airfields tend to be continuous or patterned, while sortie-operations in airspace are sporadic. Noise from military overflights also differs from airport noise because of the low-altitude and high-speed characteristics of military aircraft maneuvers. Military aircraft can exhibit a rate of increase in sound level (onset rate) of more than 150 dB per second. The DNL metric, or 24-hour average, is adjusted to account for the surprise, or startle, effect of the onset rate of aircraft noise on humans with an adjustment of up to 11 dB added to the normal SEL. The adjusted DNL averaged over a one-month period is designated as L_{dnmr}. L_{dnmr} is a much better metric for airspace analysis because it is based on a monthly, not daily, average, as aircraft do not fly in the same airspace every day.

Most people are exposed to sound levels of 50 to 55 dB DNL or higher on a daily basis. Studies specifically conducted to determine noise impacts on various human activities show that about 90 percent of the population is not significantly bothered by outdoor sound levels below 65 dB DNL (USDOT 1980).

Studies of community annoyance in response to numerous types of environmental noise show that DNL and CNEL correlate well with impact assessments and that there is a consistent relationship between DNL and CNEL and the level of annoyance. The "Schultz Curve" (discussed in Appendix C) shows the relationship between DNL noise levels and the percentage of the population predicted to be highly annoyed. This same relationship can be applied to L_{dnmr} noise levels, since L_{dnmr} is always equal to or greater than DNL for a given condition.

Noise Criteria and Regulations. Federal and local governments have established noise guidelines and regulations for the purpose of protecting citizens from potential hearing damage and from various other adverse physiological, psychological, and social effects associated with noise. The following paragraphs describe the guidelines and regulations that are relevant to the project.

According to USAF, FAA, and HUD criteria, residential units and other noise-sensitive land uses are "clearly unacceptable" in areas where the noise exposure exceeds a DNL of 75 dBA; "normally unacceptable" in regions exposed to noise between the DNL of 65 to 75 dBA; and "normally acceptable" in areas exposed to noise where the DNL is 65 dBA or less. FICON developed land-use compatibility guidelines for noise in terms of DNL (USDOT 1980). DNL is the metric used by the AF in determining noise impacts of military airfield operations for land use planning. AF land use compatibility guidelines (relative to DNL values) are documented in the AICUZ Program Handbook (USAF 1999). Five noise zones are used in AICUZ studies to identify noise impacts from aircraft operations. These noise zones range from a DNL of 65 dBA to a DNL of 80 dBA and above. For example, it is recommended that no residential uses, such as homes, multifamily dwellings, dormitories, hotels, and mobile home parks, be located where the noise is expected to exceed a DNL of 65 dBA. If sensitive structures are located in areas within a DNL range of 65 to 75 dBA, noise sensitive structures should be designed to achieve a 25 to 30 dBA interior noise reduction. Some commercial and industrial uses are considered acceptable where the noise level exceeds DNL of 65 dBA. For outdoor activities, the USEPA recommends DNL of 55 dBA as the sound level below which there is no reason to suspect that the general population will be at risk from any of the effects of noise (USEPA 1974).

Because of the unique noise environment generated by aircraft operations on MTRs, the USAF recommended evaluation of the potential annoyance response in terms of L_{dnmr}. The AF also recommended that L_{dnmr} values along MTRs be applied to the same interpretive criteria as DNL values in other circumstances.

3.2.2 March ARB

Construction Program. Building construction, modification, and demolition work can cause considerable noise emissions. A variety of sounds come from cranes, cement mixers, welding, hammering, boring, and other work processes. Construction equipment and building operations are often poorly silenced, but quickly become a part of the ambient noise levels heard everyday.

The eight proposed construction, modification, and removal projects detailed in Section 2.2.2 would generate the types of sounds listed in the above paragraph. These activities would occur intermittently between FY 04 and FY 06.

Aircraft Operations. Projected noise impacts were analyzed using results from DoD approved noise models in the vicinity of March ARB. NOISEMAP has a specific database for military helicopters and fixed-wing type aircraft, including C-141C, C-17, and KC-135R aircraft (USAF 1990).

Based on data from the current air emissions inventory, March ARB currently provides support for approximately 70,770 annual aircraft operations (see Section 2.2.3), of which 26,176 are C-141C aircraft operations, 19,504 are KC-135R aircraft operations, and none are C-17 aircraft operations. The most recent noise contour analysis presented the *1998 Air Installation Compatible Use Zone (AICUZ) Study for March ARB, California* will be used as the baseline for noise analysis in this EA (MARB 1998a). Table 3-11 shows the 1997 average busy day and annual operations by aircraft type from the 1998 AICUZ Study. Table 3-12 lists the total on and off installation noise exposure for the four noise zones depicted in Figure 3-2. Figure 3-2 presents the baseline CNEL noise levels from 65 to 80 dBA, in 5 dBA, increments surrounding March ARB.

No sensitive noise receptor sites were identified in the 1998 AICUZ Study. For this analysis, MapPoint software was used to identify sensitive noise receptor sites within a 5-mile radius of March ARB (MapPoint 2001). A total of 36 sensitive noise receptors were identified including 31 schools and five hospitals. Table 3-13 provides the location, distance from March ARB, and the CNEL level for the five closest noise receptor sites in relation to March ARB. The closest site to March ARB is Serrano Elementary School, 0.75 miles to the northeast, which falls within the 65 dBA CNEL noise contour. All sites experience noise levels less 50 dBA CNEL.

Table 3-11. Average Busy Day Aircraft Operations for 1997

Aircraft	Daily Arrival + Departure Operations [1]	Daily Closed Pattern Operations [2]	Total Daily Operations	Total Annual Operations
BASED:				
C-141C	6.84	18.60	44.04	11,450
KC-135	14.88	40.62	96.12	24,990
F-16	4.60	1.08	6.76	1,758
TRANSIENT:				
Attack/Fighter	1.50	0.00	1.50	390
Large Jet Cargo/Tanker	2.50	0.00	2.50	650
Medium Jet	0.20	0.00	0.20	52
Large Turboprop	1.10	0.00	1.10	286
Small Jet Passenger	0.10	0.00	0.10	144
Small Turboprop	0.50	0.00	0.50	130
Trainers	0.30	0.00	0.30	78
Helicopters	1.00	0.00	1.00	260
MILITARY RELATED CIVIL:				
Large Jets	0.50	0.00	0.50	130
Medium Jets	0.20	0.00	0.20	52
Business Jets	0.10	0.00	0.10	26
subtotal				**80,584**
CIVIL FORECAST:				
Cessna Caravan	1.151	0.00	1.151	420
E210	1.151	0.00	1.151	420
ATR 42	1.726	0.00	1.726	630
727-200	2.877	0.00	2.877	1,050
DC-8	8.055	0.00	8.055	2,940
DC-10	2.301	0.00	2.301	840
B-757	7.479	0.00	7.479	2,730
A310	11.507	0.00	11.507	4,200
747-200/300/400	1.151	0.00	1.151	420
DC-10-30/40	1.726	0.00	1.726	630
767-200	18.411	0.00	18.411	6,720
subtotal				**21,000**
			TOTAL	**101,584**

Notes: Does not include Customs and Aeroclub operations that do not contribute significantly to aircraft noise levels.

[1] Averages based on 260 flying days per year for military operations and 365 days per year for forecast civil operations.

[2] An operation is one takeoff/departure or one landing/arrival. A closed pattern consists of two operations, one takeoff and one landing.

Table 3-12. Acres within the 1998 Noise Zones

CNEL Noise Zone	Acres
65–69	2,450
70–74	1,186
75–79	486
80+	347
Total	**4,469**

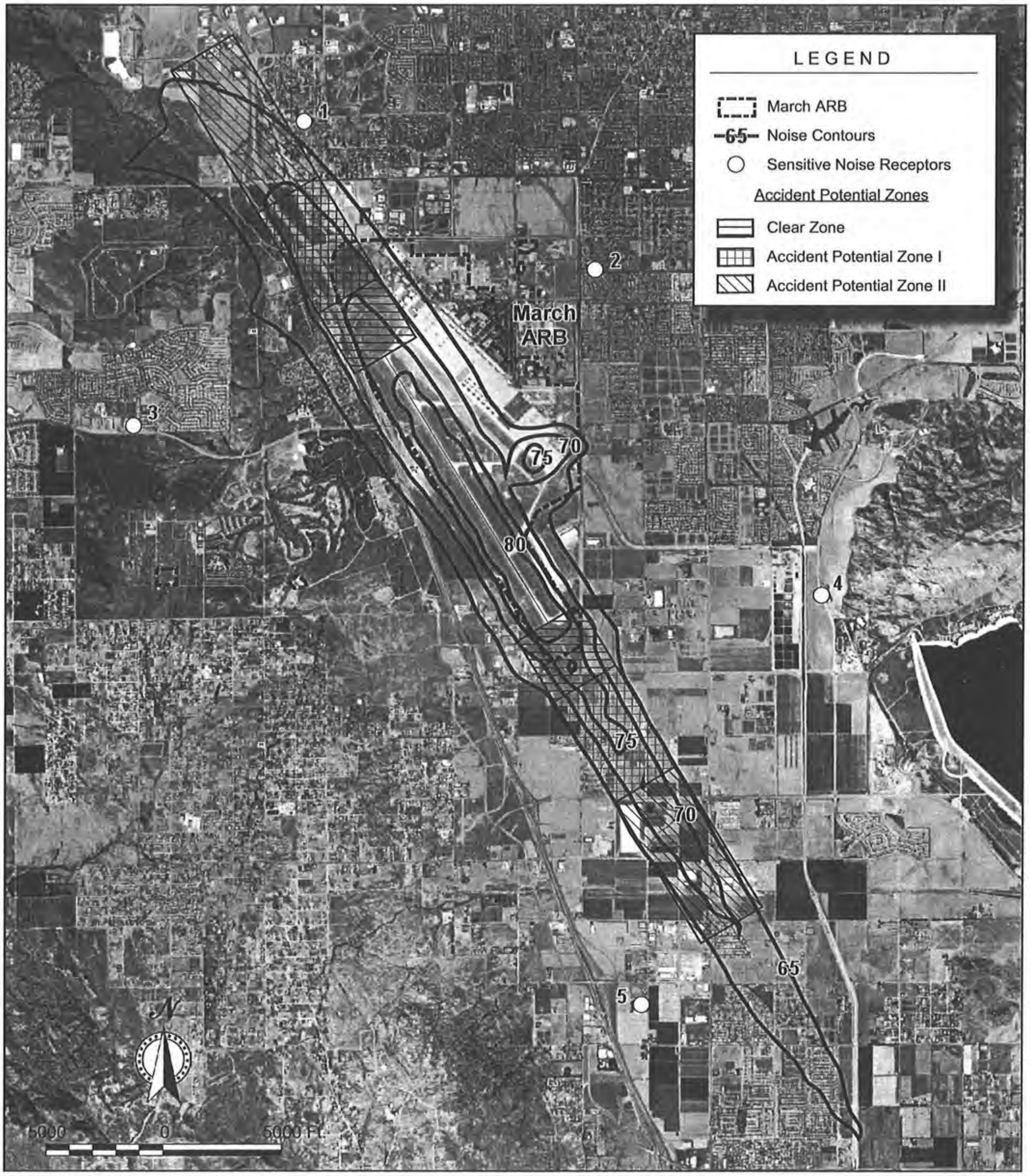


Figure 3-2. Existing Noise Contours at March ARB

Table 3-13. Sensitive Noise Locations in Proximity to March ARB

Sensitive Noise Receptor Sites	Site Location	Distance from March ARB (miles)	Existing Noise Level (CNEL)
Edgemont Elementary School	21790 Eucalyptus Avenue Moreno Valley, CA 92553	1.58	48 dBA
Serrano Elementary School	24100 Delphinium Avenue Moreno Valley, CA 92553	0.75	47 dBA
Rivera Elementary School	20440 Red Poppy Lane Riverside, CA 92508	1.94	<45 dBA
Rancho Verde High School	17750 Lasselle Street Moreno Valley, CA 92551	1.98	<45 dBA
Val Verde Elementary School	2656 Indian Street Perris, CA 92571	2.73	<45 dBA

3.2.3 Training Areas

Desert Center DZ

As discussed in Section 2.2.3, the Desert Center DZ has been fully assessed for C-141C, C-130, and C-17 aircraft use in previous EAs. Table 2-6 depicts the number of current and assessed operations for the DZ by aircraft type, which were used to develop the noise levels for the Desert Center DZ.

MTRs

Section 2.2.3 describes the seven MTRs, which have been identified to support the C-17 mission requirement for training in low-altitude flight and navigation. Noise levels resulting from aircraft operating within the affected MTRs were calculated with the USAF noise modeling program Military Operating Area and Range Noise Model (MRNMAP) (Lucas and Calamia 1996). Resultant noise levels were based on the number of sortie-operations, time of day the sortie-operations occurred, altitudes of the aircraft during the sortie-operations, engine power setting, and airspeed. The baseline noise assessment included all previously assessed aircraft shown in Table 2-4. The sortie-operations in Table 2-4 were used to develop the noise levels for each MTR.

3.3 Land Use

3.3.1 Definition of the Resource

The term "land use" refers to real property classifications that indicate either natural conditions or the types of human activity occurring on a parcel. In many cases, land use descriptions are codified in local zoning laws. There is, however, no nationally recognized convention or uniform terminology for describing land use categories. As a result, the meanings of various land use descriptions, "labels," and definitions vary among jurisdictions.

Natural conditions of property can be described or categorized as unimproved, undeveloped, conservation or preservation area, and natural or scenic area. There is a wide variety of land use categories resulting from human activity. Descriptive terms often used include residential, commercial, industrial, agricultural, institutional, and recreational.

Two main objectives of land use planning are to ensure orderly growth and compatible uses among adjacent property parcels or areas. Compatibility among land uses fosters the societal interest of obtaining the highest and best uses of real property. Tools supporting land use planning include written master plans/management plans and zoning regulations. In appropriate cases, the locations and extent of proposed actions need to be evaluated for their potential effects on project site and adjacent land uses. The foremost factor affecting a proposed action in terms of land use is its compliance with any applicable land use or zoning regulations. Other relevant factors include matters such as existing land use at the project site, the types of land uses on adjacent properties and their proximity to a proposed action, the duration of a proposed activity, and its "permanence."

In the context of aircraft operations, land use compatibility is also described in the context of noise levels. As described above in Section 3.2, an L_{dn} of 65 dB is useful to recognize as a level that, when exceeded, is normally not compatible with residential land use.

The proposed utilization of existing DZs and MTRs would not require construction or ground disturbance. In addition, the utilization of the Desert Center DZ was fully assessed in an EA entitled, *Environmental Assessment of the Desert Center Drop Zone for the 452nd Air Mobility Wing*. Therefore, the description of the affected environment for land use will be limited to March ARB and the surrounding area. Graphics are provided, however, for the federally-owned lands crossed by the MTRs.

3.3.2 March ARB

March ARB is located in Southern California, approximately 70 miles east of downtown Los Angeles and 100 miles north of San Diego. March ARB lies within western Riverside County, one of the largest counties in California. The County is composed of 7,214 square miles and extends from the Arizona border to within 10 miles of the Pacific Ocean. The total population of Riverside County exceeds 1.5 million people. From 1983 to 1993, the County population grew at an average rate of 7.29 percent annually (USDOC 1995). The average population density in Riverside County is approximately 183 persons per square mile, although the eastern portion of the County is more rural and less developed than the western portion.

In addition to being the County seat, the City of Riverside is the largest city in Riverside County and has a population of approximately 238,000 persons. Population and economic growth in Riverside County is influenced by its proximity to the greater Los Angeles metropolitan area, which serves as the economic and population center for Southern California. The Los Angeles area is west of March ARB, has a population of more than 10 million people, and is home to 38 percent of the state's residents (USDOC 1995). Figure 1-1 shows the location of March ARB in relation to California and the surrounding region.

March ARB comprises approximately 2,258 acres of U.S. Government-owned and easement land, and is surrounded by the City of Riverside to the northwest, the City of Moreno Valley to the north and east, and the City of Perris to the south. Unincorporated areas of Riverside County lie to the west of the Base. The area immediately surrounding March ARB consists of residential, commercial, and light industrial development.

Interstate 215 runs north-south along the western boundary of the main cantonment area, and separates a small arms firing range, an antenna farm, and a portion of the northern clear zone from the remainder of the Base. The Base has two active runways, Runway 14-32, which is 300 feet wide by 13,300 feet long, and Runway 12-30, which is 150 feet wide by 6,900 feet long. Both runways are oriented approximately northwest to southeast and are generally parallel to Interstate 215. A series of taxiways extending from the flightline parking apron provide access to the runways.

The activities and operations at March ARB are grouped by functional areas and land use categories, including aviation support, residential, commercial, industrial, institutional, administrative, public facilities/recreation, and vacant land. The two primary land use categories are aviation support and industrial activities, which account for more than 50 percent of all facilities and square footage on Base. Existing land uses are shown in Figure 3-3.

Surrounding Land Use. The region around March ARB is rapidly changing from one dominated by agriculture to one used for a mixture of residential, commercial, industrial, and agricultural activities. The City of Riverside is continuing to develop gradually. The cities of Moreno Valley and Perris and the western portion of Riverside County have grown rapidly during the past decade. Land use in the vicinity of the base is zoned for industrial, commercial, residential, and public uses (see Figure 3-4). Existing land use in the vicinity of the base is compatible with military uses; however, there are a few isolated areas that are incompatible with aircraft noise or accident potential (AFRES 1995).

The City of Riverside is composed of a variety of land uses. Land uses in the southeastern section of the City, primarily residential and commercial, are subject to 65 to 70 dB noise levels. Some areas north and west of the base are zoned for residential use and are subject to 60 to 70 dB noise levels (AFRES 1995).

Land use in the City of Moreno Valley, located north and east of March ARB, is predominantly residential and commercial. The area adjacent to the northern base boundary and Alessandro Boulevard is primarily agricultural and vacant land, with some industrial activity. Adjacent to the eastern edge of the base, land is used for residential, commercial, and agricultural activities. Two areas in the City of Moreno Valley, subject to aircraft noise levels between 65 and 75 dB, are located north of the base and adjacent to I-215 on the eastern border of the base. An area north of the base is zoned residential and is subject to 65 to 70 dB aircraft noise levels (AFRES 1995).

The City of Perris is located south of the base. The City consists of residential, commercial, and industrial areas. Adjacent lands are zoned for a mixture of residential, commercial, and industrial purposes. South of the base, within Accident Potential Zone (APZ) II, several mobile homes are subject to 65 to 80 dB noise levels (AFRES 1995).

Natural Areas in Proximity to the Installation. March ARB lies near a number of state parks and national forests, including Mount San Jacinto State Park and Wilderness Area, San Jacinto Wildlife Area, Lake Perris State Recreational Area, San Bernardino National Forest, and Cleveland National Forest.

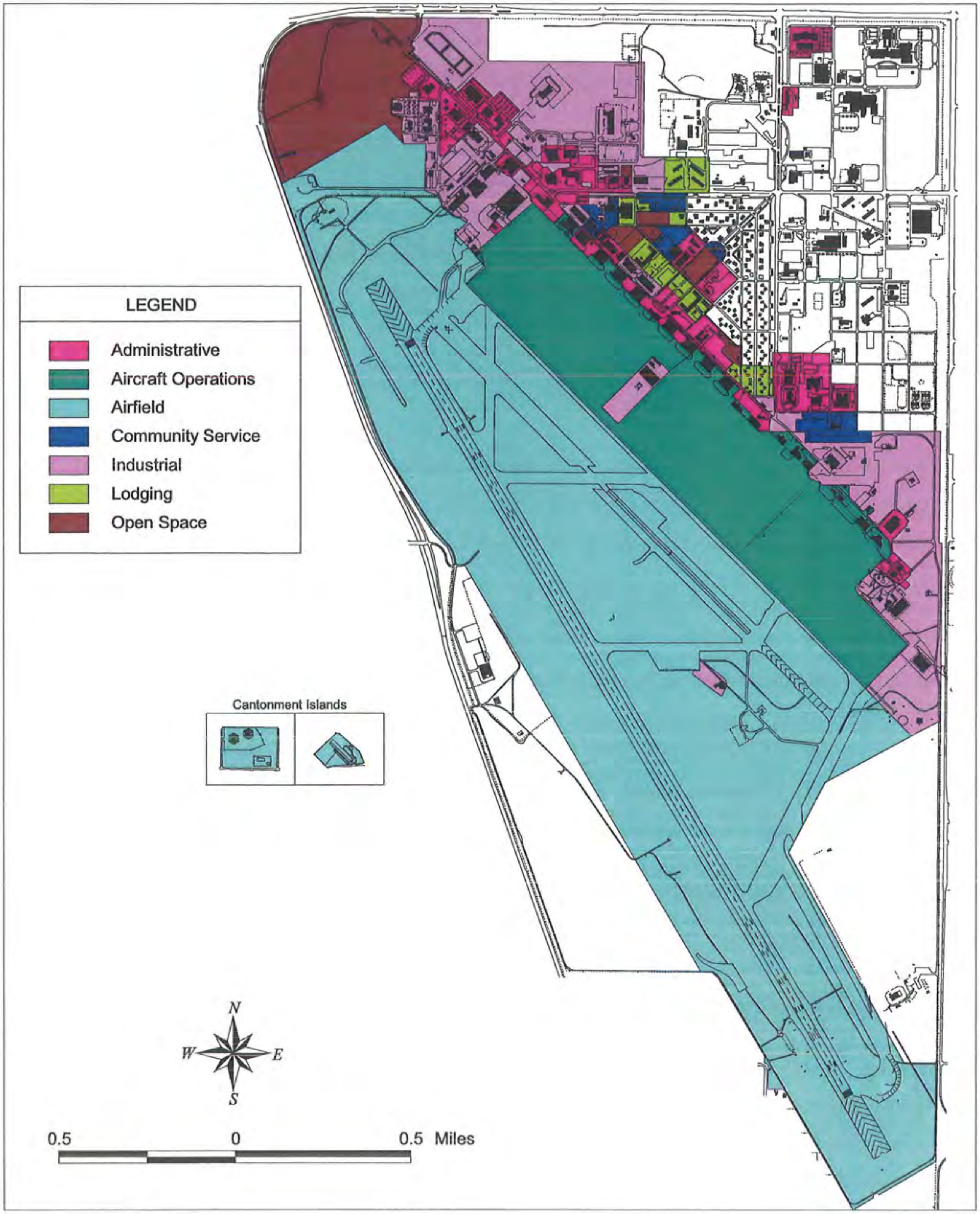


Figure 3-3. Land Uses at March ARB

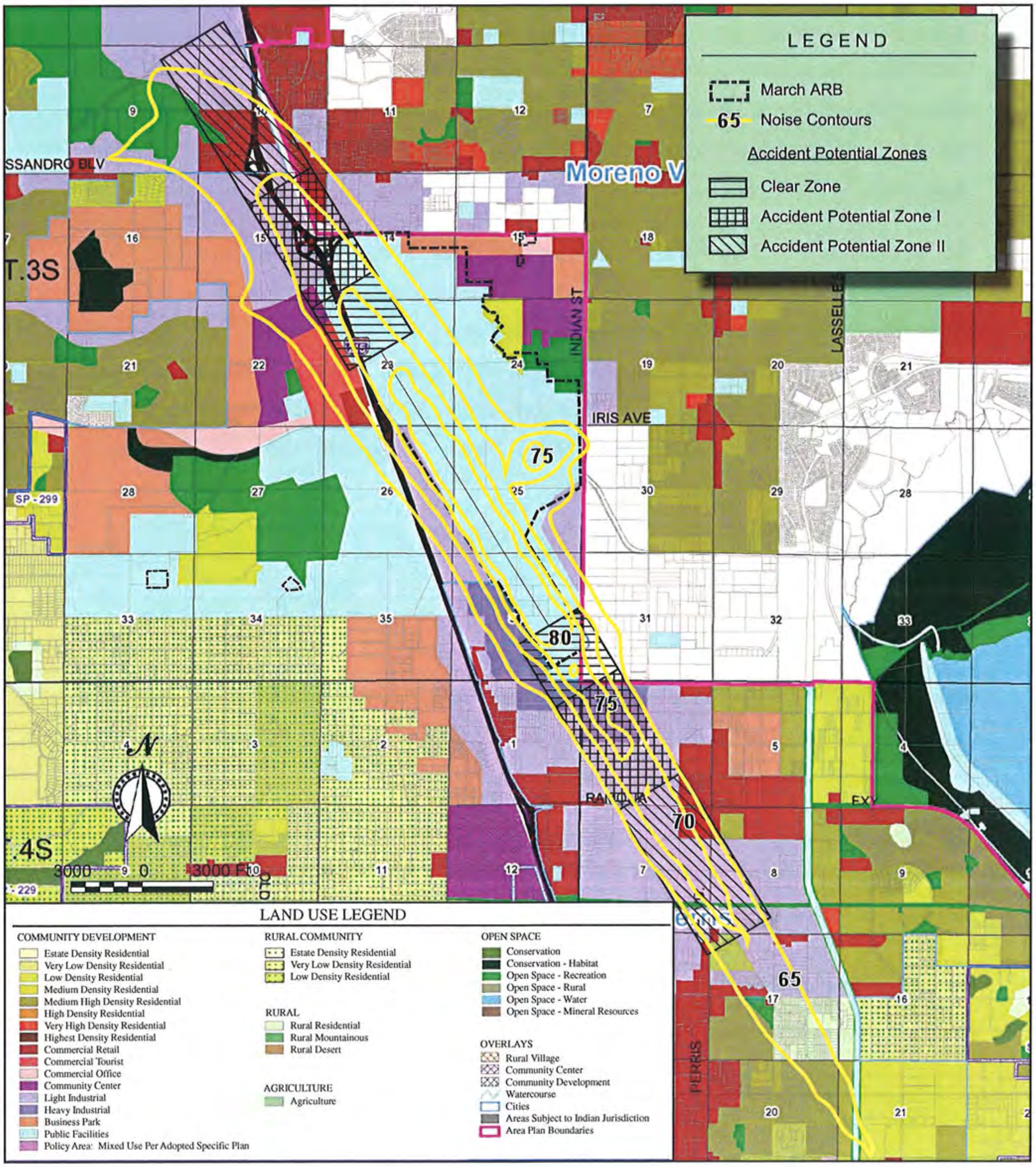


Figure 3-4. Land Uses Surrounding March ARB

The Mount San Jacinto State Park and Wilderness Area is located approximately 7 miles east of March ARB. Most of the park and wilderness area are at an elevation above 6,000 feet. San Jacinto Peak is the highest in the Santa Jacinto Range and the second highest peak in Southern California. The northeastern face of the San Jacinto Range plunges 9,000 feet in less than 6 miles, making it one of the sheerest escarpments on the continent. The area is almost entirely forested, made up of incensed cedar; white fir; and Coutler, Jeffrey, ponderosa, lodgepole, and sugar pines (AFRC 1998).

The San Jacinto Wildlife Area, located approximately 8 miles southeast of March ARB, comprises approximately 4,700 acres of wetlands, riparian woodlands, and non-native grasslands and is owned and operated by the California Department of Fish and Game. Wildlife species, especially avian, are numerous. A large variety of raptors, including six species of owls, frequent the San Jacinto Wildlife Area. In addition, the wildlife area supports several federally listed threatened and endangered species, such as the Stephens' kangaroo rat, bald eagle, peregrine falcon, and Swainson's hawk (AFRC 1998).

Lake Perris State Recreational Area is a 120-acre man-made lake that formed behind the Perry Dam, and is located approximately 5 miles east of March ARB. Bald eagles are known to nest and utilize the lake as foraging and wintering areas.

The San Bernardino National Forest is located approximately 25 miles north and east of the Base. The forest contains a great diversity of terrain and habitat, including mountain lakes, boggy meadows, quiet brooks, and rushing streams (AFRC 1998).

The Cleveland National Forest is located approximately 20 miles west of March ARB. Forest features include the Agua Tibia Wilderness; the San Mateo Canyon, of which almost 30,000 acres are proposed for wilderness status; and the Pine Creek roadless area (AFRC 1998).

3.3.3 Training Areas

Figures 3-5 through 3-7 present the federally-owned lands crossed by the MTRs.

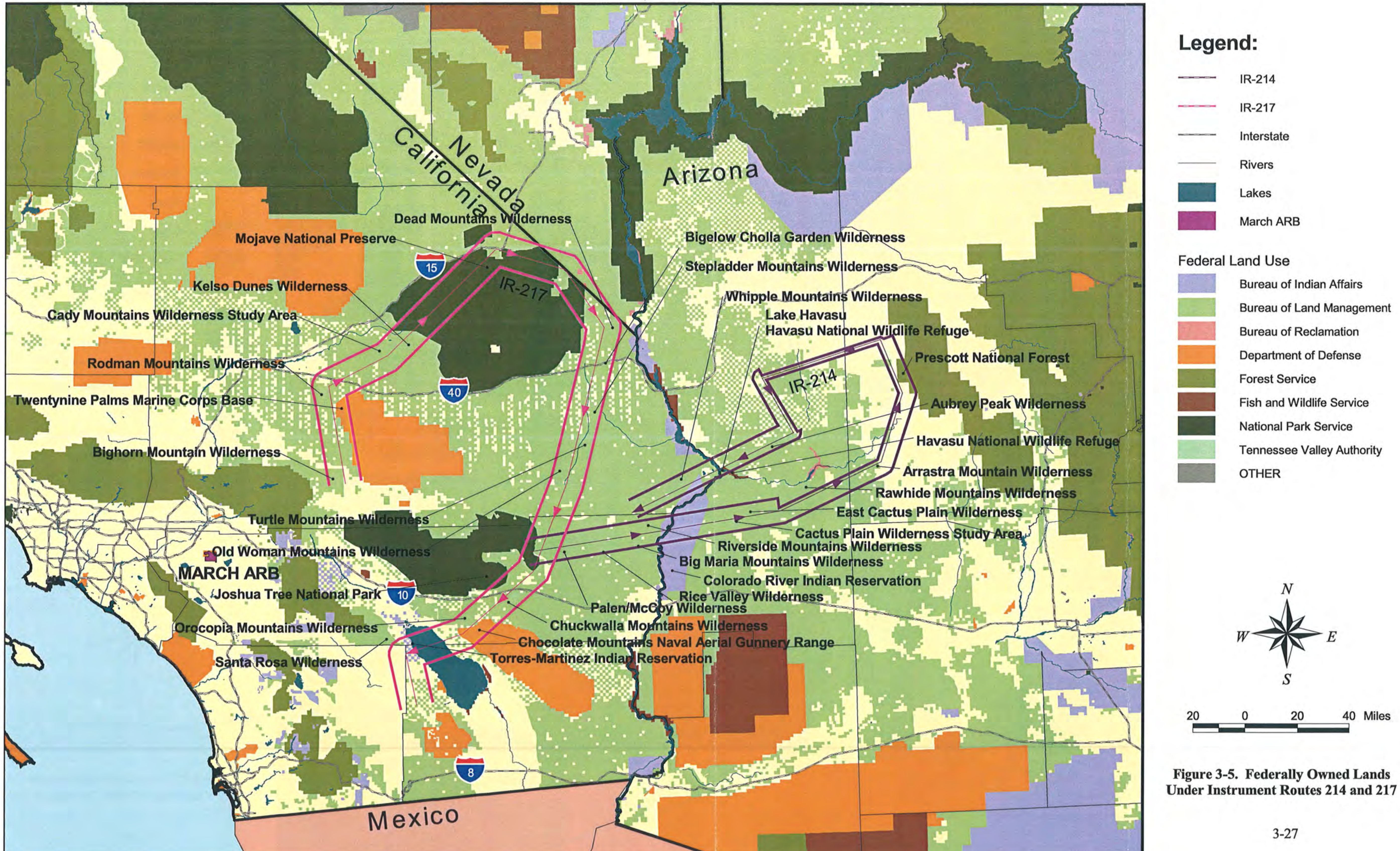


Figure 3-5. Federally Owned Lands Under Instrument Routes 214 and 217

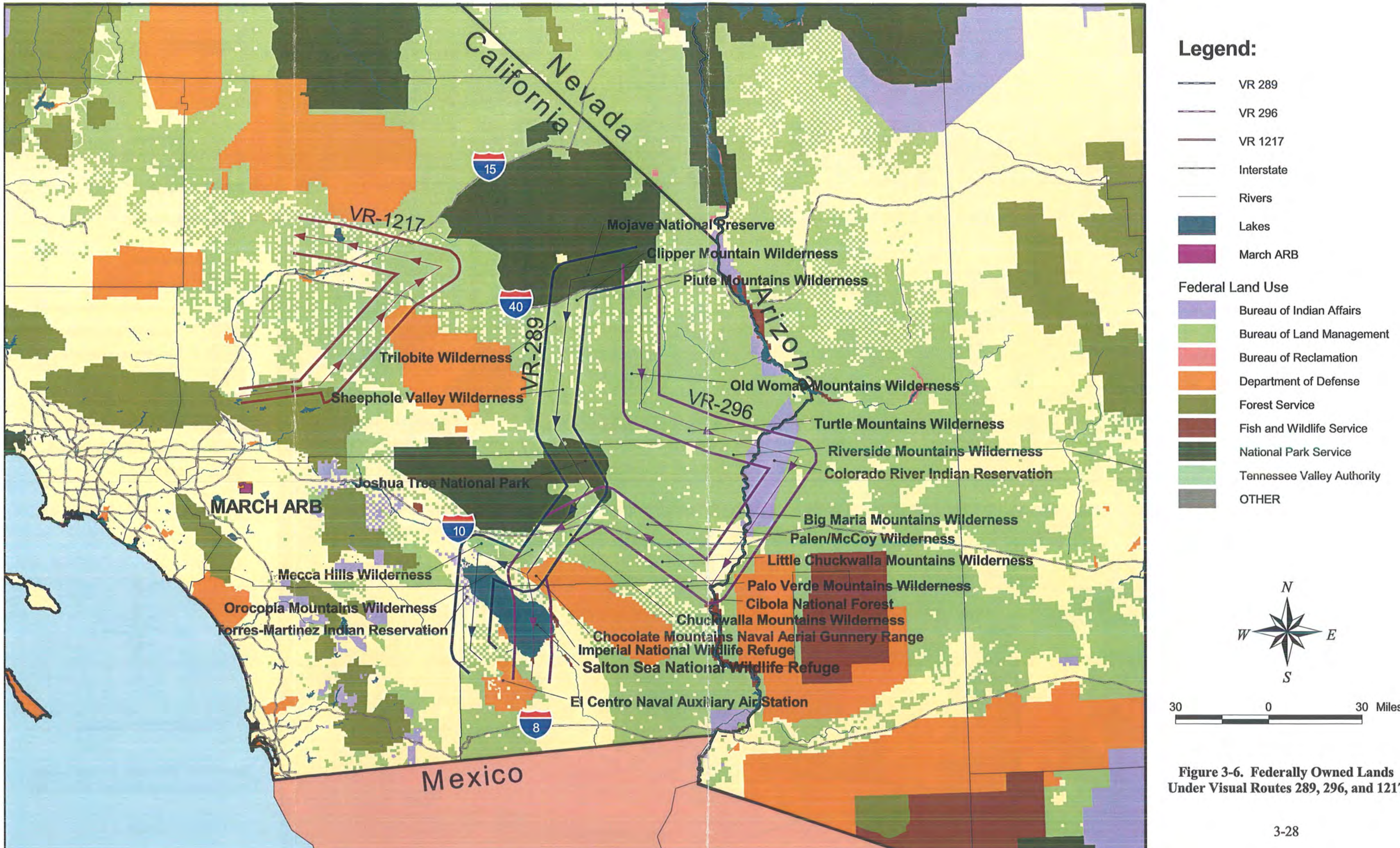


Figure 3-6. Federally Owned Lands Under Visual Routes 289, 296, and 1217

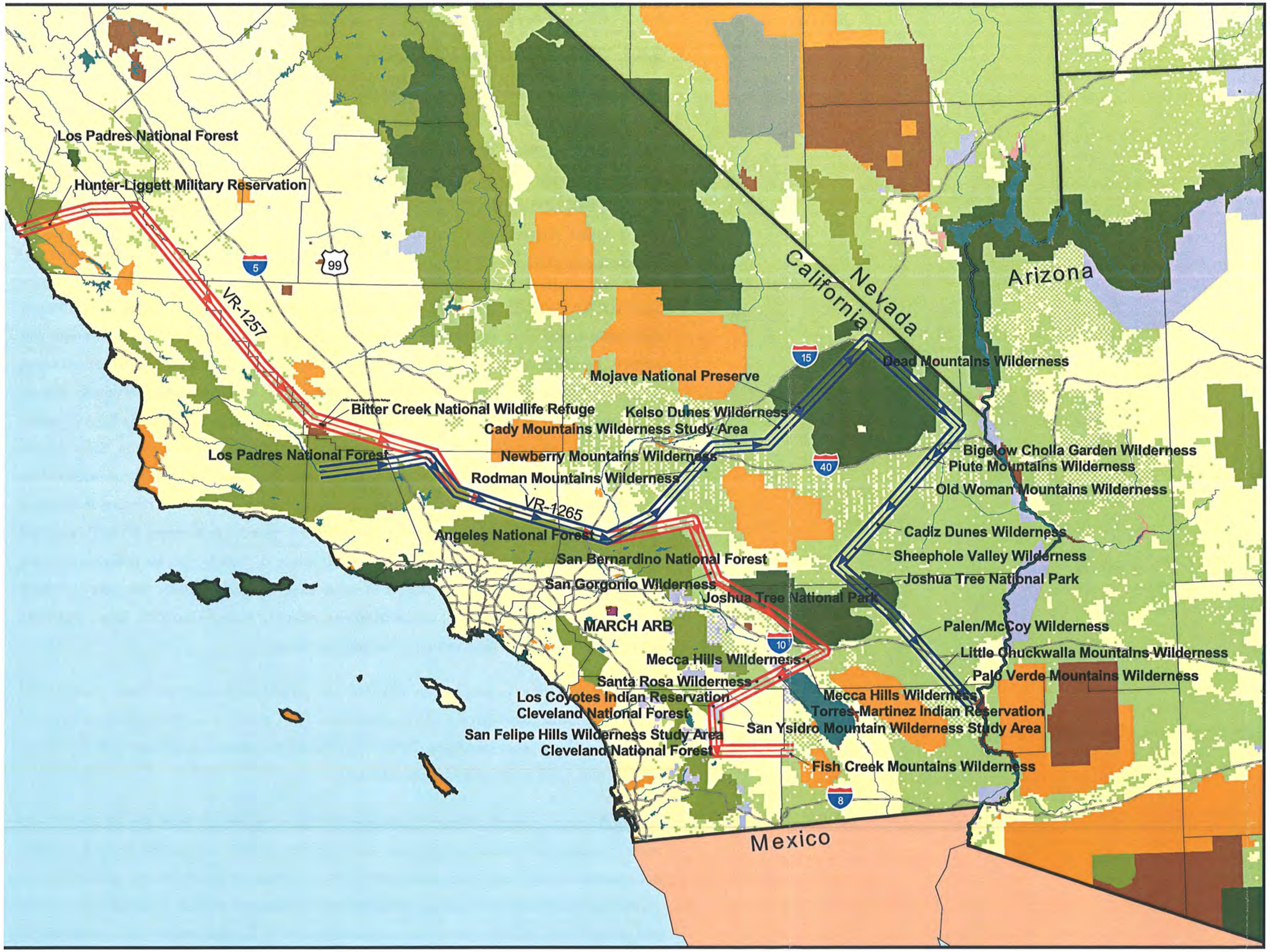


Figure 3-7. Federally Owned Lands Under Visual Routes 1257 and 1265

3.4 Air Quality

3.4.1 Definition of the Resource

In accordance with Federal Clean Air Act (CAA) requirements, the air quality in a given region or area is measured by the concentration of various pollutants in the atmosphere. The measurements of these "criteria pollutants" in ambient air are expressed in units of parts per million (ppm) or in units of micrograms per cubic meter ($\mu g/m^3$). The air quality in a region is a result not only of the types and quantities of atmospheric pollutants and pollutant sources in an area, but also surface topography, the size of the topological "air basin," and the prevailing meteorological conditions.

The CAA directed USEPA to develop, implement, and enforce strong environmental regulations that would ensure clean and healthy ambient air quality. In order to protect public health and welfare, the USEPA developed numerical concentration-based standards, or National Ambient Air Quality Standards (NAAQS), for pollutants that have been determined to impact human health and the environment. The USEPA established both primary and secondary NAAQS under the provisions of the CAA. NAAQS are currently established for six criteria air pollutants including: ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), respirable particulate matter (including particulates equal to or less than 10 microns in diameter [PM_{10}]) and particulate matter equal to or less than 2.5 microns in diameter ($PM_{2.5}$)], and lead (Pb). The primary NAAQS represent maximum levels of background air pollution that are considered safe, with an adequate margin of safety to protect public health. Secondary NAAQS represent the maximum pollutant concentration necessary to protect vegetation, crops, and other public resources along with maintaining visibility standards.

The State of California adopted the NAAQS and promulgated additional State Ambient Air Quality Standards (SAAQS) for criteria pollutants. The California standards are more stringent than the Federal primary standards. Table 3-14 presents the primary and secondary NAAQS and SAAQS that apply to the air quality in California.

Although ozone is considered a criteria air pollutant and is measurable in the atmosphere, it is not often considered a regulated air pollutant when calculating emissions because ozone is typically not emitted directly from most emissions sources. Ozone is formed in the atmosphere by photochemical reactions involving sunlight and previously emitted pollutants or "ozone precursors." These ozone precursors consist primarily of nitrogen oxides (NO_x) and volatile

Table 3-14. National and State Ambient Air Quality Standards

Pollutant	Standard Value		Standard Type
Carbon Monoxide (CO)			
8-hour Average	9 ppm[2]	(10 mg/m^3)[3,4]	Primary & Secondary
1-hour Average	35 ppm	(40 mg/m^3) [3]	Primary
1-hour Average	20 ppm		State only Primary
Nitrogen Dioxide (NO_2)			
Annual Arithmetic Mean	0.053 ppm	(100 $\mu g/m^3$) [3,5]	Primary & Secondary
1-hour Average	0.25 ppm	(472 $\mu g/m^3$	State only Primary
Ozone (O_3)			
1-hour Average[1]	0.12 ppm	(235 $\mu g/m^3$) [3]	Primary & Secondary
8-hour Average[1]	0.08 ppm	(157 $\mu g/m^3$) [3]	Primary & Secondary
10-hour Average	0.09 ppm		State only Primary
Lead (Pb)			
Quarterly Average		1.5 $\mu g/m^3$	Primary & Secondary
Monthly Average		1.5 $\mu g/m^3$	State only Primary
Particulate < 10 micrometers (PM_{10})			
Annual Arithmetic Mean		50 $\mu g/m^3$	Primary & Secondary
24-hour Average		150 $\mu g/m^3$	Primary & Secondary
Annual Arithmetic Mean		30 $\mu g/m^3$	State only Primary
24-hour Average		50 $\mu g/m^3$	State only Primary
Particulate < 2.5 micrometers ($PM_{2.5}$)			
Annual Arithmetic Mean		15 $\mu g/m^3$	Primary & Secondary
24-hour Average		65 $\mu g/m^3$	Primary & Secondary
Sulfur Dioxide (SO_2)			
Annual Arithmetic Mean	0.03 ppm	(80 $\mu g/m^3$)[3]	Primary
24-hour Average	0.14 ppm	(365 $\mu g/m^3$) [3]	Primary
1-hour Average	0.25 ppm		State only Primary

Notes:

1 In July of 1997, the 8-hr ozone standard was promulgated and the 1-hour ozone standard was remanded for all areas, excepting areas that were designated non-attainment with the 1-hour standard when the ozone 8-hour standard was adopted. In July of 2000, the ozone 1-hour standard was re-instated as a result of the Federal lawsuits that were preventing the implementation of the new 8-hour ozone standard. USEPA estimates that the revised 8-hour ozone standard rules will be promulgated in 2003-2004. In the interim, no areas can be deemed to be definitively non-attainment with the new 8-hr standard.

2 ppm – parts per million

3 Parenthetical value is an approximately equivalent concentration.

4 mg/m^3 – milligrams per cubic meter

5 $\mu g/m^3$ – micrograms per cubic meter

organic compounds (VOCs) that are directly emitted from a wide range of emission sources. For this reason, regulatory agencies attempt to limit atmospheric ozone concentrations through the control of VOC pollutants (also identified as reactive organic gases or ROG) and NO_2.

The CAA and USEPA delegated responsibility for ensuring compliance with NAAQS to the states and local agencies. As such, each state must develop air pollutant control programs and must promulgate regulations and rules that focus on meeting NAAQS and maintaining healthy ambient air quality levels. These programs are detailed in State Implementation Plans (SIPs) that must be developed by each state or local regulatory agency and approved by the USEPA. A SIP is a compilation of regulations, strategies, schedules, and enforcement actions designed to move the state into compliance with all NAAQS. Any changes to the compliance schedule or plan (i.e., new regulations, emission budgets, controls, etc.) must be incorporated into the SIP and approved by the USEPA.

The California Environmental Protection Agency (Cal/EPA), California Air Resources Board (CARB) has delegated responsibility for implementation of the Federal CAA and California Clean Air Act (CCAA) to local air pollution control agencies. March ARB lies within the South Coast Air Basin, and is subject to the rules and regulations developed by the South Coast Air Quality Management District (SCAQMD). The SCAQMD has developed a USEPA-approved SIP, which includes a wide range of detailed requirements and controls and includes a budget for non-attainment pollutant emissions throughout the region.

States or other agencies with non-attainment areas for one or more of the NAAQS may petition USEPA for redesignation as a "maintenance area" if they are able to demonstrate they have met the national standard for the three years preceding redesignation. At the time the state petitions USEPA for redesignation, it must also submit a revision of its SIP to provide for the maintenance of the applicable NAAQS for at least 10 years after redesignation ("maintenance plan") pursuant to CAA §175(A).

The CAA §176(c)(1) prohibits Federal agencies from undertaking projects that do not conform to a USEPA-approved SIP. In 1993, the USEPA developed the General Conformity Rule, which specifies how Federal agencies must determine CAA conformity for proposed sources of non-attainment pollutants in designated non-attainment areas. This rule and all subsequent amendments may be found at 40 CFR 51 Subpart W and 40 CFR 93 Subpart B. Through the Conformity Determination process specified in the final rule, any Federal agency must analyze increases in pollutant emissions directly or indirectly attributable to the Proposed Action, and may need to complete a formal evaluation that may include modeling for NAAQS impacts, obtaining a commitment from the state regulatory agency to modify the SIP to account for emissions from the proposed action, and/or provision for mitigation for any significant increases in non-attainment pollutants.

In 1997, USEPA initiated work on new General Conformity rules and guidance to reflect the new 8-hour ozone, $PM_{2.5}$, and regional haze standards that were promulgated in that year. However, because of the litigation and resulting delay in implementation of the new ozone and $PM_{2.5}$ ambient air quality standards, these new conformity requirements have not been completed by USEPA, and no draft rule language is currently available (USEPA 2001).

The General Conformity Rule and the promulgated regulations found in 40 CFR Part 93, exempt certain Federal actions from conformity determinations (e.g., contaminated site clean-up and natural emergency response activities). Other Federal actions are assumed to be in conformity if total indirect and direct project emissions are below *de minimis* levels presented in 40 CFR Part 93.153. The threshold levels (in tons of pollutant per year) depend upon the non-attainment status that the USEPA has assigned to a non-attainment area. Once the net change in non-attainment pollutants are calculated, the Federal agency must compare them to the *de minimis* thresholds. Section 4 of this document discusses the *de minimis* thresholds for each criteria pollutant and non-attainment area category.

Title V of the CAA Amendments of 1990 requires states and local agencies to permit major stationary sources. A major stationary source is a facility (i.e., plant, base, or activity) that has the potential to emit more than 100 tons annually of any one criteria air pollutant, 10 tons per year of a hazardous air pollutant, or 25 tons per year of any combination of hazardous air pollutants. However, lower pollutant-specific "major source" permitting thresholds apply to in non-attainment areas. For example, the Title V permitting threshold for an "extreme" ozone non-attainment area is 10 tons per year of potential VOC or NO_x emissions. The purpose of the permitting rule is to establish regulatory control over large, industrial-type activities and to monitor their impact upon air quality. As a major source of regulated pollutants, March ARB submitted a complete Title V operating permit to SCAQMD in 2002.

Most air pollutants emissions sources in non-attainment areas must undergo the new source review (NSR) permitting process prior to operation or construction. Through the NSR permitting process, local or state regulatory agencies review and approve proposed construction plans, regulated pollutant increases or changes, emission controls, and various other details. The agencies then issue construction permits to the source operators that detail specific requirements for construction and start-up. Once construction is complete, the sources are issued operating permits that specify detailed operating conditions, emission limits, fees, reporting and record-keeping requirements, and various other operating parameters that must be met throughout the life of the permit. The applicability of the NSR permitting process depends upon whether the proposed source(s) exceed specific emission thresholds and/or source type thresholds established in local and state regulations.

Federal Prevention of Significant Deterioration (PSD) regulations also define air pollutant emissions from proposed major stationary sources or modifications to be "significant" if: 1) a proposed project is within 10 kilometers of any Class I area; and 2) regulated pollutant emissions would cause an increase in the 24-hour average concentration of any regulated pollutant in the Class I area of 1 $\mu g/m^3$ or more (40 CFR 52.21(b)(23)(iii)). PSD regulations also define ambient air increments – limiting the allowable increases to any area's baseline air contaminant concentrations, based on the area's designation as Class I, II, or III (40 CFR 52.21(c)). One MTR associated with this Proposed Action passes directly over a Class I area – the Ventura Wilderness in Monterey County.

3.4.2 March ARB

Regional Climate. The climate at March ARB is characterized by hot summers, moderate winters, light annual rainfall, and light to moderate winds. The average annual temperature in Riverside is 64.5° Fahrenheit (°F) and annual rainfall is approximately 10 inches, with most rain events occurring from December through March (WRCC 2003).

During the summer, the region typically lies under a high-pressure zone associated with descending dry air from the upper atmosphere, preventing precipitation from forming. In the autumn and winter months, Santa Ana winds blow from the Mojave Desert toward the ocean, pushing the marine layer out to sea, and the air becomes heated by compression as it drops into the basin, resulting in very dry weather with moderate to high winds. Table 3-15 presents a summary of the average monthly temperature and precipitation for the local area.

Regional Air Quality. The USEPA classifies the air quality in an air quality control region (AQCR) or an air basin according to whether the concentration of criteria pollutants in ambient air exceeds the primary or secondary NAAQS. The USEPA has designated 11 AQCRs in

Table 3-15. Local Climate Summary

Month	Average Temperature (°F)	Average Precipitation (Inches)
January	53.7	2.27
February	55.4	2.11
March	57.2	1.78
April	61.4	0.08
May	65.6	0.24
June	71.2	0.07
July	76.9	0.04
August	77.6	0.13
September	74.2	.028
October	67.2	0.26
November	59.0	0.93
December	54.3	1.22

Source: WRCC 2003

California; however, due to the relationship between air quality and topography in California, CARB and USEPA have identified 15 specific geographic air basins. These air basin boundaries more closely coincide to non-attainment boundaries then do AQCR boundaries. Therefore, air basins provide a useful frame of references for air quality discussions in California as they relate to NAAQS and state of California AAQS.

All areas within each air basin or AQCR are designated as "attainment," "non-attainment," or "unclassifiable" for each of the six criteria pollutants. Attainment means that the air quality within an air basin or AQCR is better than the NAAQS. Non-attainment indicates that air pollutant concentrations exceed NAAQS and an unclassifiable air quality designation by USEPA means that there is not enough information to appropriately classify an air basin or AQCR, so the area is considered attainment.

As described in Appendix D, the General Conformity Rule requires that any Federal action conform to the requirements of a SIP or Federal Implementation Plan (FIP). More specifically, CAA Conformity is assured when a Federal action *does not do any one of the following*:

1. Cause a new violation of a NAAQS
2. Contribute to an increase in the frequency or severity of violations of NAAQS

3. Delay the timely attainment of any NAAQS, interim progress milestones, or other milestones toward achieving compliance with the NAAQS

The Conformity Rule applies only to actions in non-attainment or maintenance areas, and considers both direct and indirect emissions. However, since stationary sources are addressed by local or state NSR permitting requirements that ensure conformity with applicable CAA elements, this rule only addresses non-stationary/unpermitted emissions sources. Additionally, the rule applies only to Federal actions that are considered "regionally significant" or where the total emissions from the action meet or exceed the *de minimis* thresholds. An action is regionally significant when the total non-attainment pollutant emissions exceed 10 percent of the non-attainment area's total emissions inventory for that non-attainment pollutant. If a Federal action meets the *de minimis* threshold requirements and is not considered regionally significant, then a full Conformity Determination is not required.

March ARB. March ARB is located in western Riverside County, California. Riverside County is within the boundaries of the South Coast Air Basin, which is largely regulated by the SCAQMD. This region consists of Ventura County, Orange County, the majority of Los Angeles County and the non-desert western portions of Riverside and San Bernardino Counties. Based on historical ambient air quality monitoring records, the South Coast Air Basin has been designated by the USEPA as an "extreme" non-attainment area for ozone, non-attainment for carbon monoxide, and "serious" non-attainment for PM_{10}. The South Coast Air Basin is in attainment for SO_x, NO_2, and lead.

Table 3-16 presents the non-attainment pollutant SIP budget for March ARB for military aircraft emissions.

Table 3-16. SCAQMD SIP Emissions Budget for Military Aircraft Operations at March ARB

	Baseline Year	Annual Emissions (tpy)			
Pollutant	**1990**	**2000**	**2002**	**2005**	**2010**
NO_x	1010.7	501.8	501.8	501.8	501.8
VOC	2282.1	203.4	203.4	203.4	203.4
CO	-	645.4	645.4	645.4	645.4
PM_{10}	-	15.2	15.2	15.2	15.2
SO_x	-	13.1	13.1	13.1	13.1

Note: SCAQMD-approved budget for Military Aircraft Operations only - as approved in 1997, emissions are set at the same level from 2000-2020. Ref, 1997 SCAQMD, AQMP

As required under SCAQMD rules and regulations, each year March ARB compiles and submits an inventory of regulated pollutant emissions from all basewide operations. This comprehensive inventory includes stationary/permitted equipment, mobile and non-road emission sources, as well as fugitive and area sources of regulated pollutants generated during the reporting period (1 July through 30 June). Table 3-17 presents the existing air emissions for March ARB as reported for the base for the 2000/2001 reporting year.

Table 3-17. Existing Air Pollutant Emissions Inventory for March ARB

Emissions Source Type	2000/2001 Emissions Estimates				
	NO_x Emissions (tpy)	VOC Emissions (tpy)	CO Emissions (tpy)	SO_x Emissions (tpy)	PM_{10} Emissions (tpy)
Stationary Emission Sources [1]					
External Combustion Devices	3.9	0.16	2.5	0.018	0.23
Internal Combustion Devices	1.08	0.08	0.235	0.016	0.077
Fuel Transfer/Dispensing	-	0.63	-	-	-
Fuel Storage Tanks	-	0.94	-	-	-
Surface Coating	-	1.26	-	-	0.035
Fuel Cell Maintenance	-	0.15	-	-	-
Dust Collectors	-	-	-	-	0.0025
Stationary Subtotal (tpy)	**5.0**	**3.3**	**2.8**	**0.034**	**0.34**
Mobile Emission Sources					
Aircraft Operations	227.4	183.1	467.7	25.25	101.89
AGE and Aircraft Support [3]	27.9	4.74	62.5	1.83	1.64
Government Vehicles	1.86	1.02	9.5	0.12	0.2
Privately Owned Vehicle [4]	21.12	20.01	232.3	1.27	0.34
Non-Road Engines/Vehicles	21.6	2.94	27.1	1.72	2.09
Mobile Source Subtotal (tpy)	**300**	**212**	**799**	**30**	**106**
Total Current Inventory	**305**	**215.3**	**801.8**	**30.03**	**106.34**

Notes:

[1] Based on CY 2000/2001 basewide air emissions inventory, as reported to SCAQMD (covers period between: 1 July 2000 to 30 June 2001).

[2] Current March ARB aircraft operations based on approximately 70,000 airfield operations during the 12-month reporting period.

[3] AGE and Aircraft Support emissions include government-owned generators, air compressors, test stands, air conditioning units, light carts, and heaters used during and aircraft flight line and maintenance activities.

[4] POV emissions are based on current personnel counts, contractor-personnel estimates and typical commute and on-base travel distances

3.4.3 Training Areas

Desert Center DZ

The Desert Center DZ is located within the Mohave Desert Air Basin in Riverside County, approximately 45 miles west of the border between California and Arizona. This air basin has been designated by the USEPA as an attainment area for all pollutants except PM_{10} and ozone. This area is designated as serious non-attainment for PM_{10} and severe non-attainment for ozone.

The existing operation of this DZ includes airdrop training by the 452 AMW as they perform a variety of maneuvers and flight operations while deploying cargos of varying sizes and dimensions. As shown in Table 2-6, cumulative existing baseline activities at this DZ included approximately 174 sorties and 648 airdrop passes per year with C-141, C-130, and C-17 aircraft.

Additionally, regulated pollutant emissions are generated by vehicles used to retrieve materials dropped at the DZ. In calculated actual/current emissions from this process, it was assumed that each airdrop sortie requires the use of a forklift, heavy duty diesel truck, and a passenger vehicle to travel to the DZ.

Table 3-18 below presents the existing regulated pollutant emissions from aircraft and vehicle operations at the Desert Center DZ.

Table 3-18. Baseline Emissions for Desert Center Drop Zone (DZ)

	Baseline Emissions Estimates[1]				
Source Type	**NO_x Emissions (tpy)**	**VOC Emissions (tpy)**	**CO Emissions (tpy)**	**SO_x Emissions (tpy)**	**PM_{10} Emissions (tpy)**
AIRCRAFT OPERATIONS:					
C-130	0.095	0.004	0.016	0.009	0.015
C-141C	9.7	0.45	3.39	1.10	6.05
C-17	0.49	0.004	0.006	0.015	0.035
MOTOR VEHICLE OPERATIONS:					
Diesel Trucks	0.47	0.12	0.66	0.03	0.45
Passenger Vehicles	0.07	0.05	0.74	0.005	0.15
4-WD Forklifts	0.16	0.019	0.07	0.023	0.015
Totals:	**10.9**	**0.6**	**4.9**	**1.2**	**6.7**

Note: [1] Baseline emissions calculated based on current sorties and existing aircraft types per year, as presented in Table 2-6. Emissions were also estimated for heavy duty diesel trucks and passenger vehicles used to retrieve dropped materials.

Military Training Routes (MTRs)

In addition to activities within the areas immediately surrounding March ARB and the Desert Center DZ, the Proposed Action includes military aircraft training exercises within seven MTRs. These MTRs traverse seven air basins in California, two AQCRs in Arizona, and one AQCR in Nevada. Each of these potentially affected basins and/or states have approved SIPs and have implemented CAA compliance programs that focus on ensuring attainment with NAAQS. The USEPA has designated the air quality within all of the Basins and AQCRs traversed by the MTRs as in attainment or unclassifiable for SO_2, NO_2, and lead. However, 7 of the 10 affected Basins or AQCRs do not meet the NAAQS for one or more of the remaining criteria pollutants: ozone, CO, and PM_{10}. These areas, therefore, are designated as non-attainment for these pollutants. Table 3-19 presents the list of affected AQCRs (by basin description and overflying MTRs) and the pollutant(s) that are not in attainment with the NAAQS. The following includes a brief summary description of the MTRs included in this Federal action.

IR 214. IR 214 traverses 306 miles across multiple counties in southeastern California and western Arizona. This route includes the Mohave Desert Air Basin, the Mohave-Yuma AQCR, and the Northern Arizona AQCR. Specifically, IR 214 crosses the Mohave Desert Air Basin traversing Riverside County and into the Mohave-Yuma AQCR in LaPaz County, Arizona. Additionally, IR 214 crosses eastward into the Northern Arizona AQCR traversing Yavapai and Mohave Counties in Arizona, then westward into the Mohave Desert Air Basin in San Bernardino County, California.

IR 217. IR 217 traverses a total of 325 miles across multiple counties in southeastern California and a small portion of Clark County in southwestern Nevada. Specifically, IR 217 traverses north and east through the Mohave Desert Air Basin in San Bernardino County into the Las Vegas Intrastate AQCR in Clark County, Nevada. This route then traverses southwest across San Bernardino County and into the Salton Sea Air Basin in Riverside County and Imperial County. IR 217 also traverses a relatively small portion of the San Diego Air Basin in San Diego County.

VR 289. VR 289 traverses a total of 179 miles across multiple counties in southern California. This route begins in the Mohave Desert Air Basin in San Bernardino County and traverses southwest through Riverside County and into the Salton Sea Air Basin in Riverside and Imperial Counties. A small portion of the route also traverses the San Diego Air Basin in San Diego County.

Table 3-19. Affected Air Basins and NAAQS Attainment Classification

Affected Basin or AQCR	MTRs	Regulated Pollutant(s) and USEPA Non-Attainment Designation for Areas Affected by MTRs
CALIFORNIA NON-ATTAINMENT AREAS		
South Coast Air Basin	VR 1265 VR 1257 VR 1217	Ozone – Extreme PM_{10} – Serious CO – Serious
Mohave Desert Air Basin	IR 214 IR 217 VR 289 VR 296 VR 1217 VR 1257 VR 1265	Ozone – Severe PM_{10} – Moderate
Salton Sea Air Basin	IR 217 VR 289 VR 296 VR 1257 VR 1265	Ozone – Severe/Transitional PM_{10} – Serious
South Central Coast Air Basin	VR 1257 VR 1265	Ozone – Severe/Serious
San Diego Air Basin	IR 217 VR 289 VR 1257	Ozone – Serious
San Joaquin Valley Air Basin	VR 1257	Ozone – Severe PM_{10} – Serious
North Central Coast Air Basin	VR 1257	Ozone – Maintenance
ARIZONA NON ATTAINMENT/ATTAINMENT AREAS		
Mohave-Yuma AQCR	IR 214 VR 296	PM_{10} – Moderate (portion)
Northern Arizona AQCR	IR 214	None – attainment for all pollutants
NEVADA NON ATTAINMENT AREAS		
Las Vegas Intrastate AQCR	IR 217	PM_{10} – Serious * CO – Serious *

Note: * Non-attainment status applies to metropolitan areas only for this AQCR which is not traversed by the MTR.

VR 296. VR 296 traverses approximately 259 miles across multiple counties in southern California and southwestern Arizona. Specifically, VR 296 traverses the Mohave Desert Air Basin in San Bernardino County, traverses southeast through Riverside County, and then east into the Mohave-Yuma AQCR in La Paz County, Arizona. This route also extends into and terminates in the Salton Sea Air Basin in Imperial County, California.

VR 1217. VR 1217 traverses a total of 128 miles and passes through the Mohave Desert Air Basin in San Bernardino County. A very small portion of the route also extends into part of the South Coast Air Basin, also within San Bernardino County.

VR 1257. VR 1257 is the longest of the MTRs under this Proposed Action, with a total length of approximately 502 miles. This route traverses south and east through the North Central Coast Air Basin in Monterey County into the easternmost portion of the South Central Coast Air Basin in San Luis Obispo County and the San Joaquin Valley Air Basin in Kern County. VR 1257 traverses through the South Coast Air Basin in Los Angeles County and Riverside Counties and into the Mohave Desert Air Basin in San Bernardino County. Additionally, this route traverses the Salton Sea Air Basin in Riverside County and Imperial County and passes westward into the San Diego Air Basin in San Diego County.

VR 1265. VR 1265 is 466 miles length and passes through four different air basins southern California. This route traverses through the South Central Coast Air Basin in Ventura County, then eastward into the South Coast Air Basin in Los Angeles County, and then traverses the Mohave Desert Air Basin in San Bernardino and Riverside Counties. VR 1265 terminates in the Salton Sea Air Basin in Imperial County.

The quantity of criteria air pollutant emissions resulting from the use of MTRs is dependent on the length of the MTR, the number of aircraft using the route, operational airspeed, engine power setting, and the altitude each aircraft is flying. For purposes of establishing a baseline of aircraft emissions for each MTR, it is assumed that all aircraft utilizing the airspace within each MTR corridor are operated on the centerline of the MTR. Emissions are tabulated for aircraft below 3,000 feet AGL. Each of the MTRs pass through one or more air basins, so any changes (increases or decreases) in proposed aircraft operations would affect the ambient air quality and pollutant concentration levels in those areas.

The baseline criteria pollutant emissions for the MTRs included in the Proposed Action were estimated using the engine thrust requirements, airspeeds, and emission factors for nine different aircraft types historically using the MTRs. The numbers of sortie operations applied to these calculations are listed in Table 2-4.

Table 3-20 below includes the baseline emissions estimates corresponding to the traffic levels evaluated in the most recent EAs prior to replacement of the C-141Cs with C-17s. Current actual traffic levels are significantly higher than these assessed values for most MTRs. Attachment 2 to

Appendix D details the estimates of emissions from aircraft on MTRs associated with the Proposed Action.

Table 3-20. Baseline Emissions for Affected MTRs

	Baseline Emissions Estimates[1]				
MTR Number	NO_x Emissions (tpy)	VOC Emissions (tpy)	CO Emissions (tpy)	SO_x Emissions (tpy)	PM_{10} Emissions (tpy)
IR 214	0.99	0.04	0.4	0.07	0.41
IR 217	15.09	0.42	1.62	1.03	4.57
VR 289	46.66	1.71	13.53	4.07	15.78
VR 296	55.15	2.38	18.28	5.81	29.63
VR 1217	0.04	0.00	0.00	0.00	0.00
VR 1257	10.43	0.18	0.86	0.63	1.03
VR 1265	0.00	0.00	0.00	0.00	0.00
Totals:	**128.4**	**4.7**	**34.3**	**11.6**	**51.4**

[1] Baseline emissions calculated based on the current sorties and existing aircraft types per year, as presented in Table 2-4.

3.5 Safety

3.5.1 Definition of the Resource

A safe environment is one in which there is no, or an optimally reduced, potential for death, serious bodily injury or illness, or property damage. The public has little access to the construction activities associated with the Proposed Action, so the primary safety concern is associated with military training flights and the potential for aircraft crashes and loss of life and property damage. Aircraft safety focuses on matters such as the potential for aircraft mishaps, airspace congestion, bird/wildlife-aircraft strike hazards, munitions handling and use, flight obstructions, weather, and fire risks.

The public's primary safety concern with regard to military training flights is the potential for aircraft crashes and loss of life and property damage. Such mishaps may involve mid-air collisions with other aircraft, collisions with objects such as towers, buildings, or mountains, weather-related accidents, and bird-aircraft collisions. The environment for air safety is based on the physical risks associated with aircraft flight and current military operational procedures concerning air safety. Historical mishap databases enable the military to calculate the mishap rates for each type of aircraft. These rates are based on the estimated flying time that an aircraft is expected to be in the airspace, the accident rate per 100,000 flying hours for that aircraft, and the annual flying hours for that aircraft. Safe flying procedures, adherence to flight rules, and knowledge of emergency procedures form consistent and repeated aspects of training for all aircrews, including those at March ARB. Since the inception of the USAF in 1947, aircraft accidents have steadily declined each year.

Safety and accident hazards can often be identified and reduced or eliminated. Necessary elements for an accident-prone situation or environment include the presence of the hazard itself together with the exposed (and possibly susceptible) population. The degree of exposure depends primarily on the proximity of the hazard to the population. Activities that can be hazardous include transportation, maintenance and repair activities, and the creation of highly noisy environs. The proper operation, maintenance, and repair of vehicles and equipment carry important safety implications. Any facility or human-use area with potential explosive or other rapid oxidation process creates unsafe environments for nearby populations. Extremely noisy environments can also mask verbal or mechanical warning signals such as sirens, bells, or horns.

Public safety concerns also exist for airdrop training. The accuracy of the airdrop, the probability of a parachute failure, and the size of the materials being dropped all factor into these safety concerns (MAFB 1995a).

The following provides additional information on specific safety hazards associated with training flights.

Bird/Wildlife-Aircraft Strike Hazard. These are a safety concern due to the potential damage that a strike may have on the aircraft or potential injury to aircrews. Birds may be encountered at altitudes as high as 30,000 feet and higher. However, most birds fly close to grounds level, and 95 percent of all reported incidents in which a USAF aircraft has struck a bird have been below 3,000 feet AGL. Approximately half of these bird strikes occur in the airport environment, and approximately one-third occur during low-altitude training. Strike rates rise substantially as altitude decreases. The USAF devotes considerable attention to avoiding the possibility of bird/wildlife-aircraft strikes. It has conducted a worldwide program for decades to study bird migrations, bird flight patterns, and past strikes to develop predictions of where and when bird/wildlife-aircrafts might occur. This program, which consistently updates the data, also defines avoidance procedures through a Bird Avoidance Model (BAM). Each time an aircrew plans a training sortie along an established MTR or other training airspace, they use the BAM to define altitudes and locations to avoid. Use of this model has minimized bird/wildlife-aircraft strikes. Each base or flying unit also develops and maintains a bird/wildlife-aircraft avoidance plan that dictates the location and timing of avoidance measures within the airspace used by the base or unit.

Obstructions to Flights. These hazards, which include things such as towers and power transmission lines, represent safety concerns for aircrews, especially those engaged in low-altitude flight training. Aircrews are briefed and familiarized with potential obstructions along their routes before undertaking a mission. Furthermore, the FLIP and aeronautical charts identify the location of such hazards and indicate the required horizontal and/or vertical separation distances to ensure safety.

Hazardous Weather Conditions. Weather conditions can pose safety hazards and influence a pilot to alter flight. Pilots consult the National Weather Service or weather services at local airports to obtain pre-flight weather information. Adverse weather conditions of concern include tornadoes, thunderstorms, hail, severe turbulence, dust storms, and wind shear. The evaluation of potential hazards of weather conditions rests in a pilot's sound discretion based on knowledge of available information, experience, and the operational limits of the aircraft.

Construction Safety. Construction work site safety is largely a matter of adherence to regulatory requirements imposed for the benefit of employees and implementation of operational practices that reduce risks of illness, injury, death, and property damage. The health and safety of onsite military and civilian workers are safeguarded by numerous DoD and AF regulations designed to comply with standards issued by the Occupational Safety and Health Administration (OSHA) and USEPA. These standards specify the amount and type of training required for industrial workers, the use of protective equipment and clothing, engineering controls, and maximum exposure limits for workplace stressors.

Explosive Safety Zones. Explosive safety zones (ESZs) are required for areas where ordinance are stored or handled. ESZz are typically determined based upon the net explosive weight of the ordinance to be stored or handled and the blast resistance properties of the magazine. Explosive Safety Quantity Distance (ESQD) arcs are constructed that delineate the extents of each ESZ. ESZ and ESQD requirements are specified in Air Force Manual (AFMAN) 91-202, *Explosive Safety Standards*.

3.5.2 March ARB

Aircraft Safety. Risks associated with takeoffs and landings at March ARB are presented in the AICUZ Study for the base, which was developed to address safety issues and to identify hazard potential due to aircraft accidents, obstructions to navigation, and incompatible land uses based on exposure levels to aircraft noise in the surrounding area. The March ARB AICUZ Study also defines obstruction-free areas and clear zones relative to runways and taxiways, which in turn results in constraints in the siting and location of facilities on base (MARB 1998a).

The U.S. Air Force Safety Center (AFSC) has defined four classifications of mishaps: Classes A, B, C, and High Accident Potentials (HAPs). Class A mishaps result in a total cost in excess of $1 million for injury, occupational illness, and property damage; a fatality or permanent total disability; or destruction or damage beyond economical repair to USAF aircraft. Class B mishaps result in a total cost in excess of $200,000 (but less than $1 million) in property damage; permanent partial disability; or, hospitalization of five or more personnel. Class C mishaps result in total damage that costs in excess of $10,000 to $20,000 (but less than $200,000), or an injury or occupational illness that results in a loss of workers productivity greater than eight hours. Mishaps not meeting the definitions of Classes A, B, and C, but, because of damage or injury necessitate USAF reporting, are classified as HAPs.

The environment for air safety is based on the physical risks associated with aircraft flight and current military operational procedures concerning air safety. Historical mishap databases enable the military to calculate the mishap rates for each type of aircraft. These rates are based on the estimated flying time that an aircraft is expected to be in the airspace, the accident rate per 100,000 flying hours for that aircraft, and the annual flying hours for that aircraft. Historical data on C-141 mishaps are listed in Table 3-21. Table 3-21 shows that the rate of Class A and Class B mishaps is less than one mishap per 100,000 hours of flight time for the C-141 aircraft (AFSC 2003a). Historical data on KC-135 mishaps are listed in Table 3-22. Table 3-22 shows that the rate of Class A and Class B mishaps is less than one mishap per 100,000 hours of flight time for the KC-135 aircraft (AFSC 2003b).

**Table 3-21. Historical Data on C-141 Mishaps (FY 92 – FY 02)
Current as of November 2, 2002**

	Class A		Class B		Destroyed		Fatal			
Year	#	Rate	#	Rate	A/C	Rate	Pilot	All	Hours	Cum. Hrs.
FY 92	0	0.00	0	0.00	0	0.00	0	0	226,312	9,446,974
FY 93	1	0.49	0	0.00	2	0.98	4	13	203,264	9,650,238
FY 94	0	0.00	0	0.00	1	0.78	0	0	127,938	9,778,176
FY 95	0	0.00	0	0.00	0	0.00	0	0	157,059	9,935,235
FY 96	0	0.00	0	0.00	0	0.00	0	0	146,417	10,081,652
FY 97	1	0.83	1	0.83	1	0.83	2	9	121,043	10,202,695
FY 98	1	0.97	0	0.00	0	0.00	0	0	102,917	10,305,612
FY 99	0	0.00	1	1.13	0	0.00	0	0	88,888	10,394,500
FY 00	0	0.00	5	7.74	0	0.00	0	0	64,581	10,459,081
FY 01	0	0.00	3	5.79	0	0.00	0	0	51,807	10,510,888
FY 02	0	0.00	1	2.28	0	0.00	0	0	43,780	10,554,668
Lifetime	**34**	**0.32**	**39**	**0.37**	**16**	**0.15**	**34**	**161**	**10,554,668**	
5-Yr. Avg.	0.2	0.28	2.0	2.84	0.0	0.00	0.0	0.0	70,394.6	
10-Yr. Avg.	0.3	0.27	1.1	0.99	0.4	0.36	0.6	2.2	11,0769.4	

Source: AFSC 2003a

Notes: Rate of mishap per 100,000 hrs flown.

Lifetime numbers are from when the mishaps for C-141 started in FY 64.

**Table 3-22. Historical Data on KC-135 Mishaps (FY 92 – FY 02)
Current as of November 2, 2002**

	Class A		Class B		Destroyed		Fatal			
Year	#	Rate	#	Rate	A/C	Rate	Pilot	All	Hours	Cum. Hrs.
FY 92	1	0.39	0	0.00	1	0.39	0	0	255,073	10,225,044
FY 93	0	0.00	1	0.41	0	0.00	0	0	245,711	10,470,755
FY 94	0	0.00	0	0.00	0	0.00	0	0	219,206	10,689,961
FY 95	0	0.00	1	0.45	0	0.00	0	0	219,880	10,909,841
FY 96	0	0.00	1	0.46	0	0.00	0	0	215,105	11,124,946
FY 97	0	0.00	3	1.41	0	0.00	0	0	212,055	11,337,001
FY 98	1	0.47	0	0.00	0	0.00	0	0	211,206	11,548,207
FY 99	1	0.48	1	0.48	1	0.48	2	4	207,796	11,756,003
FY 00	0	0.00	1	0.56	0	0.00	0	0	177,394	11,933,397
FY 01	0	0.00	5	2.71	0	0.00	0	0	184,227	12,117,624
FY 02	0	0.00	4	1.74	0	0.00	0	0	230,153	12,347,777
Lifetime	**79**	**0.64**	**131**	**1.06**	**64**	**0.52**	**134**	**629**	**12,347,777**	
5-Yr. Avg.	0.4	0.20	2.2	1.09	0.2	0.10	0.4	0.8	202,155.2	
10-Yr. Avg.	0.2	0.09	1.7	0.80	0.1	0.05	0.2	0.4	212,273.3	

Source: AFSC 2003b

Notes: Rate of mishap per 100,000 hrs flown.

Lifetime numbers are from when the mishaps for KC-135 started in FY 57.

An aircraft mishap can cause fire and environmental contamination. Military aircraft have the capability to carry large amounts of fuel that can ignite in the event of an aircraft crash. Initial response to an aircraft accident is the responsibility of the civilian authorities nearest the crash site. These authorities would provide emergency services such as fire, police, and medical assistance, as necessary. The civilian agency responding to an aircraft accident is responsible for determining what response actions they are capable of performing. If the responding unit is not capable of performing certain response actions, they request assistance from the nearest civilian agency capable of performing the required response. In the event of an aircraft mishap, these authorities would notify the nearest USAF installation. Upon notification of the aircraft accident, the commanding officer of the nearest USAF installation dispatches a disaster response force team. The response team would provide security, medical, fire, legal, munitions, and mortuary services, as required. The response team would also assist with evacuation, accident evaluation and investigation, and retrieval of classified materials or equipment, as well as protective measures such as munitions disposal and hazardous/toxic materials removal or treatment. When necessary, the disaster response force team would coordinate activities with other regional response forces to ensure all personnel and equipment are dispatched for proper control of the accident site.

Bird/Wildlife-Aircraft Strike Hazard. The 452 AMW at March ARB actively implements a BASH Reduction Plan, thereby reducing the potential for a bird strike to occur at the base. Strike rates rise significantly as altitude decreases, which is partly due to the greater number of low-altitude missions, but mostly because birds are commonly active close to the ground. Any gain in altitude above 1,000 feet represents a substantially reduced threat of a bird strike (AMC 2002). The potential exists for future bird strikes although current BASH Plan and U.S. Department of Agriculture – Wildlife Services (USDA-WS) management strategies and protocols continue to be implemented.

Several incidences of bird aircraft strikes have been reported at March ARB. The 452 AMW – Flight Safety Officer (452 AMW/SE) maintains bird strike reports which include the date and time of each strike, conditions, aircraft model, number of birds, bird species, and altitude and location at the time of the strike (MARB 1998b). The March ARB BASH Reduction Plan provides a local program for minimizing bird strikes to aircraft by: 1) providing guidelines for the Base's Bird Hazard Working Group (BHWG), 2) providing procedures for reporting hazardous bird activity and altering or discontinuing flying operations, 3) providing procedures to disseminate information to all assigned and transient aircrews for specific bird hazards and procedures for avoidance, 4) providing procedures to eliminate or reduce environmental conditions that attract birds to the airfield, and 5) provides procedures to disperse birds on the airfield.

The BASH Reduction Plan includes maintenance specifications for grass mowing on the airfield to range from seven to 14 inches; seasonal inspection requirements for grain type grasses that attract high-threat avian species; and periodic inspection requirements for ponding and proper drainage on the airfield whenever possible to reduce insect breeding. The BASH Reduction Plan also established a Bird Hazard Warning System to provide a means for immediate exchange of information between the ground operations and aircrews concerning the existence of birds that pose a hazard (MARB 1998b). BASH reduction techniques currently listed in the March ARB BASH Reduction Plan include abating nuisance avian species using pyrotechnics and depredation, when necessary.

In addition, March ARB also uses a falconer to reduce potential BASH incidents associated with passerine and other bird species that tend to concentrate on the west side of Runway 14/32 and around the Air Museum.

Migratory waterfowl (ducks, geese, and swans) pose a threat to low-flying aircraft. Waterfowl vary considerably in size, from 1 to 2 pounds for ducks, 5 to 8 pounds for geese, and up to 20 pounds for most swans. At the base, there are several common bird types that may be present and pose a hazard: gulls, hawks, owls, falcons, blackbirds, starlings, rufous-sided towhee, pigeons, doves, ducks, geese, woodpeckers, crows, wild turkey, sparrows/house sparrows, chickadee, meadowlark, killdeer, tufted titmice, and common grackle (AMC 2002). There are two normal migratory seasons, spring and fall. Waterfowl are usually only a hazard during the migratory season. Waterfowl typically migrate at night, and generally fly between 1,500 and 3,000 feet AGL during the fall migration and 1,000 to 3,000 feet AGL during spring migration. In addition, other large avian species, such as turkey vultures and gulls, pose a threat to military aircraft.

Table 3-23 illustrates that over 51.2 percent of all USAF bird/wildlife-aircrafts occur at or below 600 feet AGL during low-level flights (AFSC 2003c). In addition, 68.3 percent of the total costs associated with bird/wildlife-aircrafts are result of strikes in this region on airspace (AFSC 2003c). Many low-level strikes occur on low-level routes associated with airdrops and bombing runs (AMC 2002). During these flights, aircrews are involved in specific duties that leave little time to monitor bird activity. Instead, flight crews utilize the Low-Level BAM to understand risks associated with their particular route. Should the BAM show an unacceptable level of risk, the operation time or route is adjusted to maximize safety.

Table 3-23. USAF Wildlife Strikes By Altitude (Low-Level/Ranges) Current as of January 14, 2003

Altitude	Count	% Total	% Cumulative	Cost	% Cost
0	54	1.65%	1.65%	$125,295.00	0.04
100	46	1.40%	3.05%	$125,652.81	0.04
200	80	2.44%	5.49%	$348,994.00	0.10
300	250	7.62%	13.11%	$10,104,366.35	2.88
400	123	3.75%	16.85%	$922,032.00	0.26
500	940	28.65%	45.50%	$10,419,263.07	2.97
600	187	5.70%	51.20%	$217,719,619.00	62.04
700	175	5.33%	56.54%	$36,706,963.68	10.46
800	169	5.15%	61.69%	$1,455,900.85	0.41
900	34	1.04%	62.72%	$159,096.80	0.05
1000	489	14.90%	77.63%	$23,260,835.75	6.63
2000	456	13.90%	91.53%	$22,983,988.87	6.55
3000	170	5.18%	96.71%	$26,340,157.28	7.51
4000	53	1.62%	98.32%	$173,691.00	0.05
5000	23	0.70%	99.02%	$26,162.00	0.01
>5000	32	0.98%	100.00%	$76,008.00	0.02
Total:	**3,281**			**$350,948,026.46**	

Source: AFSC 2003c
Note: These statistics are for those strikes where the altitude was known.

BAMs are used to visually analyze BASH during flight planning. The majority of costs incurred by the USAF occur during the fall migration (Table 3-24) of waterfowl and raptors. During September, 13.14 percent of all bird/wildlife-aircraft strikes occur, accounting for 52.23 percent of USAF BASH costs (AFSC 2003d). In addition, most bird/wildife-aircraft strikes occur after 1000 hrs (AFSC 2003e). Using online BAM software to calculate BAM during the highest risk months and at high-risk daytimes for March ARB, a BAM risk is shown as a low to moderate avian density over the region of influence. No severe avian densities are shown for these high-risk seasons or daytimes.

Table 3-24. USAF Wildlife Strikes by Month
Current as of January 14, 2003

Month	Count	% of Total	% Cumulative	Cost	% Cost
January	1,871	3.57%	3.57%	$28,897,477.66	4.70
February	1,862	3.56%	7.13%	$7,958,249.40	1.29
March	2,961	5.65%	12.78%	$31,020,244.03	5.04
April	4,790	9.15%	21.93%	$26,935,030.56	4.38
May	5,767	11.01%	32.94%	$49,639,448.53	8.07
June	3,919	7.48%	40.42%	$35,962,014.34	5.85
July	5,028	9.60%	50.02%	$40,870,064.85	6.64
August	6,223	11.88%	61.90%	$7,648,211.08	1.24
September	6,883	13.14%	75.04%	$321,317,154.05	52.23
October	7,378	14.09%	89.13%	$29,162,108.03	4.74
November	3,809	7.27%	96.40%	$16,587,276.01	2.70
December	1,885	3.60%	100.00%	$19,145,107.46	3.11
Total:	**52,376**			**$615,142,386.00**	

Source: AFSC 2000d

The USAF BASH Team maintains historic records of bird/wildlife-aircraft strikes. Detailed records of the strikes have been kept at March ARB since 1996. A summary of these strikes is presented in Table 3-25.

Table 3-25. Historical Bird/Wildlife-Aircraft Strike Data at March ARB (FY 96 – FY 01)

Year	Number of Bird Aircraft Strikes
FY 96	19
FY 97	17
FY 98	19
1999	18
2000	14
2001	14

Source: March ARB 2001

March ARB and USDA-WS personnel have been extremely effective in identifying and reducing the BASH threat on March ARB. The USDA-WS studies the resident populations and seasonal influxes of migratory species in order to continually evaluate the BASH.

March ARB does not have a current USFWS Depredation Permit to authorize the taking of nuisance species to lessen the danger of bird/wildlife strikes with aircraft. However, depredation permits are not required for killing English house sparrows *(Passer domesticus)*, European starlings *(Sturnus vulgaris)*, common pigeons or rock doves *(Columba livia)*, and mute swans *(Cygnus olor)*. In addition, 50 CFR 21.43 excludes the need for a depredation permit for red-winged blackbirds *(Agelaius phoeniceus)*, rusty blackbirds *(Euphagus carolinus)*, brown-headed cowbirds *(Molothrus ater)*, common grackle *(Quiscalus quiscula)*, and American crows *(Corvus brachyrhynchos)* when concentrated in such numbers and manner as to constitute a health hazard or other nuisance.

Radiation Danger Areas. Radio and radar transmitters are sources of electromagnetic radiation. Continued exposure to electromagnetic radiation of high-density is dangerous. The radar receiver-transmitter unit generates radio frequency (RF) power. This can be dangerous to personnel if they are exposed for a long period of time. RF power is the primary source of personnel radiation injury. RF power and fuel vapors create a hazardous condition including accidental fire ignition. Fuel servicing and RF maintenance procedures provide safety instructions. Personnel are prohibited from working in the radiation field of the energized radar antenna of the C-17 aircraft. Radar maintenance and operation is generally not performed inside hangars. If radar operation is required, the antenna must be directed into a radar window or radiation absorption material (MDC 1996).

Fire Hazards and Public Safety. The Fire Department at March ARB provides fire, crash, rescue, and structural fire protection at the base. The 452 AMW abides by a general safety policy relating to the performance of all activities at the base. Individuals, supervisors, managers, and commanders are expected to give full support to safety efforts. Safety awareness and strict compliance with established safety standards are expected.

Construction Safety. All contractors performing construction activities are responsible for following ground safety regulations and worker compensation programs, and are required to conduct construction activities in a manner that does not pose any risk to workers or personnel. Industrial hygiene programs address exposure to hazardous materials, use of personal protective equipment, and availability of Material Safety Data Sheets (MSDSs). Industrial hygiene is the responsibility of contractors, as applicable. Contractor responsibilities are to review potentially hazardous workplace operation; to monitor exposure to workplace chemical (e.g., asbestos, lead, hazardous materials), physical (e.g., noise propagation), and biological (e.g., infectious waste) agents; to recommend and evaluate controls (e.g., ventilation, respirators) to ensure personnel are properly protected or unexposed; and to ensure a medical surveillance program is in place to perform occupational health physicals for those workers subject to any accidental chemical exposures.

3.5.3 Training Areas

Desert Center Drop Zone (DZ)

AFRC follows standard safety procedures during aerial drops at all DZs. During aerial drops, the drop zone team is in place to ensure that one is in the area during airdrops. Constant radio contact is maintained with aircraft and a system of physical ground to air signals are in place should radio contact be lost. Security measures are in place along access roads to advise any traffic that airdrops are in progress.

USAF maintains records that indicate the number of malfunctions that occur during all types of C-141 airdrop training exercises. Historically, in all types of C-141 airdrop training exercises conducted at Desert Center DZ, the frequency of malfunctions is less than 1.0 percent. In addition, the 452 AMW has never had an airdrop malfunction that resulted in materials landing outside the Desert Center DZ (MAFB 1995a).

Military Training Routes (MTRs)

An aircraft mishap can also cause fire and environmental contamination. Military aircraft have the capability to carry large amounts of fuel that can combust in the event of an aircraft crash. Initial response to an aircraft accident is the responsibility of the civilian authorities nearest the crash site. These authorities would provide emergency services such as fire, police, and medical assistance, as necessary. The civilian agency responding to an aircraft accident is responsible for determining what response actions they are capable of performing. If the responding unit is not capable of performing certain response actions, they should request assistance from the nearest civilian agency capable of performing the required response. In the event of an aircraft mishap, these authorities would notify the nearest USAF installation. Upon notification of the aircraft accident, the commanding officer of the nearest USAF installation dispatches a disaster response force team. The response team would provide security, medical, fire, legal, munitions, and mortuary services, as required. The response team would also assist with evacuation, accident evaluation and investigation, and retrieval of classified materials or equipment, as well as protective measures such as munitions disposal and hazardous/toxic materials removal or treatment. When necessary, the disaster response force team would coordinate activities with other regional response forces to ensure all personnel and equipment are dispatched for proper control of the accident site. Historical safety data for C-141 and KC-135 aircraft are presented in Section 3.5.1.

3.6 Geological Resources

3.6.1 Definition of the Resources

Geological resources consist of the earth's surface and subsurface materials. Within a given physiographic province, these resources typically are described in terms of topography, soils, geology, minerals, and, where applicable, paleontology.

Topography pertains to the general shape and arrangement of a land surface, including its height and the position of its natural and human-made features.

Soils are the unconsolidated materials overlying bedrock or other parent material. Soils typically are described in terms of their complex type, slope, and physical characteristics. Differences among soil types in terms of their structure, elasticity, strength, shrink-swell potential, and erosion potential affect their abilities to support certain applications or uses. In appropriate cases, soils properties must be examined for their compatibility with particular construction activities or types of land use.

Geology is the study of the earth's composition and provides information on the structure and configuration of surface and subsurface features. Such information derives from field analysis based on observations of the surface and borings to identify subsurface composition. Hydrogeology extends the study of the subsurface to water-bearing structures. Hydrogeological information helps in the assessment of groundwater quality and quantity and its movement.

The utilization of existing DZs and MTRs would not require construction or ground disturbance; therefore, there would be no potential for impacts to geological resources. Therefore, the description of the affected environment for geological resources will be limited to March ARB and the surrounding area.

3.6.2 March ARB

Physiography. The region around March ARB is characterized by rugged mountain ranges composed of igneous and metamorphic rocks, broad erosional plains composed of deeply eroded sedimentary and crystalline basement rocks, and a broad, flat valley composed of younger alluvial material (MAFB 1996a).

March ARB lies predominantly on the Paloma Surface/Perris Plain (MAFB 1996a). The Perris Plain is a broad, nearly flat alluvium plain. The numerous bedrock hills that occur within this plain are erosional remnants of the underlying crystalline basement rocks.

The Perris Plain alluvial deposits are composed of alternating layers of varying amounts of clay, silt, sand, and gravel. Thickness of the alluvial fill varies from a few feet to over 800 feet. The buried bedrock surface is irregular, but generally slopes from northwest to southeast across the Base toward the center of Perris Plain. Bedrock data from Environmental Restoration Program (ERP) studies on Base indicated that bedrock depths vary from a few feet near the south end of the aircraft-parking apron to nearly 300 feet in the southeastern portion of the Base. The basement rock may exhibit a deeply weathered surface that can be up to 70 feet thick before encountering competent, non-weathered material (MAFB 1996a).

Topography. March ARB is in the northern end of Perris Plain, within the Santa Ana basin. The Pacific Coastal Plains are to the west of March ARB, the Transverse Ranges (including the San Bernardino and San Gabriel mountains) and the Mojave Desert are to the north, and the San Jacinto Mountains and Colorado Desert to the east. The Perris Plain is a semi-arid, north-south-trending alluvial valley bounded by low-lying granitic bedrock on the west and a series of tributary valleys and granitic mountains on the east. The valley floor has a gentle slope of approximately 20 feet per mile in a south-southeasterly direction (MAFB 1996a).

Elevations within the main cantonment area range from 1,540 feet above MSL in the northwest, to 1,465 feet MSL in the southeast (MARB 1998b). The topography of the main cantonment area of March ARB is relatively flat, with a slope of less than one percent. Storm water runoff velocities are relatively slow, which eases installation, operation, and maintenance of erosion control measures.

Natural Hazards. March ARB lies between two major fault zones: the Elsinore-Whittier, 13 miles to the southwest, and the San Jacinto, 7 miles to the northeast. The California Division of Mines and Geology consider these northwest-trending fault zones active faults. Movement along these fault zones is predominantly right lateral strike-slip (horizontal displacement along fault trace) accompanied by a smaller component of dip-slip (vertical displacement along fault trace). There are no active faults at March ARB.

The Base is located in Seismic Hazard Zone IV (MAFB 1996a). Seismic Hazard Zone IV is characterized by areas likely to sustain major damage from earthquakes and corresponds to intensities of VII or higher on the Modified Mercalli Scale. Structures and older buildings with upgrades designed to meet current Uniform Building Code (UBC) standards generally tend to withstand effects of most earthquakes.

Other seismic-related hazards include the potential for liquefaction and seismically induced dynamic settlement of soils. However, because of the relatively dense and cohesive nature of the underlying alluvium and the absence of a shallow (less that 50 feet below ground surface) regional groundwater table, the potential for these seismically induced hazards is considered low. Radon may be present in areas with granitic bedrock or in sediments derived from granitic material.

Soils. Two major soil associations are present in the March ARB area, the Cieneba-Rocky Fallbrook association and the Monserate-Arlington-Exeter association (MAFB 1996a). The Cieneba-Rocky Fallbrook association is derived from granitic rock and occurs on the western portion of the Base. These soils are typically 1 to 3 feet thick, have a surface layer of sandy loam to fine sandy loam, are well drained, with coarse to medium grain, and have slopes ranging from 2 to 50 percent (MAFB 1996a). These soils occur on undulating to steep terrain, such as granitic rock uplands and low mountains. The Monserate-Arlington-Exeter association is derived form granitic alluvium and occurs on the eastern side of the Base. These soils have a surface layer of sandy loam to loam, are well drained, with fine to medium grain, and are gently sloping. The soils are typically underlain by a shallow, relatively low permeability silica hardpan at a depth of 28 to 50 inches, resulting in a moderately high runoff potential. These soils occur on alluvial fans, terraces, and valleys.

3.7 Water Resources

3.7.1 Definition of the Resource

Water resources include groundwater, surface water, floodplains, and wastewater and storm water systems. Evaluation identifies the quantity and quality of the resource and its demand for potable, irrigation, and industrial purposes.

Groundwater. Groundwater consists of the subsurface hydrologic resources. It is an essential resource often used for potable water consumption, agricultural irrigation, and industrial applications. Groundwater typically may be described in terms of its depth from the surface, aquifer or well capacity, water quality, surrounding geologic composition, and recharge rate.

Surface Water. Surface water resources consist of lakes, rivers, and streams. Surface water is important for its contributions to the economic, ecological, recreational, and human health of a community or locale. Storm water flows, which may be exacerbated by high proportions of impervious surfaces associated with buildings, roads, and parking lots, are important to management of surface water. Storm water is important to surface water quality also because of the potential to introduce sediments and other contaminants into lakes, rivers, and streams.

Storm water systems convey precipitation away from developed sites to appropriate receiving surface waters. For a variety of reasons, storm water systems may employ a variety of devices to slow the movement of water. For instance, a large, sudden flow could scour a streambed and harm biological resources in that habitat. Storm water systems provide the benefit of reducing amounts of sediments and other contaminants that would otherwise flow directly into surface waters. Failure to appropriately size storm water systems to either hold or delay conveyance of the largest predicted precipitation event will often lead to downstream flooding and the environmental and economic damages associated with flooding. As a general rule, higher densities of development, such as are found in urban areas, require greater degrees of storm water management because of the higher proportions of impervious surfaces that occur in urban centers.

Floodplains. Floodplains are areas of low-level ground present along a river or stream channel. Such lands may be subject to periodic or infrequent inundation due to rain or melting snow. Risk of flooding typically hinges on local topography, the frequency of precipitation events, and the size of the watershed above the floodplain. Flood potential is evaluated by the Federal Emergency Management Agency (FEMA), which evaluates the floodplain for 100 and 500-year flood events. Federal, state, and local regulations often limit floodplain development to passive uses such as recreational and preservation activities in order to reduce the risks to human health and safety.

Wastewater Systems. Wastewater treatment systems may treat sanitary sewer, industrial, or both kinds of wastes. Most systems are publicly owned treatment works (POTW). For regulatory purposes, there is a sub-category of federally-owned treatment works. Wastewater treatment systems consist of a central treatment plant and a collection system of piping from waste sources. As a very general rule, treatment works are identified as primary (mechanical treatment only), secondary (mechanical and biological treatment), or tertiary (mechanical and biological or chemical treatment). Wastewater treatment plants operate under National Pollution Discharge Elimination System (NPDES) permits issued by USEPA or the states pursuant to the Clean Water Act (CWA). Key issues concerning wastewater systems typically involve the age of the system (either its collection system and infiltration/inflow problems or the treatment plant itself), the capacity of a treatment plant (usually expressed in millions of gallons per day), and a treatment plant's record of violations of its NPDES permit.

The utilization of existing DZs and MTRs would not require construction or ground disturbance, therefore, there would be no potential for impacts to water resources. Therefore, the description of the affected environment for water resources will be limited to March ARB and the surrounding area.

3.7.2 March ARB

Groundwater. The groundwater level has been rising at a rate of 8 feet per year at the center of Perris and Moreno Valley and at a rate of 2 feet per year under March ARB. The basin has received a tremendous amount of natural recharge. Natural recharge to groundwater results primarily from precipitation and infiltration.

Artificial recharge on the Base occurs near the central portion of the Base shop and housing areas and from the Heacock Storm Drain along the eastern Base boundary. Recharge occurs as a result of infiltration of irrigation water and seepage from unlined canals and septic systems. This artificial recharge, especially in the area of Heacock Storm Drain, appears to cause localized groundwater highs (AFRC 2001a).

The water quality of the groundwater in the northern portions of the Perris Plan and Moreno Valley is considered good. Total dissolved solids (TDS) concentrations in these areas range from 350 ppm to 1,000 ppm. In the southern portion of the Perris Plain, TDS values can exceed 12,000 ppm (AFRC 2001a). However, the Western Municipal Water District (WMWD) supplies all water services to the base (MARB 2000a).

Groundwater monitoring on base has identified contamination by trichloroethylene and tetrachloroethylene, as well as other chlorinated hydrocarbons, benzene, and a variety of other VOCs (AFRC 2001a). There is groundwater contamination at March ARB under the flightline and apron areas.

Surface Water. Drainage at March ARB consists of extensive natural and man-made surface drainage as well as underground storm sewer lines (AFRC 2001a). Drainage from March ARB divides into three watersheds, identified as Watershed No. 1, Watershed No. 2, and Watershed No. 3. Each watershed discharges to an outfall of the same numerical designation. In general, drainage travels in a southeasterly direction. All drainage from the March ARB main cantonment area discharges into Heacock Channel to the east and into Oleander Avenue Channel to the south. Both these channels flow into the Perris Valley Storm Drain and eventually into the San Jacinto River (AFRC 2001a). The water resources (watersheds, surface drainage, floodplains, and discharge points and outfalls) on March ARB can be seen in Figure 3-8.

Discharge Serial No. 001, receives drainage from Watershed No.1. Most of the drainage discharging to this outfall originates from the northeast portion of the flightline and associated parking aprons and taxiways (AFRC 2001a). Storm water travels primarily via underground storm drainage lines, which receive water from an extensive system of storm sewer inlets. All drainage flowing to Discharge Serial No. 1 is directed through a large open catch basin prior to being discharged into Heacock Channel.

All storm water drainage in the northern half of the Base is collected in Watershed No.2 and discharged at various points into Heacock Channel. The drainage system in Watershed 2 consists of a variety of channels, including shallow ditches, underground storm lines, street gutters, and lined and unlined channels and swales. While the majority of the storm water discharged from Discharge Serial No. 002 originates from within the main cantonment area, some storm water is contributed from areas outside the Base (AFRC 2001a).

Watershed No. 3 collects drainage from the runway and taxiway surfaces, vegetated areas surrounding the runways, and the March ARB Museum (AFRC 2001a). All drainage within the cantonment zone of Watershed No. 3 discharges to Oleander Avenue Channel at the southern boundary of the base. Storm drainage within Watershed No. 3 is transported primarily via unlined open channels punctuated by occasional underground culverts.

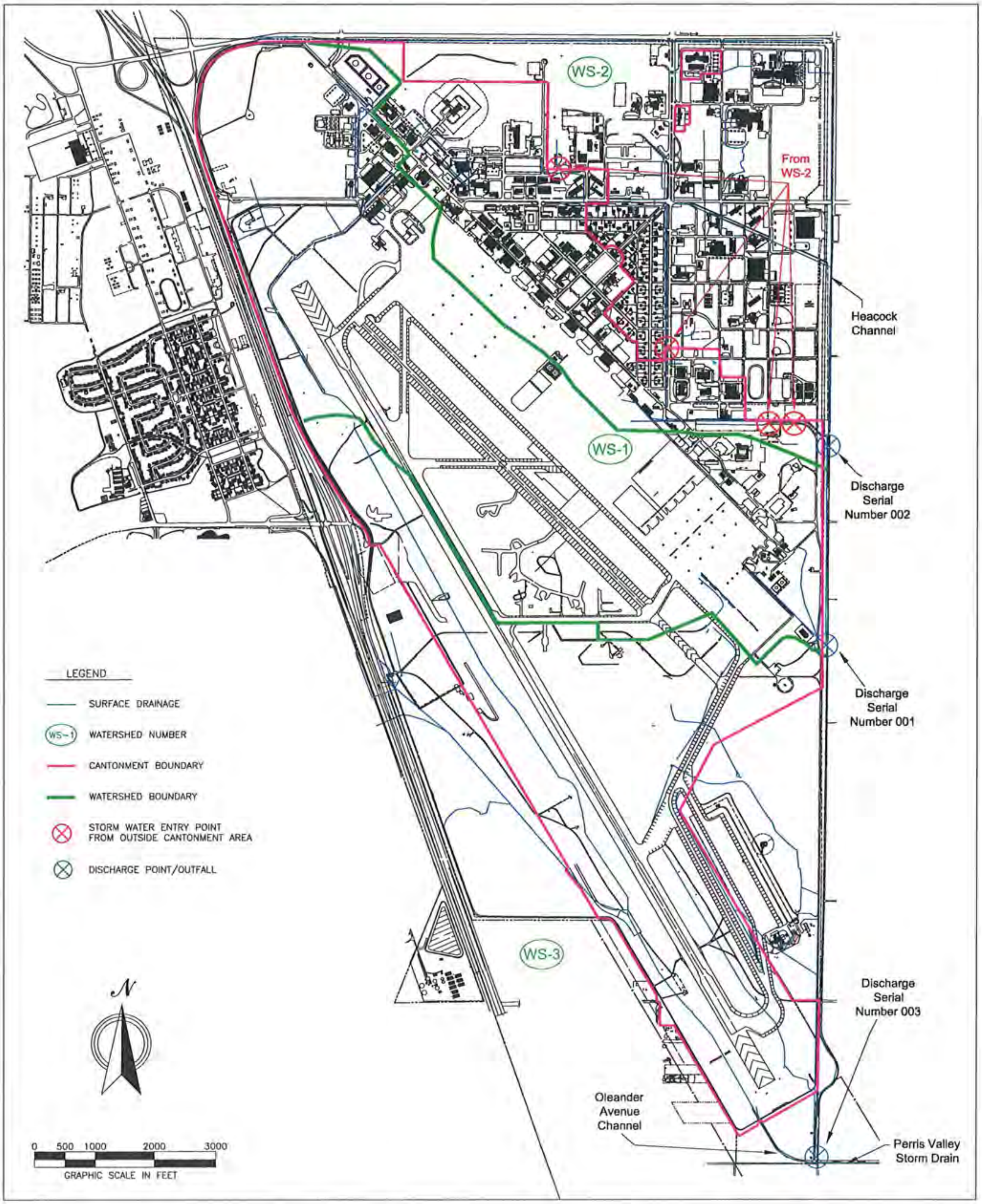


Figure 3-8. Water Resources at March ARB

Streams near March ARB are ephemeral, flowing only when precipitation occurs. During short or light precipitation events, a large portion of the rainfall may infiltrate into the ground, reducing the amount of surface runoff. However, during long or heavy precipitation events, the ground may become saturated, thereby reducing infiltration and increasing surface runoff. Standing water remaining after a storm event infiltrates or evaporates relatively quickly (AFRC 2001a).

Floodplains. FEMA Flood Insurance Rate Maps covering March ARB indicate that lands along the north and east sides of the base may be located within the 100-year floodplain. However, detailed floodplain studies have not been performed for March ARB. Floodplains are defined as areas adjoining inland or coastal waters that are prone to flooding. These areas must be reserved in order to discharge the 100-year flood without cumulatively increasing the water surface elevation more than a designated height. Once a floodplain is established, no additional obstruction (e.g., a building) should be placed in the floodplain that will increase the 100-year flood water surface elevation.

Wastewater and Storm Water Systems. Currently, the Air Force Base Conversion Agency owns and maintains March ARB's wastewater treatment facility (MARB 2000a). Storm water from the March Airfield is collected using a storm drainage system. Improved and unimproved drainage ditches and channels primarily serve other areas of the Base. Outfalls from March ARB convey storm water into drainage channels of the Riverside County Flood Control District, which in turn flows into the San Jacinto River. Following the base conversion, March ARB has three storm water drainage outfalls. The outfalls are regulated by the NPDES established by the CWA. These outfalls are automatically set up to monitor total suspended particulates (TSP). Periodically, the existing storm water ditches must be cleared of vegetation to maintain drainage flow. The Heacock Drainage Ditch has been designated as a wetland by USACE. Currently, storm water outfalls at March ARB exceed TSP limits set by the USEPA (MARB 2000a). However, monitoring systems of the March ARB storm water outfalls cannot distinguish between pollutants generated by activities on the base and those that are generated upstream.

3.8 Biological Resources

3.8.1 Definition of Resource

Biological resources include native or naturalized plants and animals, and the habitats, such as wetlands, forests, and grasslands, in which they exist. Sensitive and protected biological resources include plant and animal species listed as threatened or endangered by the USFWS or a state. Determining which species occur in an area affected by a Proposed Action may be accomplished through literature reviews and coordination with appropriate Federal and state regulatory agency representatives, resource managers, and other knowledgeable experts.

Under the Endangered Species Act (ESA) (16 U.S.C. § 1536), an "endangered species" is defined as any species in danger of extinction throughout all or a significant portion of its range. A "threatened species" is defined as any species likely to become an endangered species in the foreseeable future. The USFWS maintains an updated list of species that are regarded as candidates for possible listing under the ESA (61 Federal Register 7596). Even though candidate species receive no statutory protection under the Endangered Species Act, the USFWS believes it is important to advise government agencies, industry, and the public that these species are at risk and may warrant protection under the Act. In the past, the USFWS had categorized candidate species as either Category 1 or Category 2. Category 1 candidate species are those for which substantial information exists on biological vulnerability and threat(s) to support proposals to list as threatened or endangered. Category 2 candidate species are those for which information indicates that listing as threatened or endangered is possibly appropriate, but for which substantial data on biological vulnerability and threat(s) are not currently known or on file to support the proposed rules. Beginning with this updated list, the USFWS will recognize as candidates for listing only species that would have been included in the former Category 1 and will no longer maintain a Category list.

California implements an endangered species law that covers native species and subspecies of plants and animals (Cal. Fish & Game Code §2050 et seq.). Listings require recovery plans and designation of critical habitat, although critical habitat has never been designated. State agency consultation on projects affecting endangered species is required. The California Endangered Species Act defines an "endangered species" as a native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant that is in serious danger of becoming extinct throughout all, or a significant portion, of its range due to loss of habitat, change in habitat, overexploitation, predation, competition, or disease. A "threatened species" is a native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant that, although not presently threatened with extinction, is likely to become an endangered species in the foreseeable future in the absence of the special protection and management efforts required by Chapter 1.5 of the California Fish and Game Code. A "Species of Special Concern" is defined as native species or subspecies that have become vulnerable to extinction because of declining population levels, limited ranges, or rarity. The goal is to prevent these animals from becoming endangered by addressing the issues of concern early enough to secure long-term viability for these species.

Arizona does not have an endangered species law that offers protection above that that of the Federal ESA. The 1987 Game and Fish Commission policy calls for re-establishing threatened native wildlife. The policy does not require recovery plans or critical habitat designation. It is designed to work in conjunction with the Federal ESA. A native plants law protects certain native plants and encourages, but does not mandate, habitat protection (Ariz. Rev. Stat. Ann. §3-901 et seq.).

Nevada implemented an endangered species law that covers plants and animals (Nev. Rev. Stat. §§503.584 et seq.; 244.386). Listings are based on scientific criteria; however, recovery plans, agency consultation, and critical habitat designation are not required.

Biological resources also include wetlands. Wetlands are an important natural system and habitat because of the diverse biologic and hydrologic functions they perform. These functions include water quality improvement, groundwater recharge and discharge, pollution mitigation, nutrient cycling, wildlife habitat provision, unique flora and fauna niche provision, stormwater attenuation and storage, sediment detention, and erosion protection. Wetlands are protected as a subset of the "waters of the U.S." under Section 404 of the Clean Water Act. The term "waters of the United States" has a broad meaning under the Clean Water Act, and incorporates deep-water aquatic habitats and special aquatic habitats (including wetlands). USACE defines wetlands as "those areas that are inundated or saturated with ground or surface water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted to life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas" (33 CFR 328). Since no construction or other physical activity will occur in the areas underlying the MTR corridors under the Proposed Action, this EA only discusses existing conditions and environmental consequences associated with wetlands on March ARB and the Desert Center DZ.

3.8.2 March ARB

Vegetation. Three general plant communities were identified on the Base during a survey in 1992 (MARB 1998c): annual grassland, disturbed scrubland, and riparian. The current main March ARB cantonment area is open grasslands. Most of the project area is currently mowed, which has affected the composition of the remaining vegetation. The original vegetation on the eastern half of the main cantonment area has been removed or significantly altered by development, construction, landscaping, and other disturbances from urbanization. Few historic plant communities occur in the cantonment area (MARB 2002a).

Brome grasses with locally abundant oats, barley (*Hordeum sp.*), fescues (*Festuca sp.*), Russian thistle (*Salsola iberica.*), and Mediterranean grass (*Schismus barbatus.*) dominate the open grasslands that were surveyed in 1992 (MARB 1998c). Black mustard (*Brassica nigra*) and field mustard (*Brassica rapa var. rapa*) are also common species. Common forbs identified include white-stemmed filaree (*Erodium moschatum*), red-stemmed filaree (*Erodium cicutarium*), vinegar weed (*Trichostema lanceolatum*), dove weed, spurge (*Chamaesyce sp.*), and Jimson weed (*Datura stramomium*) (MARB 1998c). Other native vegetation occurring on March ARB consists of some remnant native grasslands and coastal sage scrub oak (*Quercus dumosa*). The coastal sage scrub oak occurs on a small portion of the non-native grasslands that dominant the undeveloped areas on the Base (MARB 2002a). Trees that are common in the main cantonment area include mature specimens of pine (*Pinus sp.*), palms, California live oak (*Quercus agrifolia nee*), and *Eucalyptus* sp. (MARB 1998c).

Turf grasses and various broad-leaf weeds are the predominant vegetation type on the developed areas of March ARB. Grass varieties consist of common introduced species, including Kentucky bluegrass (*Poa pratensis ssp. pratensis*), common Bermuda grass (*Cynodon dactylon*), and fescue mixes. A variety of shrubs and trees, mostly introduced species, are also present at March ARB. Oleander (*Nerium oleander*), a non-native tropical shrub, is common throughout the Base. Brazilian pepper (*Schinus terebinthifolius*), Peruvian pepper (*Schinus molle*), *Eucalyptus* sp., European olive, and oleander are common near buildings, roads and the perimeter of the Base (MARB 2002a).

Areas surrounding runways and taxiways are filled with non-native grasses and broad-leaved vegetation. Non-native grasslands are characterized by exotic annual forbs, such as mustards and filarees, and by exotic grasses, such as wild oats (*Avena fatua*), red brome (*Bromus rubens*), cheat grass (*Bromus tectorum*), Mediterranean grass, and barley (MARB 1998c).

Wildlife. Wildlife that may occur at March ARB includes 218 species of birds, 32 mammals, 29 reptiles, and 5 amphibians (MARB 1998c). Typical grassland mammals include California ground squirrel (*Spermophilus beecheyi*), Botta's pocket gopher (*Thomomys bottae*), and Audubon's cottontail (*Sylvilagus audubonii*). Small rodents such as the deer mouse (*Peromyscus maniculatus*), western harvest mouse (*Reithrodontomys megalotis*), and Pacific kangaroo rat (*Dipodomys agilis*) have been identified from trapping surveys (MARB 1998c). Coyote (*Canis latrans*) are the most common mammalian predators at March ARB.

Birds comprise the most diverse taxonomic group of animals on Base. Over 200 native and non-native, seasonal and resident species are known to occur at March ARB (MARB 1998c). Non-native starlings (*Sturnus vulgaris*) and native house finches (*Carpodacus mexicanus*) are found throughout the Base. Mourning dove (*Zenaida macroura*), American kestrel (*Falco sparverius*), black phoebe (*Sayornis nigricans*), common raven (*Corvus corax*), northern mockingbird (*Mimus polyglottos*), and Brewer's blackbird (*Euphagus cyanocephalus*) are common species (MARB 1998c).

The grasslands attract many seasonal granivores (seed-eaters) such as white-crowned sparrow (*Zonotrichia leucophrys*), western meadowlark (*Sturnella neglecta*), and savannah sparrow (*Passerculus sandwichensis*) as well as raptors, including northern harrier (*Circus cyaneus*), prairie falcon (*Falco mexicanus*), and golden eagle (*Aquila chrysaetos*). Grasslands are also habitat for several federal candidate species, including ferruginous hawk (*Buteo regalis*), mountain plover (*Charadrius montanus*), tri-colored blackbird (*Agelaius tricolor*), loggerhead shrike (*Lanius ludovicianus*), and California horned lark (*Eremophila alpestris actia*). The burrowing owl (*Athene cunicularia*), a California Special Concern (CSC) species, is also known to be present on March ARB (MARB 2002a).

The most common of the several reptile species on base is the side blotched lizard (*Uta stansburiana*). Other reptiles observed on March ARB include the western fence lizard (*Sceloporus occidentalis*), granite spiny lizard (*Sceloporus orcutti*), southern alligator lizard (*Elgaria multicarinata*), gopher snake (*Pituophis melanoleucus*), and southern Pacific rattlesnake (*Crotalus viridis helleri*). Orange-throated whiptail (*Cnemidophorus hyperythrus*), coastal western whiptail (*Cnemidophorus tigris*), San Diego horned lizard (*Phrynosoma coronatum*), and northern red-diamond rattlesnake (*Crotalus ruber*) are federal candidate species for listing that are known to occur on March ARB (MARB 1998c).

Threatened and Endangered Species. An installation's overall ecosystem management strategy must provide for protection and recovery of threatened and endangered species. As a policy, the Air Force gives the same protection, when practical, to any state-listed threatened, endangered, or other rare species. The USFWS and California Department of Fish and Game (CADFG) were contacted regarding the presence of threatened and endangered species in the geographic area of March ARB to satisfy Section 7(c) of the ESA (16 U.S.C. 1536) and the California Endangered Species Act (MARB 1998b).

March ARB supports one federally listed and several state-listed threatened and endangered species. In March 1996, a survey was conducted at March ARB to verify and document the presence or absence of any federal or state listed threatened, endangered, and candidate species, and CSC species (MARB 1998c). The only sensitive species identified during the March 1996 survey as occurring in the main cantonment area during this survey was the burrowing owl, which is listed as a CSC. Although not documented in the main cantonment area in March 1996, the Stephens' kangaroo rat (SKR), federally listed as endangered and state listed as threatened, was documented as occupying the area west of Interstate 215. In addition, marginal habitat was identified in the main cantonment area for the federally endangered Quino checkerspot butterfly *(Euphydryas editha quino)*. However, presence of this species has not yet been determined (MARB 1998b). Other CSC, and federally listed species, documented or observed as occurring at March ARB are listed in Table 3-26 (MARB 2002a). Figure 3-9 shows the wetlands and sensitive species locations on March ARB.

Prior to re-alignment as an Air Reserve Base, March ARB established several preserve and open space areas to minimize adverse effects, and to promote conservation and recovery goals for the SKR (MARB 1998c). Most of the SKR habitat is located west of Interstate 215. However, several areas designated as open space are within the main cantonment area, including areas west of Runway 14-32, and the property west of Interstate 215, including the Small Arms Range operated by March ARB. During a March 1996 general survey, a species-specific survey was conducted for SKR that concluded that no SKR occupied the main cantonment area of March ARB. However, a subsequent survey conducted in December 1996 indicated the presence of SKR in areas west of Interstate 215 (MARB 1998c). Although no SKR were found on the Small Arms Range, SKR were documented as occurring on the north and west side of the Small Arms Range boundary fence. Recently, an individual SKR was discovered to the east side of Interstate 215 near the March Field Museum (MARB 2002a).

Table 3-26. Threatened and Endangered Species Documented as Occurring or that may be Present on March ARB.

Common Name	*Scientific Name*	Status [1]		Documented on March ARB
		Federal	State	
MAMMALS				
Stephens' kangaroo rat [2]	*Dipodomys stephensi*	E	T	Y
San Diego black-tailed jackrabbit	*Lepus californicus bennettii*	NL	CSC	Y
BIRDS				
Burrowing owl	*Athene cunicularia*	NL	CSC	Y
California horned lark	*Eremophila alpestris actia*	NL	CSC	Y
Loggerhead shrike	*Lanius ludovicianus*	NL	CSC	Y
Tricolored blackbird	*Agelaius tricolor*	NL	CSC	Y
Bald eagle	*Haliaeetus leucocephalus*	T	E	N
Brown pelican	*Pelecanus occidentalis*	E	E	N
Mountain plover	*Charadrius montanus*	C		Y
Least Bell's vireo	*Vireo bellii pusillus*	E	E	N
Southwestern willow flycatcher	*Empidonax traillii extimus*	E		N

Source: MARB 1998b, USFWS 2003

Note: [1] Status: CSC – California Species of Special Concern
C – Candidate
E – Endangered
NL – Not Listed
T – Threatened

[2] Stephens' kangaroo rat inhabits an area west of Interstate 215.

The burrowing owl is listed as a CSC species that occurs at March ARB. The decline of much of its historical range can be attributed to widespread burrowing mammal control, which reduces burrowing sites. The burrowing owl is a small, sandy colored owl with long legs, a round head, and stubby tail. Its coloring is barred and spotted with a white chin stripe. Burrowing owls can be seen standing erect on the ground or on posts, and are present at March ARB year-round. They nest in burrows they generally acquired from other animals such as ground squirrels, badgers, or they may dig their own in soft soil. In addition to nesting, burrowing owls utilize their burrows for food storage, thermoregulation, and refuge from predators. Habitat of the burrowing owl usually consists of open grassland, prairies, farmland, and airfields (MARB 2002a). The burrowing owl occurs within, and immediately outside the cantonment area. March ARB's large California ground squirrel population and open areas provide numerous acres of

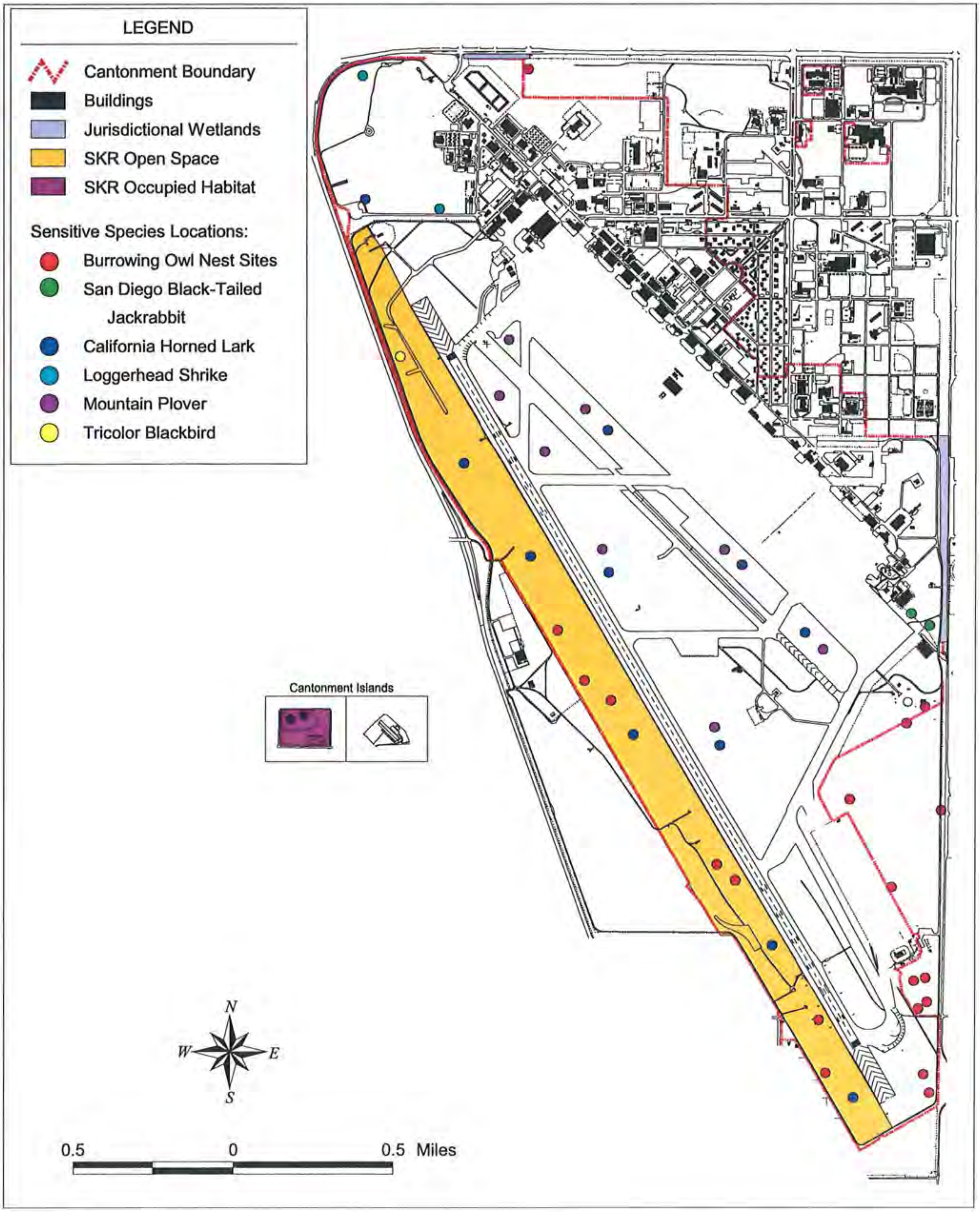


Figure 3-9. Wetlands and Sensitive Species Locations and Habitat at March ARB

suitable habitat for the burrowing owl. Several nest site locations were identified outside, but in close proximity to the Base boundary. Locations of active burrows may change during the season as fledglings disperse (MARB 1998c).

The San Diego black-tailed jackrabbit is listed as a CSC species that occurs at March ARB. The San Diego black-tailed jackrabbit (*Lepus californicus bennetti*) is a subspecies of the black-tailed jackrabbit. This subspecies is restricted to the western coast of southern California. Black-tailed jackrabbits can be distinguished from other hares by their large black-tipped ears and the black streak located on the top of the tail (Burt and Grossenheider 1976). This species is associated with grasslands and shrub areas, but is highly adaptable to disturbed areas (Jameson, Jr. and Peeters 1998). The black-tailed jackrabbit feeds on many herbs and grasses, and may breed any time of the year, depending on the food supply. Litters consist of approximately three to four young placed in shallow nest depressions in the ground (Jameson, Jr. and Peeters 1998). This species has been observed occupying several areas in the main cantonment area. Habitat for this species is present throughout the Base; however, no active burrows were located during the March 1996 survey (MARB 1998b).

The mountain plover (*Charodrius montanus*) occupies areas throughout the western U.S. during periods of migration and in the winter months. This species has been documented as occurring on March ARB and is a candidate for Federal listing under the ESA (16 U.S.C. 1536). This species forages on insects found in grassland areas. Mountain plovers are gray in color with a white wing stripe, and have a dark tail-band bordered by white feathers. Plovers are often distinguished by their characteristic style of running along the ground, taking short steps, and making frequent pauses (Robbins, Bruun, and Zim 1983). The breeding season for the mountain plover occurs in May, when approximately three olive-spotted eggs are laid in bare ground depression nests with little to no lining (Terres 1980). "Broken wing displays" are preformed by adults to lure nest intruders away from vulnerable nest locations (MARB 1998c).

The tricolored blackbird is a CSC species, and a common year-round resident in the area of March ARB. The tricolored blackbird forages and roosts in flocks, and nests in colonies of thousands along thickets and marshes. The tricolored blackbird is black with a red, bordered by white, shoulder patch, somewhat like the red-winged blackbird which has a red, bordered by yellow, shoulder patch. The tricolored blackbird occupies California year-round and has been observed foraging in groups with the red-winged blackbird on March ARB. The breeding season for the tricolored blackbird occurs from April to June. Nests are constructed of dried grasses and mud, and are placed in marshes, willow and blueberry thickets, or on the ground (Terres 1980).

The loggerhead shrike, a CSC species, has been observed occupying March ARB. This predatory songbird inhabits agricultural lands and other open areas. The loggerhead shrike resembles the northern mockingbird *(Minus polyglottos)*, but is a stockier bird with a bold black mask, black tail, and white wing patches. Their heavy bill is short and hooked. Nests are often in open-growing shrubs or small trees and are constructed of twigs, feathers, rootlets, and other plant fibers (Kale 1990). The loggerhead shrike nests from early March through June, and lays, on average, five light-gray, brown-spotted eggs. Shrikes are often perched on telephone wires and fences while hunting for small rodents, lizards, birds, grasshoppers, caterpillars, and other insects. Shrikes are incapable of grasping prey with their small feet, but frequently impale food items on barbed wire or long thorns (MARB 1998b).

The California horned lark (*Eremophila alestris actia*) is a ground bird with black sideburns, two small black horns, and a black breast mark. This species walks along the ground foraging on seeds, caterpillars, ants, grasshoppers, spiders and other insects. The California horned lark, a CSC species, nests in Southern California and has been observed occupying March ARB. Built by the females, their nests are placed in swallow depressions on the ground. Nests are lined with grasses, feathers, and hair. Two to four gray-white, brown speckled eggs are laid during early spring, usually February to July (MARB 1998c).

Wetlands. In March 1991, the USACE identified and delineated approximately 3.3 acres of jurisdictional wetlands along the Heacock and Cactus flood control channels in the northeastern portion of March ARB (MAFB 1996a). The Perris Storm drain near the perimeter roads of the southern end of Runway 14-32 contains small vernal pools (O'Neill 2002). Figure 3-9 shows the locations of wetlands at within the cantonment area of March ARB.

Vernal pools are a wetland type distinctive to the California region (USFWS 1987) and are considered jurisdictional wetlands (Ferren et al. 1996). Vernal pools are ephemeral wetlands that form in shallow depressions underlain by a substrate near the surface that restricts the percolation of water. They may be characterized by a barrier to overland flow that causes water to collect and pond. These depressions fill with rainwater during the fall and winter and may remain inundated until spring or early summer, sometimes filling and emptying numerous times during the wet season. With average rainfall patterns, vernal pools are characterized by an annual plant community dominated by wetland species (MARB 2002a). Vernal pools typically undergo four distinct phases: 1) the wetting phase beginning with the first rains in fall and early winter, 2) the aquatic phase when the peak rainfall and inundation occurs, 3) the drying phase when many plants flower and produce seed and many animals disperse; and 4) the drought phase when the soil dries and cracks, and the annual plants succumb to extreme dry conditions and turn brown (MARB 2002a).

Domestic Livestock. There are no domestic livestock present on March ARB. As a result, analysis of domestic livestock will not be carried forward for March ARB.

3.8.3 Training Areas

Desert Center Drop Zones (DZs)

Vegetation. The Desert Center DZ is within the Creosote Bush-Barsage section of the American Semidesert and Desert Province. The DZ is located on a sparsely vegetated, sandy alluvial fan that stretches south into a series of sand dunes. Vegetation in the American Semidesert and Desert Province is very sparse in most locations, with bare ground between individual plants. Cacti and thorny shrubs are conspicuous, but many thornless shrubs and herbs are also present. On the Sonoran Desert plains, the most widely distributed plant is the creosote bush (*Larrea tridentata*), which covers extensive areas in nearly pure stands. On some parts of the plains the arborescent cacti, or cholla (*Opuntia* sp.), are also common. Mesquite (*Prosopis* sp.) is less widespread and grows only along washes and watercourses (Bailey 1995).

Wildlife. Large ungulates are almost absent from the desert region of the Desert Center DZ. Some of the species that do occur are desert mule deer and collared peccary (*Tayassu tajacu*) that live chiefly in the paloverde-cactus shrub community. Carnivores, including the desert kit fox, western spotted skunk, and coyote, are small and usually nocturnal. Nocturnal burrowers, particularly kangaroo rats and pocket mice are common in the region. Merriam kangaroo rat (*Dipodomys merriami*) is closely associated with creosote bush and is common to the region. Other important species are the longtail pocket mouse (*Chaetodipus formosus*), round-tailed ground squirrel (*Citellus tereticaudus*), black-tailed jackrabbit (*Lepus californicus*), and antelope ground squirrel (Bailey 1995).

Many of the birds in the desert regions are very selective in their type of habitat. Gila woodpecker (*Melanerpes uropygialis*), purple martin (*Progne subis*), Gambel's quail (*Callipepla gambelii*), the cactus wren (*Campylorhynchus brunneicapillus*), mountain quail, black-throated sparrow (*Amphispiza bilineata*), and greater roadrunner are common in the southern part of the region (Bailey 1995). Common raptors in the Desert Center DZ area include the golden eagle, red-tailed hawk, Cooper's hawk, American kestrel and western screech-owl.

Common herptile species in the region of the Desert Center DZ include gopher snake, horned lizard, collared lizard, desert iguana (*Dipsosaurus dorsalis*), sidewinder (*Crotalus cerastes*) and several species of rattlesnake. Some species are endemic to this region such as the Gila monster (*Helioderma suspectum*), which is the only poisonous lizard in the U.S. (Bailey 1995).

Threatened and Endangered Species. USFWS and the CADFG were contacted regarding the presence of threatened and endangered species in the geographic area Desert Center DZ to satisfy Section 7(c) of the ESA (16 U.S.C. 1536) and the California Endangered Species Act (MARB 1998b).

In an August 1995 Environmental Assessment of the Desert Center DZ for the 452 AMW, the USFWS was contacted regarding the presence of threatened and endangered species occurring in the region of influence. No threatened and endangered species were identified as occurring in the region of influence. The Desert Center DZ is located within the range of the Western Mohave Desert population of the desert tortoise (*Gopherus agassizi*), which is federally and California listed as threatened. However, according to Bureau of Land Management (BLM) personnel, no desert tortoise sign has been identified in the vicinity of the DZ (MAFB 1995a).

The desert tortoise has a distinctive high-domed shell and elephant-like legs in terms of appearance and certain physical characteristics. Tortoises range in size from approximately two inches at the time of hatching to 15 inches for a large, mature male. The top shells (carapace) are brown, gray, or black, often with distinctive sections or growth lines, while the shell underneath (plastron) is often lighter in color. Desert tortoises have a life span from 50 to 100 years or more. The desert tortoise reaches sexual maturity between the ages of 12 and 20 years. Nests are built and eggs are laid in late spring, with a clutch size of 1 to 14 eggs. The eggs hatch after 70 to 120 days of incubation. The tortoise feeds on herbaceous perennials, grasses, and cacti. Desert tortoises hibernate for up to 9 months each year, becoming most active from March through June, and September and October. Most activity, however, is restricted to the early morning and evening when temperatures are cooler (MAFB 1995a).

Wetlands. No wetlands are known to occur in the operational area of the Desert Center DZ. As a result, analysis of wetlands will not be carried forward for Desert Center DZ.

Domestic Livestock. There are no domestic livestock present on Desert Center DZ. As a result, analysis of domestic livestock will not be carried forward for Desert Center DZ.

Military Training Routes (MTRs)

Vegetation. Vegetation within the region of influence overlain by the MTR corridors consist of a three state region typified by seven ecoregion types: California Coastal Range Open Woodland Shrub Coniferous Forest Meadow Province, Sierran Steppe Mixed Forest Coniferous Forest Alpine Meadow Province, California Coastal Chaparral Forest Shrub Province, California Dry Steppe Province, Intermountain Semidesert and Desert Province, American Semidesert and Desert Province, and the Colorado Plateau Semidesert Province (Bailey 1995). The area overlain by the MTR corridors and represented by these ecoregions comprises a large vegetative diversity.

Wildlife. Where two different habitats or plant communities meet, the resulting ecotonal corridor is typically represented by relatively higher animal diversity. A diversity of wildlife species have the possibility to occur within the affected environment of the MTRs due to the wide expanse of ecosystems overflown. The general species distribution was considered because the MTRs overlap several large areas. Wildlife presence in these zones depends on the season and preferred habitat availability.

Mammals common to areas overflown by the MTRs include mule deer (*Odocoileus hemionus*), coyote, mountain lion (*Puma concolor*), California bobcat (*Lynx rufus*), gray fox (*Urocyon cinereoargenteus*), dusky-footed wood rat (*Neotoma fuscipes*), western spotted skunk (*Spilogale gracilis*), brush rabbit (*Sylvilagus bachmani*), opossum (*Didelphis virginiana*), pronghorn antelope, whitetail prairie dog (*Cynomus leucurus*), porcupine (*Erethizon dorsatum*), white-footed mouse (*Peromyscus leucopus*), cliff chipmunk (*Tamias dorsalis*), Colorado chipmunk (*Tamias quadrivittatus*), rock squirrel (*Spermophilus variegatus*), and elk (*Cervus elaphus*) (Bailey 1995). Desert bighorn sheep (*Ovis canadensis nelsoni*) were recently transplanted into the Rawhide Mountains by the Arizona Fish and Game Department (AZFGD). Bighorn sheep are also present in the Mohave, Bill Williams, and Buckskin Mountains (MAFB 1995b).

Small mammals known to occur underlying the MTRs include the Merriam's chipmunk (*Tamias merriami*), California mouse (*Peromyscus californicus*), Ord's kangaroo rat (*Dipodomys ordii*), Beechy ground squirrel, desert cottontail (*Sylvilagus audubonii*), blacktail jackrabbit (*Lepus californicus*), California mouse (*Peromyscus californicus*), kangaroo rats (*Dipodomys*), wood rats (*Neotoma* sp.), kit fox (*Vulpes macrotis*), Belding ground squirrel (*Spermophilus beldingi*), Townsend ground squirrel (*Spermophilus townsendii*), and striped skunk (*Mephitis mephitis*) (Bailey 1995).

The most common birds that nest in and migrate through the area underlying the MTRs include wrentit (*Chamaea fasciata*), common bushtit (*Psaltriparus minimus*), rufous-sided towhee, white-crowned sparrow, golden-crowned sparrow (*Zonotrichia atricapilla*), several races of fox sparrow (*Passerella iliaca*), hermit thrush (*Catharus guttatus*), ruby-crowned kinglet (*Regulus calendula*), Audubon's warbler (*Dendroica coronata auduboni*), California quail (*Callipepla californica*), mourning dove, horned lark (*Eremophila alpestris*), western meadowlark, western kingbird (*Tyrannus verticalis*), northern mockingbird, house finch, lesser goldfinch, red-shafted flicker (*Colaptes auratus*), northern scrub jay (*Aphelocoma californica*), greater roadrunner (*Geococcyx californianus*), sage sparrow (*Amphispiza belli*), sage thrasher (*Oreoscoptes montanus*), greater sage grouse (*Oreoscoptes montanus*), pinyon jay (*Gymnorhinus cyanocephalus*), plain titmouse (*Parus inornatus*), black-chinned hummingbird (*Archilochus alexandri*), Woodhouse's jay, red-shafted flicker, rock wren (*Salpinctes obsoletus*), chipping sparrow (*Spizella passerinus*), common nighthawk (*Chordeiles minor*), black-throated gray warbler (*Dendroica nigrescens*), northern cliff swallow (*Hirundo pyrrhonata*), lark sparrow (*Chondestes grammacus*), pink-sided junco (*Junco hyemalis*), Shufeldt's junco, gray-headed junco (*Junco hyemalis*), red-backed junco, mountain bluebird (*Sialia currucoides*), robin (*Turdus migratorius*), Steller's jay (*Cyanocitta stelleri*), and wild turkey (*Meleagris gallopavo*) (Bailey 1995). Coastal California is a major migration route for both water and land birds. From midsummer through winter and spring, thousands of shorebirds, ducks, and geese inhabit coastal estuaries, lagoons, and mudflats. The Cibola, Havasu, Salton Sea, and Bill Williams Delta National Wildlife Refuges, which underlie the MTRs, attract migrating waterfowl in the winter months along the Pacific flyway. As many as 1.5 million ducks and 150,000 geese migrate annually through this portion of the flyway.

Common raptors in the area within the MTR corridors include the golden eagle, Cooper's hawk, red-tailed hawk (*Buteo jamaicensis*), American kestrel, and western screech-owl (*Otus kennecottii*), northern pygmy-owl (*Glaucidium gnoma*), and great gray owl (*Strix nebulosa*) (Bailey 1995).

Of the herptile species located underlying the MTRs, there are a variety of species of snakes and lizards quite common to the region. Characteristic reptiles within the area include several species of rattlesnake (*Crotalus sp.*), gopher snake, horned lizard (*Phrynosoma sp.*), collared lizard

(*Crotaphytus collaris*), side blotched lizard, western fence lizard, granite spiny lizard, southern alligator lizard, and southern Pacific rattlesnake (Bailey 1995).

Threatened and Endangered Species. The MTR corridors cover a wide range of ecoregions. Pursuant to the requirements of the ESA (16 U.S.C. § 1536), the USFWS and the appropriate state wildlife and fisheries management agency in each state overlain by the MTR corridors were contacted regarding the presence of threatened and endangered species. The USFWS, CADFG, and AZFGD were contacted regarding the presence of threatened and endangered species in the geographic area underlying the IR 214 and VR 296. Table 3-27 presents the Federal- and state-listed threatened and endangered species that may occur or migrate through the ROI.

Table 3-27. Listed Species That May Occur Within or Migrate Through IR 214 and VR 296

Species (Common Name, *Scientific name*)	Status[1] and Location	
	CA ROI	AZ ROI
BIRDS		
Bald eagle, *Haliaeetus leucocephalus*	FT, SE	FT
Yuma clapper rail, *Rallus longirostris yumanensis*	FE, ST	FE
Southwestern willow flycatcher, *Empidonax trailii extimus*	FE	FE
California brown pelican, *Pelecanus occidentalis californicus*	FE, SE	FE
California condor, *Gymnogyps californianus*	FE, SE	FE
Mexican spotted owl, *Strix occidentalis lucida*	NP	FT
REPTILES / AMPHIBIANS		
Desert tortoise, *Gopherus agassizii*	FT, ST	FT
MAMMALS		
Hualapai Mexican vole, *Microtus mexicanis hualpaiensis*	NP	FE

Source: USFWS 2002
Note: [1] Status: FE – Federally listed endangered species
FT – Federally listed threatened species
SE– State listed endangered species
ST– State listed threatened species
CSC –California Species of Special Concern
NP– Not Present in the ROI

USFWS, CADFG, and the Nevada Division of Wildlife (NVDOW) were contacted regarding the presence of threatened and endangered species in the geographic area of areas underlying IR 217. Table 3-28 presents the Federal- and state-listed threatened and endangered species that may occur or migrate through the ROI.

Table 3-28. Listed Species That May Occur Within or Migrate Through IR 217

Species (Common Name, *Scientific name*)	Status[1] and Location	
	CA ROI	NV ROI
BIRDS		
Bald eagle, *Haliaeetus leucocephalus*	FT, SE	FT
Yuma clapper rail, *Rallus longirostris yumanensis*	FE, ST	NP
Southwestern willow flycatcher, *Empidonax trailii extimus*	FE	NP
California brown pelican, *Pelecanus occidentalis californicus*	FE, SE	NP
California condor, *Gymnogyps californianus*	FE, SE	NP
REPTILES / AMPHIBIANS		
Desert tortoise, *Gopherus agassizii*	FT, ST	FT

Note: [1] Status: FE – Federally listed endangered species
FT – Federally listed threatened species
SE– State listed endangered species
ST– State listed threatened species
CSC –California Species of Special Concern
NP– Not Present in the ROI

USFWS and CADFG were contacted regarding the presence of threatened and endangered species in the geographic area underlying the VR 289, VR 1217, VR 1257, and VR 1265. Table 3-29 presents the Federal- and state-listed threatened and endangered species that may occur or migrate through the ROI.

Domestic Livestock. Livestock are commonly raised in the area underlying the MTR corridors. Cattle, sheep, hogs, chickens, and horses are common livestock in the area.

3.9 Cultural Resources

3.9.1 Definition of the Resource

Cultural resources are defined by the National Historic Preservation Act (NHPA) as prehistoric and historic sites, structures, districts, or any other physical evidence of human activity considered important to a culture, a subculture, or a community for scientific, traditional, religious, or any other reason. Depending on the condition and historic use, such resources provide can provide scientific data regarding the living conditions and lifeways of previous civilizations and/or may retain cultural and religious significance to modern groups. Several Federal laws and regulations govern protection of cultural resources, including NHPA, NEPA, the Archaeological and Historic Preservation Act, the Archaeological Resources Protection Act, and the Native American Graves Protection and Repatriation Act.

Table 3-29. Listed Species That May Occur Within or Migrate Through VR 289, VR 1217, VR 1257, and VR 1265

Species (Common Name, *Scientific name*)	Status[1] and Location
	CA ROI
BIRDS	
California condor, *Gymnogyps californianus*	FE, SE
Bald eagle, *Haliaeetus leucocephalus*	FT, SE
Bank swallow, *Riparia riparia*	ST
Greater sandhill crane, *Grus canadensis tabida*	ST
Little willow flycatcher, *Empidonax traillii brewsteri*	ST
Swainson's hawk, *Buteo swainsoni*	ST
Least Bell's vireo, *Vireo bellii pusillus*	FE, SE
Southwestern willow flycatcher, *Empidonax traillii extimus*	FE
REPTILES / AMPHIBIANS	
Blunt-nosed leopard lizard, *Gambelia sila*	FE, SE
California red-legged frog, *Rana aurora draytonii*	FT
Giant garter snake, *Thamnophis gigas*	FT, ST
Tehachapi slender salamander, *Batrachoseps stebbinsi*	ST
Kern Canyon slender salamander, *Batrachoseps simatus*	ST
Southern rubber boa, *Charina bottae umbratica*	ST
MAMMALS	
Tipton kangaroo rat, *Dipodomys nitratoides nitratoides*	FE, SE
Buena Vista Lake shrew, *Sorex ornatus relictus*	FE,
Sierra Nevada red fox, *Vulpes vulpes necator*	ST
California wolverine, *Gulo gulo luteus*	ST
Mohave ground squirrel (*Spermophilus mohavensis*	ST
Fresno kangaroo rat, *Dipodomys nitratoides exilis*	FE, SE
San Joaquin antelope squirrel, *Ammospermophilus nelsoni*	ST
Sierra Nevada bighorn sheep *Ovis canadensis californiana*	SE
San Joaquin kit fox, *Vulpes macrotis mutica*	FE, ST
Giant kangaroo rat, *Dipodomys ingens*	FE, SE

Source: MAFB 1995a
Note: [1] Status: FE – Federally listed endangered species
FT – Federally listed threatened species
SE– State listed endangered species
ST– State listed threatened species
CSC –California Species of Special Concern
NP– Not Present in the ROI

Typically, cultural resources are subdivided into *archaeological resources* - prehistoric or historic sites (where human activity has left physical evidence of that activity, but no structures remain standing), or *architectural resources* - buildings or other structures or groups of structures that are of historic or aesthetic significance. Archaeological resources comprise areas where human activity has measurably altered the earth or deposits of physical remains are found (i.e. arrowheads, pottery, human remains, historic debris, etc.). Architectural resources include standing buildings, bridges, dams, and other structures of historic or aesthetic significance. Generally, architectural resources must be more than 50 years old to be considered eligible for nomination to the NRHP. More recent structures, such as Cold War-era resources, may be eligible for nomination to the NRHP if they are particularly unique, or have the potential to gain significance in the future.

Only those cultural resources determined to be significant are subject to analysis during the EA process. Significant cultural resources are those that meet one or more of the criteria defined in 36 CFR 60.4 for inclusion on the NRHP. The general criteria for the determination of significance for cultural resources are based on several qualities, including uniqueness, association with important historic persons or events, the degree of integrity that the resource retains, its setting, and the resource's potential to retain important scientific data.

Proposed activities associated with the beddown of C-17 aircraft at March ARB are divided into two regions of influence, and have the potential to affect previously identified significant cultural resources differently in each of those regions. They are:

- The ROI associated with proposed facility construction, building demolition, and building alteration at March ARB
- The ROI associated with the proposed MTRs and the Desert Center DZ

The potential indirect impacts associated with the operation of C-17 aircraft at March ARB and within the proposed MTRs and DZ would be considerably different from the potential direct impacts associated with the proposed facility construction and renovations required to beddown and maintain the C-17 aircraft at March ARB. For purposes of clarity, an analysis of the potential direct and indirect impacts in each of these ROIs is presented independently in the following sections.

3.9.2 March ARB

The area in which construction related activities associated with the proposed beddown of C-17 aircraft at March ARB would occur has been inventoried, and all potentially significant cultural resources have been documented and evaluated for NRHP nomination eligibility in accordance with the requirements of 36 CFR 800 (Manley 1995, MAFB 1996b). The scope of the analyses presented in this section is limited to the cultural resources within the proposed region of influence that have been identified as significant as a result of previously documented cultural resource evaluations conducted in consultation with the California SHPO and the Advisory Council on Historic Preservation (ACHP). Significant cultural resources previously identified within this vicinity are represented primarily by the March Field Historic District, which has been documented, evaluated, and deemed eligible for nomination to the NRHP (Manley 1995, MAFB 1996b). Alterations to three eligible buildings that are within, and are contributing elements to, the March Field Historic District are planned in association with the proposed project. Alteration of eight ineligible buildings, the demolition of one ineligible building, and the construction of one new building outside of the March Field Historic District are also planned in association with the proposed project (see Table 3-30).

Table 3-30. Buildings Affected by Construction Associated with the Proposed Project

Building Number	Building Use	Year Built	NRHP Status	Reference
0355	Maintenance Shop	1929	Eligible	MAFB 1996b
0420	Life Support	1931	Eligible	MAFB 1996b
0453	Maintenance Shop	1929	Eligible	MAFB 1996b
0600	Flight Simulator	N/A	Not Eligible	MAFB 1996b
1221	Maintenance Hangar	1956	Not Eligible	Manley 1995
2303	Maintenance Hangar	1951	Not Eligible	Manley 1995
2306	Maintenance Dock	1967	Not Eligible	Manley 1995
2307	Maintenance Dock	1970	Not Eligible	Manley 1995
2240	Squadron Operations	N/A	Not Eligible	MAFB 1996b
2327	Maintenance Shop	N/A	Not Eligible	MAFB 1996b
2328	Maintenance Shop	N/A	Not Eligible	MAFB 1996b

Previous archaeological survey, excavation, and archival research has not resulted in the identification of significant archaeological resources, traditional cultural properties, or sacred sites within the vicinity of March ARB (Manley 1995, MAFB 1996b).

3.9.3 Training Areas

An analysis of the potential noise related impacts associated with the operation of C-17 aircraft within the proposed MTRs and the Desert Center DZ indicates that there would be no impact to subsurface (archaeological) resources, nor would there be any impact to above-ground (architectural) cultural resources. In addition, the immense size and indefinite boundaries of the

MTRs, the fact that the proposed MTRs and the Desert Center DZ would utilize existing military airspace and facilities, and the fact that no construction or ground disturbing activities would be taking place in these areas, data regarding cultural resources located within the vicinity of these areas were not collected, nor are they presented in this analysis. Potential indirect impacts associated with the MTRs and DZ are discussed in relation to general types of cultural resources that may be present within these areas. See Figures 2-6 through 2-9 for details regarding the estimated dimensions of the proposed MTRs and the location of the Desert Center DZ.

3.10 Socioeconomics and Environmental Justice

3.10.1 Definition of the Resource

Socioeconomics are defined as the basic attributes and resources associated with the human environment, particularly population and economic activity. Regional birth and death rates and immigration and emigration affect population levels. Economic activity typically encompasses employment, personal income, and industrial or commercial growth. Changes in these two fundamental socioeconomic indicators may be accompanied by changes in other components, such as housing availability and the provision of public services. Socioeconomic data at county, state, and national levels permits characterization of baseline conditions in the context of regional, state, and national trends.

Data in three areas provide key insights into socioeconomic conditions that might be affected by a proposed action. Data on employment may identify gross numbers of employees, employment by industry or trade, and unemployment trends. Data on personal income in a region can be used to compare the "before" and "after" effects of any jobs created or lost as a result of the Proposed Action. Data on industrial or commercial growth or growth in other sectors provides baseline and trend line information about the economic health of a region.

In appropriate cases, data on an installation's expenditures in the regional economy help to identify the relative importance of an installation in terms of its purchasing power and jobs base.

Demographics identify the population levels and changes to population levels of a region. Demographics data may also be obtained to identify, as appropriate to evaluation of a proposed action, its characteristics in terms of race, ethnicity, poverty status, educational attainment level, and other broad indicators.

On February 11, 1994, President Clinton issued EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*. This EO requires that Federal agencies' actions substantially affecting human health or the environment do not exclude persons, deny persons benefits, or subject persons to discrimination because of their race, color, or national origin. The essential purpose of the EO is to ensure the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no groups of people, including racial, ethnic, or socioeconomic groups, should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of Federal, state, tribal, and local programs and policies. Consideration of environmental justice concerns includes race, ethnicity, and the poverty status of populations in the vicinity of where a proposed action would occur. Such information aids in evaluating whether a proposed action would render vulnerable any of the groups targeted for protection in the EO.

Socioeconomic data shown in this section are presented at county, state, and U.S. levels to characterize baseline socioeconomic conditions in the context of regional, state, and national trends. Data have been collected from previously published documents issued by Federal, state, and local agencies; from state and national databases (e.g., U.S. Bureau of Economic Analysis' Regional Economic Information System).

On April 21, 1997, the President issued EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*. This EO requires Federal agencies, to the extent permitted by law and mission, to identify and assess environmental health and safety risks that might disproportionately affect children. The EO further requires Federal agencies to ensure that their policies, programs, activities, and standards address these disproportionate risks. The order defines environmental health and safety risks as "risks to health or to safety that are attributable to products or substances that the child is likely to come in contact with or ingest (such as the air we breathe, the food we eat, the water we drink and use for recreation, the soil we live on, and the products we use or are exposed to)." Such information aids in evaluating whether a proposed action would render vulnerable children targeted for protection in the EO.

The proposed utilization of existing DZs and MTRs would not require construction or ground disturbance. There would be no potential for impacts to socioeconomic resources. Therefore, the description of the affected environment for socioeconomic resources will be limited to March ARB and the surrounding area.

3.10.2 March ARB

In FY 02, March ARB employed nearly 8,300 persons; more than half of whom were employed by the 452 AMW. The 452 AMW includes almost 4,200 Air Force Reservists and approximately 915 Air Reserve Technicians or civilians. All military personnel live off-base; however, there are 433 rooms available for qualified military members and retirees on a space available, temporary basis.

March ARB's total expenditures were $77,770,212 in FY 02. Furthermore, there was a total annual payroll of approximately $150,422,844. The payroll expenditure for March ARB, combined with the expenditure on operations and maintenance relate activities, is estimated to have created 2,357 secondary jobs in the surrounding communities and had an overall economic impact of $324,210,165.

The ROI for economic activities at March ARB is Riverside County, CA. Data relevant to Riverside County, the State of California, and the U.S. are provided in Table 3-31. To comply with EO 12898, ethnicity and poverty status in the vicinity of March ARB were examined and compared to state and national data. The Census Bureau bases the poverty status of families and individuals on threshold variables, including income, family size, number of family members under 18 and over 65 years of age, and amount spent on food. The U.S. poverty threshold is $13,738 for a family of three, and 12.4 percent of the U.S. population were below the poverty level in 2000. Based on the 2000 U.S. Census Bureau (Table 3-31), Riverside County and the State of California have a slightly higher poverty level than the national level.

3.11 Infrastructure

3.11.1 Definition of the Resource

Infrastructure consists of the systems and physical structures that enable a population in a specified area to function. Infrastructure is wholly human-made, with a high correlation between the type and extent of infrastructure and the degree to which an area is characterized as "urban" or developed. The availability of infrastructure and its capacity to support growth are generally regarded as essential to economic growth of an area. The infrastructure information contained in

Table 3-31. Race and Poverty Characteristics in Riverside County, the State of California, and the U.S.

	U.S.	State of California	Riverside County, California
Total Population	281,421,906	33,871,648	1,545,387
Percent White	75.1	59.5	65.6
Percent Black	12.3	6.7	6.2
Percent American Indian, Eskimo, or Aleut	0.9	1.0	1.2
Percent Asian or Pacific Islander	3.7	11.2	4.0
Percent Other	5.5	16.8	18.7
Percent Reporting 2 or more races	2.4	4.7	4.4
Percent Living in Poverty	12.4	14.2	14.2

Source: U.S. Bureau of Census 2000

this section was obtained from the March ARB General Plan (MARB 2000a) and provides a brief overview of each infrastructure component and comments on its existing general condition. The infrastructure components to be discussed in this section include transportation systems, utilities (electrical power, natural gas, liquid fuel, liquid oxygen [LOX] systems, and water supply), solid waste, and sanitary systems.

Solid waste management primarily concerns itself with the availability of landfills to support a population's residential, commercial, and industrial needs. Alternative means of waste disposal may involve waste-to-energy programs or incineration. In some localities, landfills are designed specifically for, and limited to, disposal of construction and demolition debris. Recycling programs for various waste categories (e.g., glass, metals, and papers) reduce reliance of landfills for disposal.

Since no construction activities would occur within the areas underlying the MTRs and at the Desert Center DZ, this section will only analyze the existing infrastructure environment on March ARB.

3.11.2 March ARB

Prior to realignment, March ARB consisted of over 6,500 acres. The realignment of March Field has excessed over 4,000 acres, leaving the base limited room for future facility development. Though March ARB has been drastically reduced in size, the installation retains nearly all of its mission-critical property and facilities, which includes the airfield, flightline, logistic support, and administrative facilities (March ARB 2000a).

Transportation Systems. March ARB is located at the confluence of two major transportation arteries making it readily accessible to the San Diego Metropolitan Area, Los Angeles Basin, and to destinations northeast. Rapid growth in the surrounding communities and the realignment of the bases' cantonment area has affected the traffic circulation on- and off-base.

The off-base transportation system consists of regional access to the base via Interstate (I)-215 and State Route (SR)-60. Cactus Avenue, a four-lane arterial, provides direct access to March ARB and is the primary east-west arterial providing connectivity with I-215 and the Moreno Valley. I-215 is a six-lane north-south freeway, which defines the western boundary of the base. Major interchanges providing access to the base are I-215 at Cactus Avenue and I-215 at Alessandro Boulevard.

The transportation network on-base is delineated according to the road classifications outlined in AFI 32-7062, *Air Force Comprehensive Planning*. This AFI classifies the road network into three groups: arterial, collector, and local. The primary arterial serving March ARB's cantonment area is Graeber Avenue, a two-lane industrial arterial originating at the Main Gate at Cactus Avenue, running parallel to the flightline, and terminating at the south-side flightline facilities.

Electrical Power. Southern California Edison provides March ARB with electrical power. The base receives power delivered via a 34.5 kilovolt (KV) main substation. A 34.5 KV transmission line also serves the western portion of March ARB. The primary electrical distribution system on base is via 13.8 KV transmission lines. In 1994, the expected capacity within the March ARB cantonment area was 350.4 million watts (MW). The average monthly usage at that time was 3,386.4 MW per hour (MWH) or 14 percent of capacity. Peak power capacity was reported to be 32 MW. Peak usage within the cantonment area was reported to be 13.064 MW or 40.8 percent of capacity.

Natural Gas. Natural Gas distribution to March ARB is serviced by the Southern California Gas Company. The current distribution system is serviced via a 24-inch main. The natural gas distribution system provides service to the March ARB cantonment area. Many of the gas lines that comprise the natural gas distribution system do not comply with state standards. Following recent segregation of service, an alternate gas source to the Joint Powers Authority (JPA) property has been established by at Heacock Station.

Liquid Fuel. Liquid fuel distribution to March ARB is serviced by Kinder Morgan via a pipeline. March ARB utilizes JP-8, diesel, and motor gas (mogas) fuels. This fuel is stored in two 55,000-barrel and one 35,000-barrel bulk fuel tanks. Based on 1994 estimates, March ARB has excess JP-8 storage capacity of 3.5 million gallons above the normal requirements (March ARB 2000a).

The aircraft re-fueling system consists of two 10,000-gallon tanks and two type III systems. The maximum fuel rate for these two systems is 6,600 gallons per minute (gpm). The AGE fuel systems are supplied from Building 437, which includes a 5,000-gallon diesel storage tank, a 5,000-gallon mogas storage tank, and a 7,500-gallon JP-8 storage tank. The vehicular fuel systems serve the base gas station (Building 2495), which consists of two truck off-loading stations and two 300-gpm loading racks.

LOX Systems. March ARB operates a LOX storage facility with four storage tanks. Building 1254 has one 5,000-gallon LOX storage tank, one 2,000-gallon LOX storage tank, and two 2,000-gallon LOX storage tanks. Existing LOX facilities are adequate to meet AGE base needs; however, an adequate facility for LOX AGE storage and maintenance does not currently exist (MARB 2000a).

Water Supply. March ARB receives its water supply from the H.J. Mills Filtration Plant in Riverside, California, which is operated by the WMWD. As a result of the realignment of March ARB, the water treatment facilities that supply water to the base no longer belong to the base. Estimates of water usage for the realigned cantonment area of March ARB average approximately 1.2 million gallons per day (mgd). Currently, sources for potable water are adequate to meet March ARB's present needs and those for the foreseeable future (MARB 2000a).

Solid Waste. Municipal solid waste (MSW) at March ARB is managed in accordance with the guidelines specified in AFI 32-7042, *Solid and Hazardous Waste Compliance*. This AFI incorporates by reference the requirements of Subtitle D, 40 CFR Parts 240 through 244, 257, and 258, and other applicable federal regulations, AFIs, and DoD Directives. In general, AFI 32-7042 establishes the requirement for installations to have a solid waste management program that incorporates the following: a solid waste management plan; procedures for handling, storage, collection, and disposal of solid waste; record-keeping and reporting; and pollution prevention.

A contractor handles the collection, transportation, and removal of non-hazardous MSW from March ARB (Wright 2003). Waste is collected in dumpsters located throughout the base and then removed. Currently, there are no operating landfills at March ARB.

Non-hazardous MSW from March ARB is primarily transported to the El Sobrante Sanitary Landfill, located in Corona, CA, with some MSW being transported to the Badlands Sanitary Landfill in Moreno Valley, CA. The El Sobrante Sanitary Landfill is managed by Waste Management, Inc. in Riverside County. The El Sobrante Sanitary Landfill is registered as a Class III landfill with a useful life of approximately 30 to 50 years (WM 2003). The Badlands Sanitary Landfill is managed by the Riverside County Waste Management District. The Badlands Sanitary Landfill is registered as a Class III landfill with a useful life of approximately 15 to 17 years (RCWMD 2003).

In FY 02, March ARB disposed 1,082 tons of non-hazardous MSW and 43.5 tons of construction and demolition (C&D) waste (Wright 2003). C&D waste generated from specific construction, renovation, and maintenance projects on March ARB, most of which are performed by off-base contractors, is the responsibility of the contractor. All non-recyclable C&D waste is collected in a C&D dumpster near the Resource, Recovery, and Recycling Program (RRRP) yard until removal. C&D waste contaminated with hazardous waste, asbestos, lead-based paint, or other undesirable components are managed in accordance with 452 SPTG/CEV procedures and AFI 32-7042.

Sanitary Systems. As a result of the realignment of March ARB, the sewage treatment plant that treats wastewater from March ARB no longer belongs to the base and is controlled by the Western Municipal Water District. The sewage treatment plant is located southwest of the main cantonment area west of I-215. The sewage treatment plant achieves secondary treatment using a two-stage trickling filter system and has a rated capacity of 1.2 mgd. Currently, the sewage treatment plant has the capacity to serve March ARB and many of the surrounding properties, including the joint-use cargo facilities (MARB 2000a).

3.12 Hazardous Materials and Wastes

3.12.1 Definition of the Resource

AFPD 32-70, *Environmental Quality*, establishes the policy that the Air Force is committed to:

- Cleaning up environmental damage resulting from its past activities

- Meeting all environmental standards applicable to its present operations
- Planning its future activities to minimize environmental impacts
- Managing responsibly the irreplaceable natural and cultural resources it holds in public trust
- Eliminating pollution from its activities wherever possible

Hazardous material is defined as any substance with physical properties of ignitability, corrosivity, reactivity, or toxicity that may cause an increase in mortality, serious irreversible illness, and incapacitating reversible illness, or that may pose a substantial threat to human health or the environment. Hazardous waste is defined as any solid, liquid, contained gaseous, or semisolid waste, or any combination of wastes that pose a substantial present or potential hazard to human health or the environment.

Evaluation of hazardous materials and wastes focuses on underground storage tanks and aboveground storage tanks and the storage, transport, and use of pesticides and herbicides, fuels, and Petroleum, Oils, and Lubricants (POLs). Evaluation may also extend to generation, storage, transportation, and disposal of hazardous wastes when such activity occurs at or near the project site of a proposed action. In addition to being a threat to humans, the improper release of hazardous materials and wastes can threaten the health and well-being of wildlife species, botanical habitats, soil systems, and water resources. In the event of release of hazardous materials or wastes, the extent of contamination varies based on type of soil, topography, and water resources.

Special hazards are those substances that may pose a risk to human health, but are not regulated as contaminants under the hazardous waste statutes. Included in this category are asbestos containing materials (ACM), radon, lead-based paint (LBP), polychlorinated biphenyls (PCBs), and unexploded ordnance. The presence of special hazards or controls over them may affect, or be affected by, a proposed action. Information on special hazards describing their locations, quantities, and condition assists in determining the significance of a proposed action.

The Comprehensive Environmental Response, Compensation, and Liability Act, as amended by the Superfund Amendments and Reauthorization Act, and the Toxic Substances Control Act define hazardous materials. The Solid Waste Disposal Act as amended by the Resource Conservation and Recovery Act, which was further amended by the Hazardous and Solid Waste Amendments, defines hazardous wastes. In general, both hazardous materials and wastes include substances that, because of their quantity, concentration, physical, chemical, or infectious characteristics, may present substantial danger to public health or welfare or the environment when released or otherwise improperly managed.

Through its Environmental Restoration Program (ERP), DoD evaluates and cleans up sites where hazardous wastes have been spilled or released to the environment. The ERP provides a uniform, thorough methodology to evaluate past disposal sites, to control the migration of contaminants, to minimize potential hazards to human health and the environment, and to clean up contamination. Description of ERP activities provides a useful gauge of the condition of soils, water resources, and other resources that may be affected by contaminants. It also aids in identification of properties and their usefulness for given purposes (e.g., activities dependent on groundwater usage may be foreclosed where a groundwater contaminant plume remains to complete remediation).

Since the operations occurring within the MTRs are limited to flying operations, analysis for hazardous materials and waste and ERP sites within the MTRs will not be carried forward. Furthermore, as the activities conducted at DZs (i.e., airdrops and retrievals) do not include the use or storage of hazardous materials, the generation of hazardous waste, or the potential to encounter contamination from ERP sites, analysis of hazardous material and waste and ERP sites at the DZs will not be carried forward. The remainder of this section only discusses hazardous material and waste and ERP site issues at March ARB.

3.12.2 March ARB

Hazardous Materials. AFI 32-7086, *Hazardous Materials Management*, establishes procedures and standards that govern management of hazardous materials throughout USAF. It applies to all USAF personnel who authorize, procure, issue, use, or dispose of hazardous materials, and to those who mange, monitor, or track any of those activities. The 452 AMW has established a hazardous materials pharmacy in accordance with AFI 32-7086 (MARB 2000b). The pharmacy ensures that only the smallest quantities of hazardous materials necessary to accomplish the mission are purchased and used.

Hazardous and toxic material procurements at March ARB are approved and tracked by the Bioenvironmental Engineering Office located at March ARB. The Environmental Management office at March ARB supports and monitors environmental permits, hazardous material and hazardous waste storage, spill prevention and response, and participation on the Base Environmental Protection Committee.

Hazardous Wastes. The 452 AMW maintains a Team March Hazardous Waste Management Plan (MARB 2000b) as directed by AFI 32-7042, *Solid and Hazardous Waste Compliance*. This plan prescribes the roles and responsibilities of all members of March ARB with respect to the waste stream inventory, waste analysis plan, hazardous waste management procedures, training, emergency response, and pollution prevention. The plan establishes the procedures to comply with applicable Federal, state, and local standards for solid waste and hazardous waste management.

Wastes generated at March ARB include waste flammable solvents, contaminated fuels and lubricants, paint/coating, stripping chemicals, waste oils, waste paint-related materials, MSW, and other miscellaneous wastes. Management of hazardous waste is the responsibility of each waste-generating organization and environmental management flight (452 SPTG/CEV). A USEPA permit for hazardous waste is not required on March ARB, because March ARB does not store hazardous waste on base for more than 90 days (MARB 2000b). A USEPA identification number has been assigned to March ARB for use in tracking hazardous waste once it leaves the base. It is the responsibility of hazardous waste generators to ensure that their hazardous waste is transferred daily to a designated 90-day hazardous waste site. There are no hazardous waste accumulation points authorized on March ARB. Base Supply/Pharmacy has appointed a primary and alternate manager for each hazardous waste site on March ARB. Hazard waste generators are required to maintain a listing of all the hazardous waste streams generated in their section, proper identification, handling, storage, and record keeping of hazardous waste.

Pollution Prevention. AFI 32-7080, *Pollution Prevention Program*, implements the regulatory mandates in the Emergency Planning and Community Right-to-Know Act, Pollution Prevention Act of 1990; EO 12856, *Federal Compliance with Right-to-Know Laws and Pollution Prevention Requirements*; EO 12873, *Federal Acquisition, Recycling, and Waste Prevention*; and EO 12902, *Energy Efficiency and Water Conservation at Federal Facilities*. AFI 32-7080 prescribes the establishment of Pollution Prevention Management Plans. The 452 AMW fulfills this requirement with the following plans:

- Integrated Solid Waste Management Plan (MARB 2002b)
- Storm Water Pollution Prevention Plan (AFRC 2001a)
- Team March Hazardous Waste Management Plan (MARB 2000b)
- Hazardous Material Emergency Planning and Response (HAZMAT) Plan (MARB 1999)

These plans ensure that March ARB maintains a waste reduction program and meets the requirements of the CWA, the NPDES permit program and Federal, state, and local requirements for spill prevention control and countermeasures.

Asbestos. AFI 32-1052, *Facilities Asbestos Management,* provides the direction for asbestos management at Air Force installations. This instruction incorporates by reference applicable requirements of 29 CFR 669 et seq., 29 CFR 1910.1025, 29 CFR 1926.58, 40 CFR 61.3.80, Section 112 of the CAA, and other applicable AFIs and DoD Directives. AFI 32-1052 requires bases to develop an asbestos management plan for the purpose of maintaining a permanent record of the status and condition of ACM in installation facilities, as well as documenting asbestos management efforts. In addition, the instruction requires installations to develop an asbestos operating plan detailing how the installation accomplishes asbestos-related projects. Asbestos is regulated by the USEPA with the authority promulgated under OSHA, 29 U.S.C. 669, et seq. Section 112 of the CAA regulates emission of asbestos fibers to ambient air. The USEPA policy is to leave asbestos in place if disturbance or removal could pose a health threat.

Asbestos at March ARB is managed in accordance with the Asbestos Management Plan that was updated in 2002 (MARB 2002c). This plan specifies procedures for the removal, encapsulation, enclosure, and repair activities associated with ACM abatement projects. Additionally, it is designed to protect personnel who live and work on March ARB from exposure to airborne asbestos fibers as well as to ensure the installation remains in compliance with Federal, state, and local regulations pertaining to asbestos. Not all of the buildings on March ARB have been surveyed to locate, identify, and evaluate any materials containing asbestos (O'Neill 2003). Materials that may contain asbestos include pipe insulation and floor tiles. Asbestos materials are removed on an as needed basis to minimize health risks from release of asbestos fibers during normal activities, maintenance, renovation, or demolition.

Lead-Based Paint. The Residential Lead-Based Paint Hazard Reduction Act of 1992, Subtitle B, Section 408 (commonly called Title X), passed by Congress on October 28, 1992, regulates the use and disposal of lead-based paint on Federal facilities. Federal agencies are required to comply with applicable Federal, state, and local laws relating to lead-based paint activities and hazards.

USAF policy and guidance establishes lead-based paint management at USAF facilities. The policy incorporates by reference the requirements of 29 CFR 1910.120, 29 CFR 1926, 40 CFR 50.12, 40 CFR 240 through 280, the CAA, and other applicable Federal regulations.

Additionally, the policy requires each installation to develop and implement a facility management plan for identifying, evaluating, managing, and abating lead-based paint hazards. LBP at March ARB is managed in accordance with the Lead-Based Paint Management Plan that was updated in 2002 (MARB 2002d). Not all of the buildings on March ARB have been surveyed to locate, identify, and evaluate any materials containing lead-based paint (O'Neill 2003).

Environmental Restoration Program. ERP is a subcomponent of the Defense Environmental Restoration Program (DERP) that became law under the Superfund Amendments and Reauthorization Act. The ERP requires each DoD installation to identify, investigate, and cleanup hazardous waste disposal or release sites.

March ARB began its ERP in 1983 with the investigation of possible locations of hazardous waste contamination. In March of 1989, March ARB was placed on the USEPA's National Priorities List (NPL), a list of sites that are considered to be of special interest and require immediate attention (MARB 2003). In 1990 a Federal Facility Agreement signed by the Air Force, USEPA, and Cal/EPA set a series of specific goals and timetables for the cleanup program. The USEPA and Cal/EPA are partners in the cleanup, and provide regulatory oversight throughout the process.

March ARB has an ERP and 44 validated ERP sites (MARB 2003). Figure 4-4 shows the location of the ERP sites and the proposed location of construction projects on March ARB. March ARB began its ERP program in 1988. Of the 44 ERP site areas on base identified as possibly requiring treatment, 35 have been completely cleaned or further investigation has shown that they do not pose a threat (MARB 2003). All leaking underground storage tanks have been removed. All former dumpsites have been either excavated or sealed in place. Sources of past leakage or other routes of contamination have been removed or repaired, and future contamination is prevented by strict regulation of the storage and handling of potentially hazardous materials.

None of the contamination at March ARB currently poses a threat to human health or the environment in the surrounding community. All contamination is contained within the base boundaries, with the exception of a low-level plume of trichloroethene (TCE) and tetrachloroethene (PCE) (chemicals from cleaning solvents) that has migrated into the groundwater off the eastern boundary of the base (MARB 2003).

Because the groundwater in the area of the plume is not used as a source for drinking water, and there is no pathway for exposure to the outside environment, the plume is not a hazard to area residents and does not restrict land use (except to prohibit the installation of drinking water wells). March ARB has been treating this plume and its source area since 1992, with a resulting decrease in the size and concentration of the plume.

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4. Environmental Consequences

Section 4 presents an evaluation of the environmental impacts that may result from implementing the Proposed Action or the No Action Alternative. This chapter focuses on impacts considered potentially significant. The general approach followed throughout this Section is to describe briefly the range of impacts that would occur and then provide a discussion of impacts that are considered significant.

The specific criteria for determining the significance of impacts and assumption for the analyses are presented under each resource area. Significance criteria for most potential impacts were obtained from standard criteria; Federal, state, or local agency guidelines and requirement; and/or legislative criteria. Long-term implications of the Proposed Action are also presented in this Section.

The significance of an action is measured in terms of its context and intensity. The extent to which a proposed action may affect an environmental resource depends on many factors. In some cases, environmental resources may be affected directly; in others, they may be affected indirectly; and in some cases, not affected at all.

The significance of an action is analyzed in several contexts, such as society as a whole (human, national), the affected region, the affected interests, and the locality. Significance may vary with the setting of a proposed action.

Intensity refers to the severity of impact. Impacts may be beneficial or adverse. Consideration must be given to whether an impact affects public health or safety and whether it affects areas having unique characteristics, such as historical or cultural resources, wetlands, or ecologically critical areas. The significance of impacts may also depend on the degree of their being controversial or posing highly uncertain, unique, or unknown risks. Significance may be found where an action sets a precedent for future actions having significant effects, as well as in cases involving cumulative impacts. In considering intensity, consideration must be given to the degree to which the action may adversely affect animal or plant species listed as endangered or threatened or their habitat. Finally, in evaluating intensity, consideration must be given to whether an action violates a law or regulation imposed for the protection of the environment.

4.1 Airspace Management

4.1.1 Evaluation Criteria

Impacts to airspace use were assessed by comparing the projected military flight operations with existing conditions and with forecasted civil aviation activities in the defined ROI. This assessment included analyzing the capability of affected airspace elements to accommodate projected military activities, and determining whether such increases would have any adverse impacts on overall airspace use in the area. Also included are considerations of factors such as the interaction of the proposed use of specific airspace with adjacent controlled, uncontrolled, or other military training airspace, possible impacts on other non-participating civil and military aircraft operations, and possible impacts on civil airports that underlie or are proximate to the airspace involved in the proposal.

4.1.2 March ARB

Impacts to airspace management are predicated on the extent to which the Proposed Action would affect air traffic in the vicinity of March ARB and the navigable airspace in an enroute environment. For additional information regarding Airspace Management, see Section 3.1.1.

Total airfield operations would decrease by approximately 34 percent under the Proposed Action (see Table 2-3). This is primarily due to having fewer aircraft stationed at March ARB. Also, training requirements would differ from what is currently being flown in C-141C aircraft. Overall, the Proposed Action would have a positive impact on airfield operations at March ARB.

4.1.3 Training Areas

Desert Center Drop Zone (DZ)

As part of the C-17 training, DZs are used to drop pallets and boxes to simulate cargo drops for humanitarian relief projects and wartime missions. Under the Proposed Action, the number of airdrops at the Desert Center DZ would decrease by approximately 65 percent from current activities (see Table 2-6). This would result in a positive effect to the airspace on or surrounding the DZ.

Military Training Routes (MTRs)

Training objectives for the MTRs include low-altitude navigation, ingress/egress at Desert Center DZ, and enemy threat avoidance. Safety is paramount, and inflight operations must ensure all safety procedures are followed to avoid conflict with other military or civilian air traffic.

IR 214. The Proposed Action would increase the annual use of this MTR by 26 sorties. This would not have a significant impact on other airspace. Projected flights in this corridor would average just over four sorties per month. However, consideration must be given to civilian air traffic along IR 214 on some segments due to the number of crossing Victor Airways. There are two private airports located within the route corridor. The current FLIP lists no noise-sensitive avoidance areas. The normal minimum altitude for training flights by the 452 AMW would be between 300 and 500 feet AGL during daylight hours and over 500 feet AGL during evening and night hours.

IR 217. The Proposed Action would increase the annual use of this MTR by 79 sorties. This would not have a significant impact on other airspace. Projected flights in this corridor would average fewer than 35 sorties per month. However, consideration must be given to civilian air traffic along IR 217 on some segments due to the number of crossing Victor Airways. There are three private and three public use airports located within the route corridor. The current FLIP lists no noise-sensitive avoidance areas. The normal minimum altitude for training flights by the 452 AMW would be between 300 and 500 feet AGL during daylight hours and over 500 feet AGL during evening and night hours.

VR 289. The Proposed Action would decrease the annual use of this MTR by 193 sorties. This would not have a significant impact on other airspace. Projected flights in this corridor would average 110 sorties per month. However, consideration must be given to civilian air traffic along VR 289 on some segments due to the number of crossing Victor Airways. There are three private and four public use airports located within the route corridor. The current FLIP lists no noise-sensitive avoidance areas. The normal minimum altitude for training flights by the 452 AMW would be between 300 and 500 feet AGL during daylight hours and over 500 feet AGL during evening and night hours.

VR 296. The Proposed Action would decrease the annual use of this MTR by 405 sorties. This would not have a significant impact on other airspace. Projected flights in this corridor would average fewer than 29 sorties per month. However, consideration must be given to civilian air traffic along VR 296 on some segments due to the number of crossing Victor Airways. There are three private and three public use airport located within the route corridor. The current FLIP lists no noise-sensitive avoidance areas. The normal minimum altitude for training flights by the 452 AMW would be between 300 and 500 feet AGL during daylight hours and over 500 feet AGL during evening and night hours.

VR 1217. The Proposed Action would increase the annual use of this MTR by 79 sorties. This would not have a significant impact on other airspace. Projected flights in this corridor would average fewer than seven sorties per month. However, consideration must be given to civilian air traffic along VR 1217 on most segments due to the number of crossing Victor Airways. There is one private airport located within the route corridor. The current FLIP lists one noise-sensitive avoidance area. The normal minimum altitude for training flights by the 452 AMW would be between 300 and 500 feet AGL during daylight hours and over 500 feet AGL during evening and night hours.

VR 1257. The Proposed Action would increase the annual use of this MTR by 79 sorties. This would not have a significant impact on other airspace. Projected flights in this corridor would average fewer than 16 sorties per month. However, consideration must be given to civilian air traffic along VR 1257 on some segments due to the number of crossing Victor Airways. There is one private airport located within the route corridor. The current FLIP lists three noise-sensitive avoidance areas. The normal minimum altitude for training flights by the 452 AMW would be between 300 and 500 feet AGL during daylight hours and over 500 feet AGL during evening and night hours.

VR 1265. The Proposed Action would increase the annual use of this MTR by 79 sorties. This would not have a significant impact on other airspace. Projected flights in this corridor would average fewer than seven sorties per month. However, consideration must be given to civilian air traffic along VR 1265 on some segments due to the number of crossing Victor Airways. There are four private airports located within the route corridor. The current FLIP lists one noise-sensitive avoidance areas. The normal minimum altitude for training flights by the 452 AMW would be between 300 and 500 feet AGL during daylight hours.

There would be no significant, adverse effects pertaining to use of the airspace within the MTR corridors under the Proposed Action. There would be beneficial impacts on VRs 289 and 296 because the number of annual sortie-operations would decrease.

4.2 Noise

4.2.1 Evaluation Criteria

Noise impact analyses typically evaluate potential changes to existing noise environments that would result from implementation of a proposed action. Potential changes in the noise environment can be beneficial (i.e., if they reduce the number of sensitive receptors exposed to unacceptable noise levels), negligible (i.e., if the total area exposed to unacceptable noise levels is essentially unchanged), or adverse (i.e., if they result in increased noise exposure to unacceptable noise levels). Projected noise impacts were evaluated quantitatively for the Proposed Action.

4.2.2 March ARB

Construction Program. Implementation of the Proposed Action would have minor, temporary effects on the noise environment near the project sites resulting from the use of heavy equipment for construction. The nearby facilities would experience muffled construction noise during the workday. However, noise generation would last only for the duration of construction activities, and could be reduced through the use of equipment exhaust mufflers and restriction of construction and demolition activities to normal working hours (i.e., between 7 a.m. and 5 p.m.). Because the noise environment on base and in the vicinity of March ARB is dominated by military aircraft overflight, noise produced by construction and demolition activities at the eight sites would not affect sensitive receptors on or off the base. Noise associated with construction and demolition activities would be comparatively minor, and would occur in relatively remote areas of the base.

Aircraft Operations. Noise is a principal concern associated with aircraft operations. The main issues concerning noise effects on humans are physiological effects (hearing loss and nonauditory effects), behavioral effects (speech or sleep interference and performance effects), and subjective effects such as annoyance. These issues are discussed in greater detail in Appendix C. Noise impacts would be considered significant if increased noise levels resulted in land use incompatibility.

Noise impacts in the vicinity of March ARB were analyzed by incorporating proposed aircraft operational data into the NOISEMAP computer model. Since flight operational data was not available for C-17 aircraft stationed at March ARB, it was provided from the NOISEMAP modeling completed in March 1999 for the C-17 unit at Charleston AFB, South Carolina. Under the Proposed Action, noise levels would greatly decrease in the vicinity of the March ARB (see

Table 4-1 and Figures 4-1 and 4-2). The area exposed to the noise levels of DNL 65 dBA or higher would decrease by about 1,400 acres or 29 percent. This change is due in large part to the decrease in aircraft operations, varying flight profiles, and the decrease in the amount of noise generated by the C-17 compared to the C-141C.

Table 4-1. Proposed Noise Contour Acreage in the Vicinity of March ARB

Contour Value (DNL)	Baseline	Proposed	Projected Decrease (%)
65 - 69	2,450	1,743	-28.86%
70 - 74	1,189	765	-35.50%
75 - 79	486	299	-38.48%
80 +	347	255	-26.51%
Total	4,469	3,062	-28.86%

As discussed in Section 3.2.1, the closest sensitive noise receptor that falls within the 65 dBA CNEL noise contours produced by aircraft operating from March ARB is Serrano Elementary School. Table 4-2 shows the results of the Proposed Action on the sensitive noise receptor sites. As indicated in the table, all noise levels at these sites remain below 50 dBA. The highest noise value is 48 dBA CNEL at Edgemont Elementary School, which remains constant under the Proposed Action because the DC-8 aircraft causing this value does not change from the baseline to the Proposed Action. Due to the altitude at which the aircraft operate, the reduced noise level produced by the C-17 compared to the C-141C, and the proximity of the sensitive noise receptor sites to March ARB, implementation of the Proposed Action would have a positive effect on these sensitive noise receptors.

Table 4-2. Sensitive Noise Locations

Sensitive Noise Receptor Sites	Existing Noise Level (DNL)	Proposed Noise Level (DNL)
Edgemont Elementary School	48 dBA	48 dBA
Serrano Elementary School	47 dBA	<45 dBA
Rivera Elementary School	<45 dBA	<45 dBA
Rancho Verde High School	<45 dBA	<45 dBA
Val Verde Elementary School	<45 dBA	<45 dBA

Source: MapPoint 2001

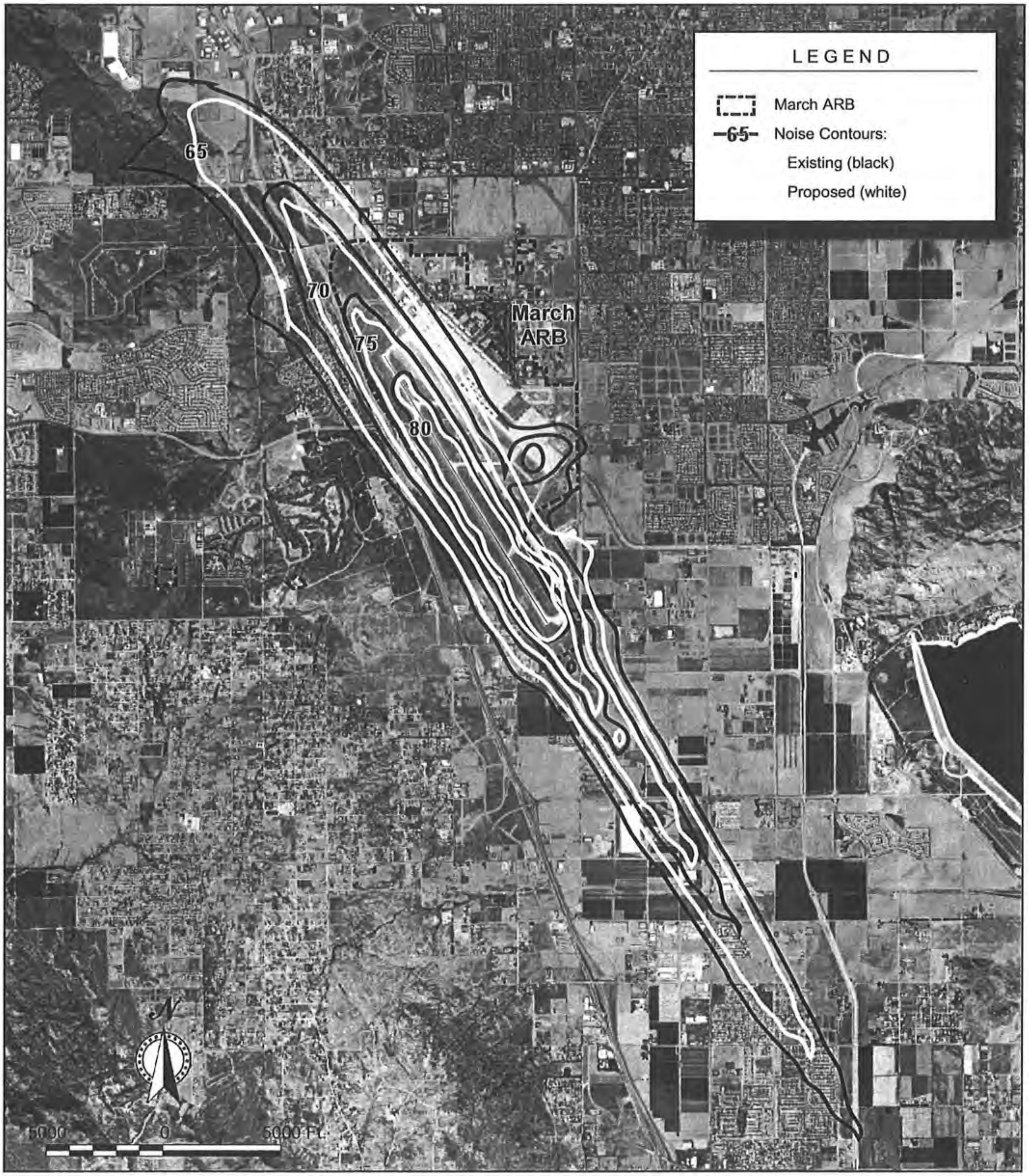

Figure 4-1. Proposed Noise Contours at March ARB

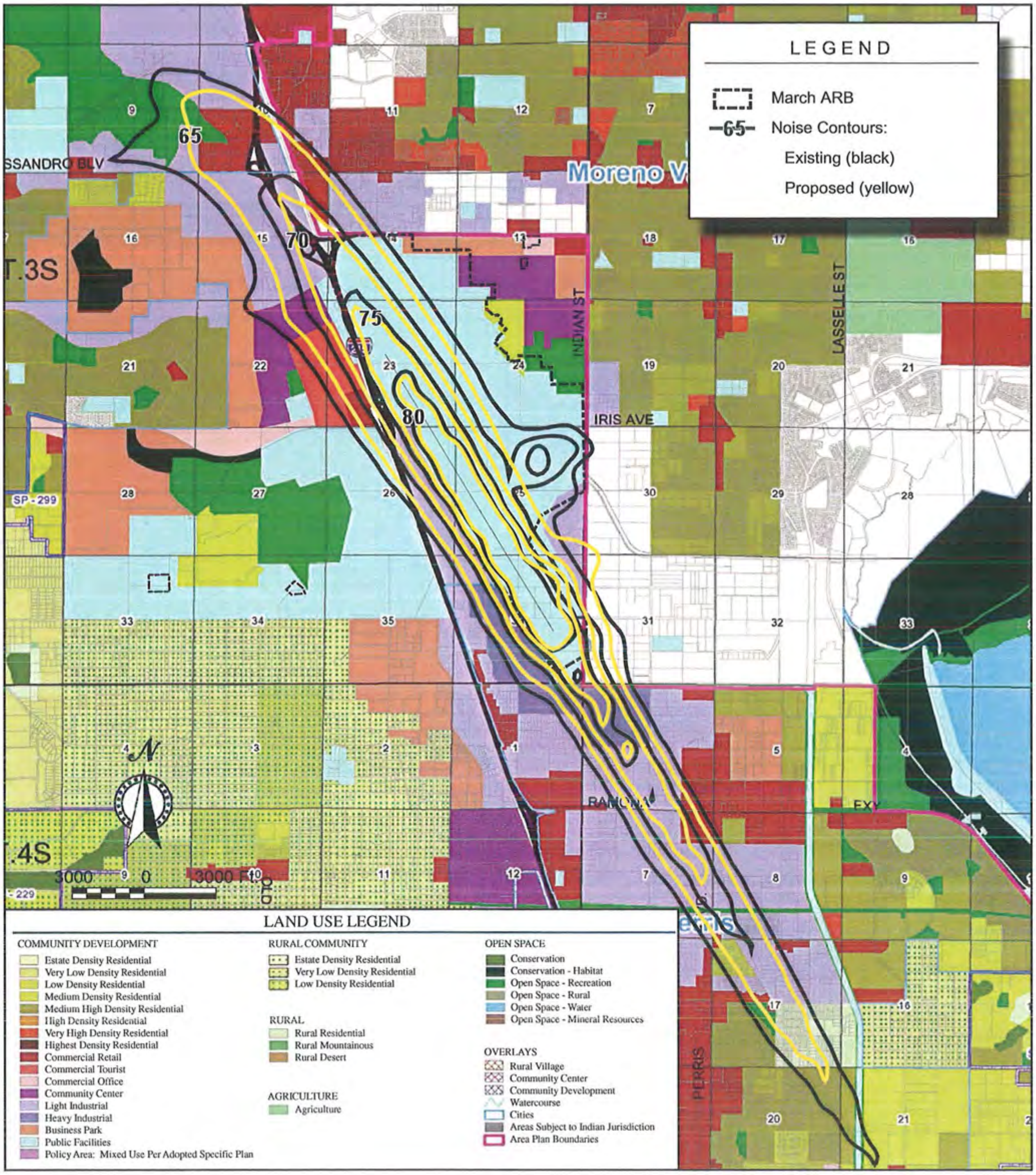

Figure 4-2. Existing Land Use and Proposed Noise Contours at March ARB

4.2.3 Training Areas

Desert Center DZ

Implementation of the Proposed Action would have a slight impact on noise within the existing Desert Center DZ environment when compared to previously assessed aircraft sorties operating within this airspace. The sorties shown in Table 2-6 depict the current and proposed sortie utilization. As expected, when the total sorties per year decrease from current levels, the proposed noise levels along these airspaces are below the baseline noise level for Desert Center DZ airspace area. The noise levels at the Desert Center DZ would decrease with the decrease in number of proposed sorties and airdrop passes. Furthermore, the NOISEMAP results indicated that a 65 dB noise level would not be reached at the Desert Center DZ or on any portion of the flight paths that were modeled for baseline or proposed conditions. Therefore, the Proposed Action would not have a significant impact resulting from noise at the Desert Center DZ.

MTRs

Implementation of the Proposed Action would have a slight impact on noise along existing MTRs when compared to previously assessed aircraft sorties operating within these airspace corridors. The sorties shown in Table 2-4 depict the current and proposed sortie utilization. As expected, when the total sorties per year either remain constant or increase from current levels, the proposed noise levels along these airspaces are equal to or slightly above the baseline noise level for each airspace unit. Table 4-3 depicts the baseline and proposed noise level for each airspace unit. In all cases, the noise level would remain below the L_{dnmr} of 65 dBA. Therefore, the Proposed Action would not have a significant impact resulting from noise along existing MTRs.

Table 4-3. Proposed Noise Contour Acreage in the Vicinity of March ARB

Identification	Baseline Noise Value (L_{dnmr})	Proposed Noise Value (L_{dnmr})	Projected Net Change
IR 214	< 45.0	< 45.0	40.9
IR 217	48.0	48.1	48.0
VR 289	60.0	60.0	60.0
VR 296	52.0	52.0	52.0
VR 1217	< 45.0	< 45.0	10.1
VR 1257	45.0	45.3	45.0
VR 1265	0.0	< 45.0	0.0

4.3 Land Use

4.3.1 Evaluation Criteria

The significance of potential land use impacts is based on the level of land use sensitivity in areas affected by a proposed action and compatibility of proposed actions with existing conditions. In general, a land use impact would be significant if it met the following criteria:

- Was inconsistent or in noncompliance with existing land use plans or policies
- Precluded the viability of existing land use
- Precluded continued use or occupation of an area
- Was incompatible with adjacent land use to the extent that public health or safety is threatened
- Conflicted with planning criteria established to ensure the safety and protection of human life and property

4.3.2 March ARB

No conversion of land use would occur at March ARB. Construction and demolition projects would occur on land classified as improved lands – Industrial Administrative. Impacts associated with construction, demolition, and removal of construction materials and debris would include temporary disruption of land uses due to elevated noise levels, increased dust, interference with roadway access, and visual effects. The majority of construction activities at March ARB involve interior renovations. One demolition and construction project would occur. Building 2307 would be demolished and a new hangar would be constructed on that site. No significant changes to land use would occur at March ARB.

There would be no adverse effects to the land use surrounding March ARB. All construction and demolition activities would be limited to areas located on the base.

4.3.3 Training Areas

Military Training Routes (MTRs)

Impacts to land use can be caused by noise or visual presence of aircraft. The most sensitive areas for noise and visual disturbance are wildlife areas, recreational areas, and urban development. Wildlife and recreational land usage can be affected if the area is intended to provide a remote, natural experience. Use of the seven MTRs would overfly State Parks, National Parks, National Wilderness Areas, National Forests, and Native American Reservations.

The areas most sensitive to noise resulting from aircraft overflights are National Wilderness Areas. Low flying military aircraft near National Wilderness Areas may cause a startle effect, but the noise exposure would be very brief.

Overflight by aircraft of lakes and rivers used for recreation may cause a slight visual and noise disturbance. However, the disturbances would be infrequent and brief, and would not cause a significant decline in recreational use of the resources. In addition, the noise levels estimated as a result of the implementation of the Proposed Action are within accepted land use guidelines. Therefore, no significant impacts would be expected as a result of the Proposed Action.

4.4 Air Quality

4.4.1 Evaluation Criteria

The potential impacts to local and regional air quality conditions near a proposed Federal action are determined based upon the increases in regulated pollutant emissions relative to existing conditions and ambient air quality. Specifically, the impact in NAAQS "attainment" areas would be considered significant if the net increases in pollutant emissions from the Federal action resulted in one of the following scenarios:

- Cause or contribute to a violation of any national or state ambient air quality standard
- Expose sensitive receptors to substantially increased pollutant concentrations
- Represent an increase of ten percent or more in an affected AQCR emissions inventory

Impacts to air quality in NAAQS "non-attainment" areas are considered significant if the net changes in project-related pollutant emissions result in one of the following scenarios:

- Cause or contribute to a violation of any national or state ambient air quality standard
- Increase the frequency or severity of a violation of any ambient air quality standard
- Exceed any significance criteria established in a SIP
- Delay the attainment of any standard or other milestone contained in the SIP

With respect to the General Conformity Rule, impacts to air quality would be considered significant if the proposed Federal action would result in an increase of a non-attainment or maintenance area's emission inventory by ten percent or more for one or more non-attainment pollutants, or if such emissions exceed *de minimis* threshold levels established in 40 CFR

93.153(b) for individual non-attainment pollutants or for pollutants for which the area has been designated as a non-attainment or maintenance area.

The *de minimis* threshold emission rates were established by the USEPA in the General Conformity Rule in order to focus analysis requirements on Federal actions with the potential to have "significant" air quality impacts. Table 4-4 presents these thresholds, by regulated pollutant. These *de minimis* thresholds are similar, in most cases, to the definitions for major stationary sources of criteria and precursors to criteria pollutants under the CAA's NSR Program (CAA Title I). As shown in Table 4-4, *de minimis* thresholds vary depending upon the severity of the non-attainment area designation by USEPA.

Table 4-4. General Conformity Rule *de minimis* Emission Thresholds

Pollutant	Status	Non-Attainment Classification	*de minimis* Threshold (tons/yr)
Ozone (measured as – "precursors": Nitrogen Oxides (NO_x) or Volatile Organic Compounds (VOCs))	Non-attainment	Extreme Severe Serious Moderate/marginal (inside ozone transport region) All others	10 25 50 50 (VOCs)/100 (NO_x) 100
	Maintenance	Inside ozone transport region Outside ozone transport region	50 (VOCs)/100 (NO_x) 100
Carbon Monoxide (CO)	Non-attainment/ Maintenance	All	100
Particulate Matter <10 microns (PM_{10})	Non-attainment Maintenance	Serious Moderate Not Applicable	70 100 100
Sulfur Dioxide (SO_2)	Non-attainment/ maintenance	Not Applicable	100
Nitrogen Dioxide (NO_2)	Non-attainment/ maintenance	Not Applicable	100

Source: 40 CFR 93.153(b)

Federal PSD regulations also define air pollutant emissions to be "significant" if: 1) a proposed major stationary source is within 10 kilometers of any Class I area; and 2) regulated pollutant emissions would cause an increase in the 24-hour average concentration of 1 $\mu g/m^3$ or more of any regulated pollutant in the Class I area (40 CFR 52.21(b)(23)(iii)). PSD regulations also define ambient air increments – limiting the allowable increases to any area's baseline air contaminant concentrations, based on the area's designation as Class I, II, or III (40 CFR 52.21(c)). Although not directly applicable to mobile sources, modeling of ambient air concentrations relative to aircraft emissions will show whether the Proposed Action causes a significant impact to ambient air quality in the affected areas. Given that six of the seven MTRs associated with the Proposed Action pass within 10 km of a Class I area, the Joshua Tree Wilderness Area, the resulting impacts have been assessed using appropriate dispersion modeling for this analysis.

Local and regional pollutant impacts resulting from direct and indirect emissions from stationary emission sources under the Proposed Action are addressed through Federal and state permitting program requirements under the NSR and PSD regulations (40 CFR Parts 51 and 52 and SCAQMD Regulations II, XIII, and XVII). As noted previously, March ARB has appropriate permits in place and has met all applicable permitting requirements and conditions for specific stationary devices.

4.4.2 March ARB

March ARB is located in Riverside County and the California South Coast Air Basin. This area has been categorized by the USEPA as an "extreme" non-attainment area for ozone, a "serious" non-attainment area for PM_{10}, and a "serious" non-attainment area for CO. This area is in attainment for the remaining three criteria pollutants.

Since a USEPA-designated non-attainment area is affected by this Proposed Action, the USAF must comply with the Federal General Conformity Rule (40 CFR, Part 93 and SCAQMD Regulation XIX). To do so, an analysis has been completed to ensure that, given the changes in direct and indirect emissions of the ozone precursors (NO_x and VOCs), PM_{10}, and CO, the Proposed Action would be in conformity with applicable CAA requirements. The Conformity Determination requirements specified in this rule can be avoided if the project-related non-attainment pollutant emission rate increases are below *de minimis* thresholds levels for each pollutant and are not considered regionally significant. For purposes of determining conformity in this non-attainment area, projected regulated pollutant emissions associated with the Proposed Action were estimated using available aircraft operations data, construction emissions, and other non-permitted emission source information. The emission calculations and *de minimis* threshold comparisons are collectively presented in the Air Conformity Analysis provided in Appendix D.

Based on a review of current C-141C and other airfield operations at March ARB, as well as the existing and proposed C-17 operations at McGuire AFB, New Jersey; McChord AFB, Washington; and Charleston AFB, South Carolina; it has been determined that the potential sources of all non-attainment pollutant emissions associated with the Proposed Action would result from: 1) construction activities associated with the Proposed Action; and 2) aircraft operations, maintenance, and support activities after delivery of the C-17 aircraft. Under the Proposed Action, existing C-141C aircraft would drawdown from the existing 16 PAA to 8 PAA before the arrival of the first C-17 aircraft at March ARB, which is scheduled for delivery during the second quarter of CY 06. Required construction activities would be completed before the full fleet of C-17 aircraft would begin operation. The scope of the analysis was limited to those operations or activities that would result in emissions changes that would be directly or indirectly attributable to the implementation of the Proposed Action.

The potential air quality impacts have been assessed based on the characteristics of the Proposed Action (i.e., aircraft operations, construction, etc.) and are presented below.

Construction Activities. The Proposed Action consists of eight construction projects at various locations and facilities throughout March ARB. These projects address the requirements for the C-17 airframe and support facilities, as well as personnel training. One of the eight construction projects includes the demolition of an existing building and the first phase of construction of a new C-17 Maintenance and Inspection Hangar. The second phase of construction is programmed as another construction project. The remaining six construction projects include smaller modifications, alternations, and additions to the interior of existing structures. Table 4-5 lists the projected start date, estimated duration, and areas affected by implementation of the proposed construction projects or facility modifications.

The construction projects would generate TSP and PM_{10} emissions as fugitive dust from ground disturbing activities (e.g., grading, demolition, soil piles, etc.) and combustion of fuels in construction equipment. Fugitive dust emissions would be greatest during the initial site preparation activities and would vary from day-to-day depending on the construction phase, level of activity, and prevailing weather conditions. The quantity of uncontrolled fugitive dust emissions from a construction site is proportional to the area of land being worked and the level of construction activity.

Table 4-5. Proposed Construction Projects at March ARB

Construction Projects	Start Date [1] (CY)	Duration[2] (Months)	Net Project Area[3] (ft^2)	Asphalt Area (ft^2)
NEW FACILITIES				
Construct C-17 Maintenance and Inspection Hangar (Phase I)	2004	12	53,281	--
Continue Interior Build-out of C-17 Maintenance and Inspection Hangar (Phase II)	2005	6	7,535	--
EXISTING FACILITIES				
Demolition – Bldg. 2307 for C-17 Hangar	2003	6	50,332	--
Alternation – Bldg. 2240, Squadron Operations Facility, Interior Renovations	2004	12	38,319	47,899
Alteration – Maintenance Shops, Interior Renovations: - Bldg. 2328 – Avionics - Bldg. 2327 – Hydraulics - Bldg. 355 – Survival Equipment - Bldg. 1221 – AGS Storage	2003	6	20,774	--
Alteration – Bldg. 420, Life Support Shop, Renovation and new asphalt parking overlay	2003	6	27,997	4,950
Alteration – Bldg. 600, Flight Simulator Facility, Interior Renovations	2003	6	21,076	--
Alteration – Bldgs. 429 and 453, Mobility Equipment Storage Facility, Interior Renovations	2005	12	25,446	--
Alteration – Maintenance Hangars, Interior Renovations: - Bldg. 423 – Hangar Doors/Interior - Bldg. 2303 – Hangar Doors/Interior - Bldg. 2306 – Interior Renovation	2006	6	156,282	--

Notes: [1] Start dates based on project-specific information provided by 452 CES/CEC.
[2] Project durations are based on estimates provided by 452 SPTG personnel.

Fugitive dust emissions for various construction activities were calculated using emission factors and assumptions published in USEPA's AP-42 Section 11.9 dated 7/98 and Section 13.2 dated 9/98. These estimates assume that 230 working days are available per year for construction (accounting for weekends, weather, and holidays). Using the California Crop Weather data for Los Angeles, CA the average soil percent moisture was estimated to be an average of 10 percent for 2001. Wind speed of greater then 12 mph is recorded 30 percent of the time in this region, which is based on average wind rose data and measured speed for two regional sites.

Construction operations would also result in emissions of criteria pollutants as combustion products from construction equipment as well as evaporative emissions from architectural coatings and asphalt paving operations. The emission factors and estimates were generated based on guidance provided in *Air Quality Thresholds of Significance* from SMAQMD (SMAQMD 1994). Emissions for CY 2004, the heaviest planned construction year, are estimated at 3.39 tpy of NO_x, 3.39 tpy of VOC, 2.46 tpy CO, and 2.85 tpy of PM_{10}, including fugitive emissions. These emissions would be of a temporary nature and would be more than offset by the expected reduction in airfield operations during construction as the C-141C aircraft are gradually retired between the fourth quarter of FY 03 and the third quarter of FY 05.

For purposes of this analysis, the project duration, affected project site area disturbed, and parking area information presented in Table 4-5 was used to estimate fugitive dust and all other criteria pollutant emissions. The construction emissions presented in Table 4-6 include the estimated annual construction PM_{10} emissions associated with the Proposed Action at March ARB. These emissions would produce slightly elevated short-term PM_{10} ambient air concentrations. However, the effects would be temporary, and would fall off rapidly with distance from the proposed construction site.

Specific information describing the types of construction equipment required for a specific task, the hours the equipment are operated, and the operating conditions vary widely from project to project. For purposes of analysis, these parameters were estimated using established methodologies for construction and experience with similar types of construction projects. Combustion by-product emissions from construction equipment exhausts were estimated using USEPA's AP-42 emissions factors for heavy-duty diesel-powered construction equipment.

Table 4-6. Annual Construction Emissions from the Proposed Action at March ARB

	Proposed Construction Emissions Estimates				
Calendar Year (CY)	**NO_x[1] (tpy)**	**VOC[1] (tpy)**	**CO[1] (tpy)**	**SO[1] (tpy)**	**PM_{10}[1] (tpy)**
2003	2.41	2.07	1.89	0.13	1.78
2004	3.39	3.39	2.46	0.18	2.85
2005	5.34	2.52	4.96	0.26	0.58
2006	3.92	1.66	3.66	0.19	0.29

Note: [1] Denotes non-attainment pollutant in South Coast Air Basin.

The construction emissions presented in Table 4-6 include the estimated annual emissions from construction equipment exhaust associated with the Proposed Action. As with fugitive dust emissions, combustion emissions would produce slightly elevated air pollutant concentrations. However, the effects would be temporary, fall off rapidly with distance from the proposed construction site, and would not result in any long-term impacts. Attachment 1 to Appendix D details the emission factors, calculations, and estimates of construction-related emissions for the Proposed Action.

Analysis of the data presented in Table 4-6 indicates that the greatest emissions of NO_x and CO air pollutants would be expected to occur during CY 05 and the greatest VOC and PM_{10} emissions would be expected during CY 04. The reason that emissions of all pollutants do not peak in the same year is because relative emissions of the different pollutants vary through the course of construction projects. Early phases of construction projects involve more heavy diesel equipment and earthmoving, resulting in higher NO_x and PM_{10} emissions. Later phases of construction projects involve more light gasoline equipment and surface coating, resulting in more CO and VOC emissions.

Aircraft Operations. Emissions from airfield operations at and near March ARB are released within Riverside County in the South Coast Air Basin. As noted above, this area has been designated by USEPA as "extreme" non-attainment for ozone, "serious" non-attainment for PM_{10}, and "serious" non-attainment for CO. Calculations of airfield air pollutant emissions from both baseline and Proposed Action aircraft operations were based on the annual number of LTO and TGO cycles at the March ARB airfield.

For March ARB airfield operations, it was assumed that a LTO cycle includes an approach from 3,000 feet AGL to the airfield, landing, taxi-in to parking position, taxi-out to the runway, take-off, and climb out to 3,000 feet AGL. A TGO cycle is identical to a LTO cycle, except all taxi time has been excluded. The 3,000 feet AGL ceiling is assumed as the atmospheric mixing height, above which any pollutants generated would not contribute to increased pollutant concentrations at ground level. Therefore, all pollutant emissions from aircraft operations above 3,000 feet AGL were excluded from the calculations and this analysis.

For the various flight profiles, published fuel flow rates, times-in-mode, and aircraft engine emission factors were used for estimating pollutant emissions (AFIERA 2001). Each flight profile is characterized by a series of modes-of-operation or power settings (e.g., takeoff, climb out, approach, taxi). As applicable, USEPA suggested default times-in-modes for various types of aircraft (e.g., military transport, military combat, etc.) were also used in these calculations. The net changes in air pollutant emissions for proposed airfield operations at March ARB for the maximum overall emission year are presented in Table 4-7. The estimates of airfield operations emissions are detailed in Attachment 2 to Appendix D.

Table 4-7. Net Change in Emissions at March ARB Associated with the Proposed Action for the Projected Maximum Emissions Year - 2003

Air Pollutant Emissions Sources	NO_x Emissions (tpy)	VOC Emissions (tpy)	CO Emissions (tpy)	SO_x Emissions (tpy)	PM_{10} Emissions (tpy)
Baseline Emissions [1]	**305**	**215.3**	**801.8**	**30.03**	**106.34**
External Combustion Changes	--	--	--	--	--
Internal Combustion Changes	--	--	--	--	--
Aircraft Operations Changes	-7.1	-10.2	-16.9	-0.9	-4.3
All Other Sources (AGE, GOVs, POVs, Surface Coating, Fuel Cells, etc.)	--	--	--	--	--
Non-Road Engines & Routine Base Construction Activities	--	--	--	--	--
Project-Related 2003 Construction Emissions	2.41	2.07	1.89	0.13	1.78
Total Net Change:	**-4.69**	**-8.13**	**-15.01**	**-0.77**	**-2.52**
Conformity *De minimis Thresholds*	**10**	**10**	**100**	**--**	**70**
Change from Baseline (%)	-1.5%	-3.8%	-1.9%	-2.6%	-2.4%
2003 Total Emissions (Baseline + Net Change)[2]:	**300**	**207.2**	**786.8**	**29.3**	**103.8**

Notes: [1] From Table 3-17. Based on 2000/2001 Air Emissions Inventory for March ARB (AFRC 2001b).

[2] Reflects anticipated emissions for 2003, the maximum emission year. Because the dominant emissions changes result from the retirement of the C-141C aircraft, 2003 is the maximum emissions year. Emissions for the years 2003 to 2006 would gradually decrease and future years beyond 2006 would be lower.

The seven MTRs pass over or through ten different air basins in California, Arizona, and Nevada. Of these air basins affected by the Proposed Action, nine are designated as non-attainment areas for one or more regulated pollutants. The air basin and associated attainment status designations are presented in Table 3-19. Estimates of emissions from aircraft navigating the MTRs are based on the number of aircraft, aircraft speed, and fuel consumption (thrust settings) while on the

MTRs. Baseline and net changes in MTR emissions are tabulated in Appendix D, Attachment 3 and are presented later in this section.

AGE and Aircraft Support Operations. Calculations of air pollutant emissions for current AGE and aircraft support activities at March ARB were based on 2000/2001 usage of fuels, along with data collected from interviews of March ARB personnel and data published in the March ARB Air Emission Inventory for the 2000/2001 reporting period (AFRC 2001b). This source category includes AGE such as generators, compressors, light carts, hydraulic test stands, heaters and other government-owned off-road equipment used in flight line operations.

After reviewing current records and interviewing AGE shop and Logistics Group personnel at March ARB, McChord AFB, and Charleston AFB (where C-17s have already replaced C-141s), it was concluded that only a very small reduction in emissions from AGE emissions sources would be expected as a result of the Proposed Action. No further analysis is required.

Vehicle Operations – GOVs and POVs. Calculations of air pollutant emissions from privately-owned vehicles (POV) commuting were based on the vehicle miles traveled (VMT), vehicle category or classification (e.g., light-duty gasoline vehicle), average vehicle speed measured in mph, average vehicle occupancy rate, and the USEPA approved pollutant emission factors. Emission factors from the USEPA's mobile source emission model, MOBILE5a, adjusted to reflect the California vehicle inspection and maintenance (I/M) program, were used to estimate emissions from motor vehicles.

The Proposed Action would not increase personnel at March ARB. Therefore, net change in vehicle emissions associated with the Proposed Action would be negligible. The estimated reduction in vehicle emissions over the 2000-2006 time period would be due to normal fleet turnover and replacement with newer-model (lower emission) vehicles. Furthermore the SCAQMD does not count publicly owned vehicle emissions with the March ARB basewide total emissions when establishing the SIP planning budget for the base. These vehicle emissions are included for informational purposes in the baseline emissions listed in Section 3 of this EA and in the total basewide emissions presented in Table 4-7.

Analysis of the operations and discussions with base personnel at March ARB indicate that no additional or specialized government-owned vehicles (GOVs) would be required for implementation of the Proposed Action. Therefore, there would be a negligible net change in

GOV pollutant emissions currently occurring at March ARB. The same GOVs supporting C-141 operations would also be used to support C-17 basing and operations.

External Combustion (Space and Water Heating). Natural gas-fired boilers are used at March ARB for heating basewide facilities. During the 2000/2001 baseline year, the installation had two permitted boilers that exceeded the SCAQMD permitting threshold with input capacities greater than 2 million BTU/hour. The remaining 181 unpermitted external combustion units have capacities equal to or less than two million BTU/hour. These smaller units range in capacity from 45,000 BTU/hr to two million BTU/hr and are located throughout the installation to provide space heat and hot water.

Calculations of current/baseline air pollutant emissions were based on actual natural gas meter readings for the base during the 2000/2001 reporting period. The emissions related to the Proposed Action were based on the net increase in building area on-base, an annual heating requirement of 0.06 million BTU/ft^2 of additional building area, and USEPA emission factors for industrial natural gas-fired boilers. Because the net increase in enclosed area at March ARB would be 10,500 ft^2, the net increase in cumulative regulated air pollutant emissions would be less than one ton per year. The net changes in air pollutant-specific emissions from the proposed increase in use of small boilers and space heaters at March ARB are presented in Table 4-7.

Internal Combustion Devices (Emergency Power). March ARB has twenty non-permitted and eight permitted internal combustion (IC) engines located throughout the installation. These diesel-fueled units are used to provide back-up power and fire pump service on an emergency basis only. Regulated pollutant emissions from these units are not anticipated to change significantly upon implementation of the proposed action.

Although none of the buildings that would undergo construction or interior alternation currently have IC engines, for this analysis, it was conservatively assumed that one small (unpermitted) diesel-fired IC engine would be installed with the Proposed Action. Emissions were estimated assuming the maximum potential operation of this unit of 500 hours per year. The increase in regulated pollutant emissions associated with this additional device is shown in Table 4-7.

Fuel Transfer, Dispensing, & Storage Tanks. During the 2000/2001 reporting period, approximately 35.2 million gallons of JP-8 were used in refueling aircraft; approximately 110,000 gallons of gasoline were dispensed into vehicles and equipment; and 125,000 gallons of diesel fuel were similarly stored and dispensed to vehicles and equipment at the base. As discussed above, the Proposed Action would result in an overall decrease in the number of annual flight operations at March ARB. It is reasonable to assume that this would result in an overall decrease in the JP-8 fuel use and distribution at the airfield and an associated reduction in fuel handling emissions. However, for this analysis it was conservatively assumed that potential KC-135 refueling flight activities, other possible flight operations, and basewide ground activities could consume a similar volume of fuel during future years. Therefore, there is no appreciable net change in the anticipated fuel distribution activities or evaporative fuel storage and dispensing emissions with the Proposed Action.

Surface Coating. Existing permitted surface coating activities at March ARB include high volume low pressure (HVLP) spray gun painting operations in a single permitted paint booth in Building 452 as well as various HVLP coating operations outside the booth. This source category also includes non-permitted architectural coatings and "area" use of adhesives, aerosol spray cans, and other miscellaneous hazardous materials that emit regulated pollutants. Total 2000/2001 reporting period emissions for these activities included approximately 1.26 tons of VOC and 0.035 tons of PM_{10} emissions

Based on discussions with March ARB personnel, it is not anticipated that the Proposed Action would result in increased routine surface coating operations. In the event that surface coating activities do increase, these changes to the permitted coating operations will be addressed with SCAQMD through the NSR permitting process. As such, conformity with CAA requirements would be assured. However, for this analysis, a no net change in surface coating emissions has been assumed for the Proposed Action.

Fuel Cell Maintenance. The Proposed Action is anticipated to result in a slight reduction in the number of fuel cell maintenance activities required at March ARB. This is based on an overall reduction in the number of aircraft as well as a significant reduction in the overall age of the aircraft at the base. During the 2000/2001 reporting period, March ARB conducted approximately 108 hours of fuel cell repairs on 13 different C-141 aircraft (AFRC 2001b). These routine activities generated approximately 62 pounds of VOC emissions during the year or approximately 66 percent of the maximum "potential" emissions estimated for this source category.

Based on the characteristics of the eight new C-17 aircraft that would beddown at March ARB in replacement of the older C-141 aircraft, it is reasonable to assume that fuel cell repair activities would be less than previous year/baseline operations. However, it has been conservatively assumed that no changes in VOC emissions would occur over the life of the proposed project relative to this baseline.

Conformity Analysis. The information presented in Table 4-7 shows that emissions of all regulated pollutants are projected to decrease under the Proposed Action at March ARB. The year 2003 was selected for Table 4-7 because it is projected to be the maximum emissions year for basewide NO_x and VOC emissions. Comparison of the projected non-attainment pollutants indicate that the Base would remain within its 1994 SIP emissions budget for military aircraft under the Proposed Action. However, it is anticipated that this budget will be revised and updated by 2004 to include other source categories and emissions types at March ARB.

All emissions from airfield operations would decrease under the Proposed Action at March ARB due to the significant reduction in the number of aircraft and routine sorties. Construction activities would result in temporary increased emissions in all criteria pollutants for the duration of the required construction projects. However, these emissions would be offset by the substantial reduction in aircraft operations emissions from the Proposed Action.

In addition, as discussed in the General Conformity Analysis presented in Appendix D, the combination of construction, airfield operations, and MTR operations associated with the Proposed Action would result in maximum net emissions changes associated with the Proposed Action that would be lower than the *de minimis* thresholds, and below regional significance criteria for the South Coast Air Basin in the vicinity of March ARB. Table 4-7 presented the results of this analysis for the maximum projected emissions year – 2003. Table 4-8 presents the results of this analysis for the final condition (2006 and beyond) of the Proposed Action.

4.4.3 Training Areas

Desert Center DZ

The Proposed Action at the Desert Center DZ includes the continued dropping of various materials (pallets, water tanks, bags, etc.) from cargo aircraft during military training exercises. The Proposed Action includes a gradual reduction in the number of C-141C sorties and airdrop passes and gradual increase in similar C-17 operations. Projected DZ training requirements under the Proposed Action would result in a decrease of approximately 65 percent in the total number of current/existing airdrop passes at this location. The DZ is located in a portion of the Mohave

Table 4-8. Net Change in Emissions at March ARB Associated with the Proposed Action for the Final Condition – CY 06 and Beyond

Air Pollutant Emissions Sources	NO_x Emissions (tpy)	VOC Emissions (tpy)	CO Emissions (tpy)	SO_x Emissions (tpy)	PM_{10} Emissions (tpy)
Baseline Emissions [1]	**305**	**215.3**	**801.8**	**30.03**	**106.34**
Internal Combustion Changes	0.4	0.03	0.08	0.03	0.03
External Combustion Changes	0.03	0.0	0.01	0.0	0.0
Aircraft Operations Changes	-70.8	-161.5	-265.1	-12.3	-57.3
All Other Sources (AGE, GOVs, POVs, Surface Coating, Fuel Cells, etc.)	--	--	--	--	--
Non-Road Engines & Routine Base Construction Activities	--	--	--	--	--
Project-Related 2006 Construction Emissions	3.92	1.66	3.66	0.19	0.29
Change in MTR Emissions in So. Calif. Air Basin	0.8	0.0	0.1	0.1	0.3
Total Net Change:	**-65.6**	**-159.8**	**-261.2**	**-12.0**	**-56.7**
Conformity *de minimis* Thresholds	**10**	**10**	**100**	**--**	**70**

Notes: [1] From Table 3-17. Based on 2000/2001 Air Emissions Inventory for March ARB (AFRC 2001b).

[2] Reflects anticipated emissions for 2006 and beyond.

Desert Air Basin that is in attainment for all regulated pollutants, although portions of the basin have been designated as "severe" non-attainment for ozone and "moderate" non-attainment for PM_{10}.

Most of the regulated air pollutant emissions associated with the use of the DZ are generated by aircraft during airdrop exercises and while at elevations below 3,000 feet AGL. Emissions are calculated by using standard engine-specific emission factors, route characteristics, air speeds, and specific throttle setting and times for typical airdrop exercises.

The second source of air pollutants at the DZ is vehicles that are used to retrieve the dropped materials from the site. For this analysis, it was conservatively assumed that three vehicle types (heavy duty forklifts, heavy duty diesel trucks, and heavy duty passenger vehicles) are used to prepare and retrieve these materials remaining at the DZ following operations operations. It is assumed that truck and passenger vehicle travel from March ARB to the DZ (approximately 300 miles round trip) once for each airdrop exercise at the DZ. Further, it was assumed that the heavy duty forklift would operate for an average of two hours for each DZ airdrop sortie.

Table 4-9 presents the estimated net changes in regulated pollutant emissions with implementation of the Proposed Action. As shown, the Proposed Action would result in an overall net decrease in all pollutant emissions associated with the DZ. This would generate an overall improvement in ambient air quality to the Mohave Desert Air Basin.

Table 4-9. Estimated Emissions and Net Changes for Desert Center DZ - Proposed Action

	Proposed Action Emissions Estimates[1]				
Source Type	**NO_x Emissions (tpy)**	**VOC Emissions (tpy)**	**CO Emissions (tpy)**	**SO_x Emissions (tpy)**	**PM_{10} Emissions (tpy)**
AIRCRAFT OPERATIONS:					
C-130	0.095	0.004	0.016	0.009	0.015
C-141C	0.0	0.0	0.0	0.0	0.0
C-17	7.87	0.06	0.09	0.25	0.60
MOTOR VEHICLE OPERATIONS:					
Diesel Trucks	0.23	0.06	0.32	0.014	0.21
Passenger Vehicles	0.03	0.025	0.36	0.003	0.07
4-WD Forklifts	0.08	0.009	0.03	0.01	0.007
Total Proposed Action Emissions:	**10.9**	**0.6**	**4.9**	**1.2**	**6.7**
Net Change (Proposed Action minus Current):	**-2.7**	**-0.5**	**-4.1**	**-0.9**	**-5.8**

Note: [1] Baseline emissions calculated based on current sorties and existing aircraft types per year, as presented in Table 2-6. Emissions were also estimated for heavy duty diesel trucks and passenger vehicles used to retrieve dropped materials.

Military Training Routes (MTRs)

There are seven MTRs affected by this Proposed Action, and each of them passes through air basins or AQCRs that have been designated as non-attainment areas for one or more regulated pollutants (See Table 3-20). The calculations of air pollutant emissions for baseline conditions and implementation of the Proposed Action from MTR operations were based on the length of the MTR, number of aircraft, the operational airspeed, and on published aircraft engine emission factors and fuel flow rates. For purposes of analysis, it was assumed that all aircraft utilizing the airspace within each MTR corridor would be operated on the centerline of the MTR, at 300 to 3,000 feet AGL. Attachment 2 to Appendix D details the estimates of emissions from aircraft on MTRs associated with the Proposed Action. Table 4-10 presents the emissions, by MTR associated with the Proposed Action. The net changes in air pollutant emissions from along each of the MTRs are presented in Table 4-11, and the net pollutant change within each affected Air Basin are presented in Table 4-12. This analysis shows that approval and implementation of the Proposed Action would not exceed applicable *de minimis* thresholds established for aircraft operations on MTRs within non-attainment areas. Further, any net increase in Proposed Action emissions would likewise be negligibly small fractions of the regional inventories. Therefore, the proposed aircraft operations on these MTRs would not significantly impact the ambient air quality within any of the affected basins.

Table 4-10. Proposed Action Emissions for Affected MTRs

	MTR Emissions with the Proposed Action Only [1]				
MTR Number	**NO_x Emissions (tpy)**	**VOC Emissions (tpy)**	**CO Emissions (tpy)**	**SO_x Emissions (tpy)**	**PM_{10} Emissions (tpy)**
IR 214	5.9	0.1	0.2	0.3	1.3
IR 217	30.9	0.6	2.2	1.7	7.5
VR 289	32.8	1.0	8.2	2.4	6.7
VR 296	13.6	0.4	3.1	1.0	3.0
VR 1217	3.5	0.1	0.3	0.2	1.2
VR 1257	24.1	0.4	1.9	1.5	5.8
VR 1265	12.7	0.2	1.0	0.8	4.4
Totals:	**123.6**	**2.9**	**17.0**	**8.0**	**30.0**

Note: [1] Proposed action emissions were calculated using the Proposed Annual sortie total, published emission factors and known aircraft operational conditions in each MTR as presented in Table 2-4.

Table 4-11. Net Emissions Changes for Affected MTRs

	Net Emissions Changes with Proposed Action (Current minus Proposed Action) [1]				
MTR Number	**NO_x Emissions (tpy)**	**VOC Emissions (tpy)**	**CO Emissions (tpy)**	**SO_x Emissions (tpy)**	**PM_{10} Emissions (tpy)**
IR 214	4.9	0.1	0.2	0.2	0.9
IR 217	15.8	0.2	0.6	0.7	3.0
VR 289	-13.8	-0.7	-5.3	-1.7	-9.1
VR 296	-41.5	-2.0	-15.2	-4.8	-26.6
VR 1217	3.5	0.1	0.3	0.2	1.2
VR 1257	13.7	0.3	1.1	0.9	4.7
VR 1265	12.7	0.2	1.0	0.8	4.4
Totals:	**-4.8**	**-1.8**	**-17.3**	**-3.6**	**-21.5**

Note: [1] Proposed action net emissions changes were calculated by subtracting the current emissions from the Proposed Annual total emissions.

Table 4-12. Net Emissions Changes to Affected Air Basins Due to Proposed MTR Use

	Net Emissions Changes with Proposed Action				
Air Basin	**NO_x Emissions (tpy)**	**VOC Emissions (tpy)**	**CO Emissions (tpy)**	**SO_x Emissions (tpy)**	**PM_{10} Emissions (tpy)**
CALIFORNIA AIR BASINS					
South Coast Air Basin	0.8	0.0	0.1	0.1	0.3
Mohave Desert Air Basin	-1.7	-1.1	-10.7	-2.2	-13.1
Salton Sea Air Basin	-8.3	-0.6	-4.7	-1.3	-7.4
South Central Coast Air Basin	2.8	0.1	0.2	0.2	1.0
San Diego Air Basin	1.9	0.0	0.1	0.1	0.6
San Joaquin Air Basin	1.2	0.0	0.1	0.1	0.4
North Central Coast Air Basin	2.3	0.0	0.2	0.1	0.8
ARIZONA AIR BASINS					
Mohave-Yuma AQCR	-5.3	-0.3	-2.6	-0.8	-4.4
Northern Arizona AQCR	1.3	0.0	0.0	0.1	0.2
NEVADA AIR BASIN					
Las Vegas Intrastate AQCR	0.2	0.0	0.0	0.1	0.0
TOTALS	**-4.77**	**-1.83**	**-17.34**	**-3.61**	**-21.47**

Note: [1] MTR contribution only, does not include net change in emissions from March ARB in South Coast Air Basin. See Tables 4-6 and 4-7 for cumulative totals for March ARB.

Ground-Level Impacts from MTR Sorties. Six of the seven MTRs that would be used by C-17 aircraft under this Proposed Action intersect or pass within 10 km of the Joshua Tree Wilderness Area, which is located in eastern California and is designated as a Federal PSD Class I Area. However, ground level impacts from MTR traffic is minimized within this wilderness area because AFI 11-206 prohibits USAF aircraft from flying lower than 2,000 (turbojet) or 1,200 feet (turboprop) over National Park Areas, USFWS areas, and U.S. Forest Service areas as defined on the National Oceanic and Atmospheric Administration (NOAA) sectional aeronautical charts. These minimum altitude restrictions are listed as "Special Operating Procedures" in Section 1.5.

To determine air pollution impacts from low-flying military aircraft, the USAF has developed an air quality dispersion model called *Multiple Aircraft Instantaneous Line Source* (MAILS) (AFESC 1992). MAILS is an interactive air-quality model used to determine air emissions concentrations generated by military aircraft in low-altitude airspace. The dispersion algorithm used in MAILS is based on the commonly-used Gaussian plume dispersion model, and has been validated using the USEPA model known as *Industrial Sources Complex Short-Term,* or ISCST.

MAILS has also been specifically designed to provide the worst-case solution because of the pollutant dispersion with changing wind speed and direction.

Analyses of worst-case conditions at the MTR intersections near the Joshua Tree Wilderness Area were performed using the MAILS Model. This analysis assumed the worst-case use of the most traveled area point where the six MTRs intersect or overlap near this area. Other worst-case assumptions include a mixing height of 3,000 feet, C-17 airspeed of 300 KIAS, and minimum aircraft flying altitudes of 2,000 feet AGL over the Joshua Tree Wilderness Area and 300 feet AGL over the adjacent Class II areas.

As shown in Table 4-13, the modeling results indicate that only very small percentages of the AAQS would be generated by the flight operations associated with Proposed Action. The highest percentages of any AAQS standards generated would be fine and total particulate, with only 0.07 percent of the standards being generated. Similarly, Table 4-14 shows that a small portion of the CAA PSD Class I Area Increment would be generated by the Proposed Action. The highest percentage of any Class I PSD Increment Limit generated would be for nitrogen oxides and sulfur dioxide, each at 0.2 percent of the allowable increment.

These data show that the Proposed Action would not violate the NAAQS or PSD standards and would not have a significant impact on the ambient air quality of the underlying area.

Conformity Analysis - MTRs. As discussed previously, Appendix D presents a region-by-region comparison of the net MTR non-attainment pollutant emission changes shown in Table 4-14 for each affected air basin's annual emission inventory and to each non-attainment region's conformity *de minimis* threshold. This analysis indicates that applicable non-attainment area pollutant emissions associated with the MTR sorties are cumulatively less than existing conditions. Additionally, the Proposed Action does not exceed either the *de minimis* threshold or the regional significance guidelines under the Final General Conformity Rule individually for each affected region.

4.5 Safety

4.5.1 Evaluation Criteria

Impacts were assessed based on direct effects from aircraft crashes (i.e., damage to aircraft and points of impact), as well as secondary effects, such as fire and environmental contamination.

Table 4-13. MAILS Modeling - Comparison of Maximum Modeled C-17 Emissions Impacts to National and California Ambient Air Quality Standards and Class II Area PSD Increments

Pollutant	Averaging Time	Primary AAQS ($\mu g/m^3$)[1]	Class II PSD Increases ($\mu g/m^3$)	Modeled Pollution Concentration ($\mu g/m^3$)[2]	Percent of AAQS	Percent of Class II PSD Increase
Carbon Monoxide (CO)	1 hour 8 hours	40,000 10,000	N/A N/A	4.8 0.49	0.012% 0.005%	- -
Nitrogen oxide (NO_x)	Annual	100	25	0.05	0.05%	0.2%
Suspended Particulate Matter (PM_{10})	24 hours Annual	150 50	30 17	0.11 0.006	0.07% 0.01%	0.4% 0.03%
Total Suspended Particulate (TSP)	24 hours[3] Annual[3]	150[3] 60[3]	N/A N/A	0.11 0.006	0.07% 0.01%	- -
Sulfur oxide (SO_x)	3 hours 24 hours 24 hours[3] Annual Annual[3]	1,300 365 260[3] 80 60[3]	512 91 N/A 20 N/A	0.45 0.046 0.046 0.0023 0.0023	0.03% 0.01% 0.02% 0.003% 0.004%	0.09% 0.05% - 0.01% -

Notes: [1] μg/m3 – micrograms per cubic meter.
[2] These pollution concentrations represent worst-case combined maximum emission concentrations for Proposed Action C-17 emissions on the six MTRs that intersect or pass near the Joshua Tree Wilderness Area.
[3] California Secondary AAQS

Table 4-14. MAILS Modeling - Comparison of Maximum Modeled C-17 Emissions Impacts at Joshua Tree Wilderness Area to Class I PSD Standards

Pollutant	Averaging Time	Class I PSD Increments ($\mu g/m^3$)[2]	Modeled Pollution Concentration ($\mu g/m^3$)[3]	Percent of Class I PSD Limits
Carbon Monoxide (CO)	1 hour 8 hours	N/A N/A	0.45 0.046	0.001% 0.0005%
Nitrogen oxide (NO_x)	Annual	2.5	0.0047	0.2%
Suspended Particulate Matter (PM_{10})	24 hours Annual	8.0 4.0	0.011 0.0005	0.1% 0.01%
Sulfur oxide (SO_x)	3 hours 24 hours Annual	25.0 5.0 2.0	0.042 0.0044 0.0002	0.2% 0.09% 0.01%

Notes: [1] μg/m3 – micrograms per cubic meter.
[2] Reference: 40 CFR 52.21(c)
[3] These pollution concentrations represent worst-case combined maximum emission concentrations for the Proposed Action C-17 emissions on six training routes that pass over or near the Joshua Tree Wilderness Area.

The extent of these secondary effects is situationally dependent and difficult to quantify. For example, there would be a higher risk of fire from aircraft crashes in highly vegetated areas during a hot, dry summer than would be the case if the mishap occurred in a rocky, barren area during the winter. As stated in Section 3.5.1, historical mishap databases enable the military to calculate the mishap rates for each type of aircraft. These rates are based on the estimated flying time that an aircraft is expected to be in the airspace, the accident rate per 100,000 flying hours for that aircraft, and the annual flying hours for that aircraft.

4.5.2 March ARB

Construction Safety. Short-term, minor adverse effects would be expected. Implementation of the Proposed Action would slightly increase the short-term risk associated with construction contractors performing work at March ARB during the normal workday because of the increase in construction activities. Contractors would be required to establish and maintain safety programs. Projects associated with the Proposed Action would not pose a safety risk to base personnel or to activities at the base. Proposed construction projects would enable the 452 AMW to meet future mission objectives at the base, and conduct or meet mission requirements in a safe operating environment.

Fire Hazards and Public Safety. No impacts regarding fire hazards or public safety are expected to occur on base from construction projects planned as part of the Proposed Action. Proposed construction activities would improve the safety and efficiency of the mission.

Aircraft Safety. Historical data on C-17 mishaps is listed in Table 4-15. This table shows that the rate of Class A and Class B mishaps is slightly more than four mishaps per 100,000 hours of flight time for the C-17 aircraft (AFSC 2003f). Although this is a slight increase from mishaps per 100,000 hours for the C-141 aircraft, the C-17 aircraft is relatively new in the USAF cargo aircraft fleet. As with most other USAF aircraft, as flying hours increase, aircrews are expected to become more efficient and familiar with the aircraft, thereby decreasing the likelihood of future mishaps. In addition, the Proposed Action dictates a decrease in the total number of aircraft operations by approximately 34.1 percent per year. Therefore, no significant, adverse impacts would be expected as a result of the Proposed Action.

**Table 4-15. Historical Data on C-17 Mishaps (FY 92 – FY 02)
Current as of November 2, 2002**

	Class A		Class B		Destroyed		Fatal			
Year	**#**	**Rate**	**#**	**Rate**	**A/C**	**Rate**	**Pilot**	**All**	**Hours**	**Cum. Hrs.**
FY 92	0	0.00	0	0.00	0	0.00	0	0	539	547
FY 93	0	0.00	0	0.00	0	0.00	0	0	1,252	1,799
FY 94	0	0.00	0	0.00	0	0.00	0	0	4,454	6,253
FY 95	0	0.00	0	0.00	0	0.00	0	0	12,968	19,221
FY 96	1	4.75	1	4.75	0	0.00	0	0	21,050	40,271
FY 97	1	3.78	1	3.78	0	0.00	0	0	26,487	66,758
FY 98	1	2.35	0	0.00	0	0.00	0	0	42,623	109,381
FY 99	0	0.00	0	0.00	0	0.00	0	0	56,676	166,057
FY 00	0	0.00	3	5.13	0	0.00	0	0	58,423	224,480
FY 01	0	0.00	3	3.70	0	0.00	0	0	81,072	305,552
FY 02	2	1.90	12	11.41	0	0.00	0	0	105,138	410,690
Lifetime	**5**	**1.22**	**20**	**4.87**	**0**	**0.00**	**0**	**0**	**410,690**	
5-Yr. Avg.	0.6	0.87	3.6	5.23	0.0	0.00	0.0	0.0	68,786.4	
10-Yr. Avg.	0.5	1.22	2.0	4.88	0.0	0.00	0.0	0.0	41,014.3	

Source: AFSC 2003f

Notes: Rate of mishap per 100,000 hrs flown.
Lifetime numbers are from when the mishaps for C-17 started in FY 91.

Bird/Wildlife-Aircraft Strike Hazard. Continued implementation of the 452 AMW BASH Reduction Plan would minimize conditions giving rise to incidents involving birds. In addition, the decrease in aircraft operations at March ARB would reduce the likelihood of a bird/wildlife strike with aircraft. Therefore, no significant, adverse effects would be expected as a result of the Proposed Action.

Explosive Safety Zones. Ordinance storage and handling areas on March ARB are currently being reevaluated and new explosive safety plans are being developed to reduce potential safety hazards to aircraft and personnel while maintaining the mission requirements for March ARB (MARB 2000a). Building 2307 is located at the edge of an ESQD arc. Building 2307 is scheduled for demolition, and construction of a new C-17 hangar is proposed on the same site.

The boundaries of the new C-17 hangar may extend into the existing ESQD arc (see Figure 4-3). The siting of the proposed hangar would follow the guidelines specified in AFMAN 91-202 and USAF safety and planning procedures. Therefore, no significant, adverse effects would be expected from ESZs as a result of the Proposed Action.

4.5.3 Training Areas

Desert Center Drop Zone (DZ)

Aircraft Safety. The Proposed Action would not result in any changes to the type of operations currently conducted at the Desert Center DZ, and the potential for C-17 aircraft mishap from the Proposed Action would be very low. Therefore, no adverse impacts to aircraft safety and accident potential would result from the Proposed Action.

Airdrop operations for the Desert DZ under the Proposed Action would be similar to the airdrop operations currently being conducted by the 452 AMW. Historically, the 452 AMW has had no airdrop malfunctions that have resulted in materials landing outside the DZ training area. Therefore, the potential for a malfunction resulting in a mishap outside the Desert Center DZ would remain very low.

Bird/Wildlife-Aircraft Strike Hazard. The probability of a bird/wildlife strike would not increase under the Proposed Action. The 452 AMW currently conducts its airdrop training exercises at the Desert Center DZ, and would continue to do so under the Proposed Action. Therefore, the potential for a C-17 aircraft mishap resulting from a bird/wildlife strike would remain low.

Military Training Routes (MTRs)

Aircraft Safety. The Proposed Action dictates an increase in the number of aircraft operations at within most of the MTR corridors. Historical data on C-17 mishaps is listed in Table 4-15. As shown in Table 4-15, the rate of Class A and Class B mishaps is less than five mishaps per 100,000 hours of flight time for the C-17 aircraft. Although this is a slight increase from mishaps per 100,000 hours for the C-141 aircraft, the C-17 aircraft is relatively new in the USAF cargo aircraft fleet. As with most other USAF aircraft, as flying hours increase, aircrews are expected to become more efficient and familiar with the aircraft thereby decreasing the likelihood of future mishaps. Therefore, no significant, adverse impacts would be expected as a result of the Proposed Action.

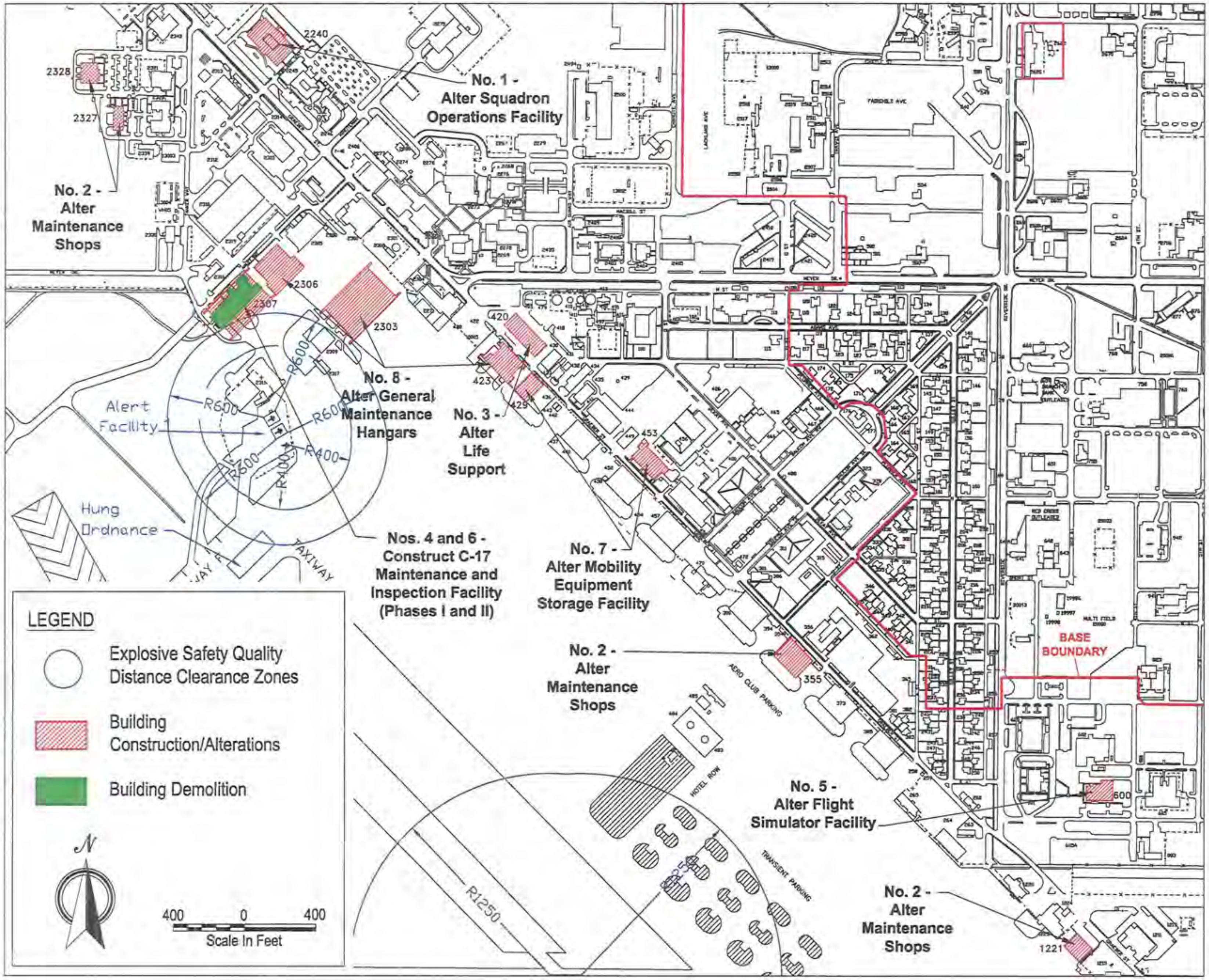

Figure 4-3. Explosive Safety Quality Distance Clearance Zones at March ARB

Bird/Wildlife-Aircraft Strike Hazard. As stated in Section 3.5, the BAM software is used to calculate bird/wildlife strikes during the highest risk months and times of day in the ROI for the MTRs. Results of the BAM indicate that the safety risk in terms of avian density over the MTR corridors is low to moderate. No severe avian densities are shown for these high-risk seasons or times of day. Although there would be slight increases in aircraft activity within most of the MTR corridors under the Proposed Action, the BASH threat would remain the same as existing conditions. Therefore, no significant, adverse effects would be expected as a result of the Proposed Action.

4.6 Geological Resources

4.6.1 Evaluation Criteria

Protection of unique geological features, minimization of soil erosion, and the siting of facilities in relation to potential geologic hazards are considered when evaluating potential impacts of a proposed action on geological resources. Generally, impacts can be avoided or minimized if proper construction techniques, erosion control measures, and structural engineering design are incorporated into project development.

Analysis of potential impacts on geological resources typically includes the following steps:

- Identification and description of resources that could potentially be affected
- Examination of a proposed action and the potential effects this action may have on the resource
- Assessment of the significance of potential impacts
- Provision of mitigation measures in the event that potentially significant impacts are identified

4.6.2 March ARB

Under the Proposed Action, construction activities, such as grading, excavating, and recontouring of the soil, would result in soil disturbance. Implementation of best management practices during construction would limit potential impacts resulting from construction activities. Fugitive dust from construction activities will be minimized by watering and soil stockpiling, thereby reducing to negligible levels the total amount of soil exposed. Standard erosion control means (e.g., silt fencing, sediment traps, application of water sprays, and revegetation at disturbed areas) would also reduce potential impacts related to these characteristics. Therefore, impacts on soils at the base would not be significant.

The Proposed Action would not cause or create significant changes to the topography of March ARB or the surrounding area. Therefore, no significant impact on regional or local topography or physiographic features would result from implementation of the Proposed Action.

4.7 Water Resources

4.7.1 Evaluation Criteria

Significance criteria for water resources impacts are based on water availability, quality, and use; existence of floodplains; and associated regulations. A potential impact on water resources would be significant if it were to result in one of the following scenarios:

- Reduce water availability to existing users or interfere with the supply
- Create or contribute to overdraft of groundwater basins or exceed safe annual yield of water supply sources
- Adversely affect water quality or endanger public health by creating or worsening adverse health hazard conditions
- Threaten or damage unique hydrologic characteristics
- Violate established laws or regulations that have been adopted to protect or manage water resources of an area.

The impact of flood hazards on a proposed action is significant if such an action is proposed in an area with a high probability of flooding.

4.7.2 March ARB

Implementation of the Proposed Action is expected to have no adverse effects on water quality. The Proposed Action would cumulatively increase the impervious surface area and runoff on the base. Adherence to proper engineering practices and applicable codes and ordinances would reduce storm water runoff-related impacts to a level of insignificance. Erosion and sedimentation controls would be in place during construction to reduce and control siltation or erosion impacts to areas outside of the construction site. The use of silt fencing and sediment traps, the application of water sprays, and the revegetation of disturbed areas would also reduce potential impacts. Implementation of sediment and erosion controls during the proposed construction activities would maintain surface water runoff quality at levels comparable to existing conditions and would limit potential adverse effects to soils resulting from the Proposed Action.

Construction activities would require the use of water for dust suppression. The volume of water to be used for dust control would be minimal. Fugitive dust from construction activities would be minimized by watering and soil stockpiling, thereby reducing the total amount of soil impacted. No runoff would be expected to result for this process. Therefore, no significant impacts to surface water are expected to result from the use of water for dust control during construction.

Flight operations and maintenance would pose no demand on water resources nor involve any activities that would affect surface or groundwater resources. The airspace components of the Proposed Action would not require any construction or ground disturbance; therefore, there would be no potential for impacts to floodplains, wetlands, or surface water flow quantity or quality.

4.8 Biological Resources

4.8.1 Evaluation Criteria

This section evaluates the potential impacts to the biological resources under the Proposed Action. The significance of impact to biological resources is based on the following factors:

- Importance (i.e., legal, commercial, recreational, ecological, or scientific) of the resource
- Proportion of the resource that would be affected relative to its occurrence in the region
- Sensitivity of the resource to proposed activities
- Duration of ecological ramifications

Due to the large area under consideration associated with the Proposed Action, a habitat perspective will provide a framework for analysis of general classes of effects (i.e., removal of critical habitat, noise associated with training, human disturbance, etc.). The impacts to biological resources are significant if species or habitats of high concern are adversely affected over relatively large areas. Impacts are also considered significant if disturbances cause reductions in population size or distribution of a species of high concern.

Ground disturbance, noise associated with aircraft operations, or construction may directly or indirectly cause potential impacts to biological resources. Direct impacts from ground disturbance were evaluated by identifying the types and locations of potential ground-disturbing activities in correlation to important biological resources. Habitat removal and damage or degradation of habitats may be associated with ground disturbing activities.

The proximate effects of aircraft training and noise associated with a proposed action may be of sufficient magnitude to result in the direct loss of individuals and reduction of reproductive output within certain ecological settings. Ultimately, extreme cases of such stresses could have the potential to lead to population declines or local or regional extinction. To evaluate effects, considerations were given to number of individuals or critical species involved, amount of habitat affected, relationship of the area of potential effect to total critical habitat within the region, type of stressors involved, and magnitude of the effects.

The significance of impacts on wetland resources is proportional to the functions and values of the wetland complex. Wetlands function as habitat for plant and wildlife populations, including threatened and endangered species that depend on wetlands for their survival. Wetlands are valuable to the public for flood mitigation, stormwater runoff abatement, aquifer recharge, water quality improvement, and aesthetics. On a global scale, wetlands are significant factors in the nitrogen, sulfur, methane, and carbon dioxide cycles. These parameters vary from year to year or from season to season. Quantification of wetlands functions and values, therefore, is based on the ecological quality of the site as compared with similar sites, and the comparison of the economic value of the habitat with the economic value of the proposed activity that would modify it. A significant adverse impact on wetlands would occur should either the major function or value of the wetland be significantly altered.

As a requirement under the ESA, Federal agencies are required to provide documentation that ensures that agency actions will not adversely affect the existence of any threatened or endangered species. The ESA requires that all Federal agencies avoid "taking" threatened or endangered species (which includes jeopardizing threatened or endangered species habitat). Section 7 of the ESA establishes a consultation process with USFWS that ends with USFWS concurrence or a determination of the risk of jeopardy from a Federal agency project.

4.8.2 March ARB

Vegetation. Proposed construction activities to support the beddown of the C-17 aircraft at March ARB would occur solely within the improved areas of the installation. The proposed demolition and construction activities are within the designated Industrial-Administrative land use area at March ARB (see Figure 3-3). No natural vegetation communities within the ROI of the construction activities. Land disturbing activities associated with construction and demolition activities is limited to lawn and landscaped areas. Affected areas would be reseeded or replanted following the construction and/or demolition period. Although short-term, localized minor effects could be expected on vegetation in proximity to the construction and demolition sites, no significant, adverse effects would be expected as a result of the implementation of the Proposed Action at March ARB.

Wildlife. Wildlife habitat within the improved areas of the installation is limited due to fragmentation by the existing facilities, roads, and impervious surfaces at March ARB. Furthermore, most of the area associated with the Proposed Action consists of disturbed, landscaped, paved, or mowed lands. Construction activities would not impact habitat available to the mammals, birds, or herptiles that occur at March ARB. This assessment is based on the limited extent of areas that would be affected by the Proposed Action.

Potential effects on wildlife are also a function of noise produced by aircraft operations (see also section 1.2.5). Predictors of wildlife response include prior experience with overflights, aircraft approach distance, stage in the breeding cycle, activity or context, age and sex composition. Previous experience with similar overflights is the most important of these indicators. The rate of habituation to aircraft overflights is not known. However, the maximum sound level (L_{dnmr}) calculated for the aircraft operations within all of the training areas that are part of the Proposed Action is less than current conditions (see Section 4.2). Therefore, no significant, adverse impacts on wildlife would be expected to result from the Proposed Action.

Threatened and Endangered Species. As previously mentioned, there are federally listed several state-listed threatened, endangered, and CSC species that has the potential to occur in proximity to the proposed construction and demolition project area. Short term noise created during construction and demolition activities to support the C-17 basing is not likely to affect threatened or endangered species due to the proximity of construction activities to these species. No construction activities would occur within areas where threatened or endangered species have been documented or within their potential habitat. Therefore, there would be no effect to threatened, endangered, or rare species as a result of this portion of the Proposed Action on March ARB.

The foregoing observations concerning aircraft overflights apply equally to wildlife listed as threatened or endangered. Impacts to threatened and endangered species as a result of the use of the C-17 within the study area would not be expected due to the decreased noise levels associated with the C-17. The Proposed Action would have no effect and would not be likely to jeopardize the continued existence of Federal or state-listed threatened and endangered species on or in proximity to March ARB. Although written confirmation was not received, the USFWS Carlsbad

Field Office provided verbal confirmation that no federally listed species would be affected by the Proposed Action on March ARB (Boyarsky 2003).

Therefore, no significant, adverse impacts to threatened and endangered species would be expected as a result of the Proposed Action at March ARB.

Wetlands. Construction activities at March ARB would not occur within the vicinity of the approximately 3.3 acres of jurisdictional wetlands along the Heacock and Cactus flood control channels in the northeastern portion of March ARB or the Perris Storm drain near the perimeter roads of the southern end of Runway 14-32 which contains small vernal pools. Therefore, no significant, adverse effects on wetlands are expected at March ARB as a result of the Proposed Action.

4.8.3 Training Areas

Desert Center Drop Zone (DZ)

Vegetation. A decrease in airdrop operations is described as part of the Proposed Action. Vehicles retrieving airdrop bundles at the Desert Center DZ remain on established roads and trails and trace the drops to the maximum extent possible to avoid impacts to vegetation. If leaving the road becomes necessary, the minimum number of vehicles needed would be used to take the most direct route to the airdrop bundles. If drops land outside the cleared area, existing roads or trails would be used to avoid impacts to vegetation. Activities are coordinated with appropriate personnel at the Desert Center DZ to ensure procedures are followed.

Therefore, the Proposed Action would minor beneficial impact on vegetative communities due to decreased drops at the Desert Center DZ.

Wildlife. Since the Proposed Action calls for a decrease in airdrops, no significant adverse impacts at the Desert Center DZ are expected. Vehicles retrieving airdrop bundles at the Desert Center DZ remain on established roads, trails, and traces drop to the maximum extent possible to avoid impacts to wildlife. Activities are coordinated with appropriate personnel at Desert Center DZ to ensure procedures are followed.

Therefore, the Proposed Action would have minor beneficial impact on wildlife resources that occur within, and in the vicinity of, the Desert Center DZ.

Threatened and Endangered Species. The ROI at the Desert Center DZ occurs within the range of the Western Mohave Desert population of the desert tortoise. Though no signs of the desert tortoise have been observed in the vicinity of the DZ, precautions would be taken to minimize harassment of tortoises potentially occurring in the area of the DZ. Required precautions include minimizing vehicle traffic in the area when retrieving bundles and staying on established gravel roads to the maximum extent possible.

The foregoing observations concerning aircraft overflights apply equally to wildlife listed as threatened or endangered. The Proposed Action is not likely to jeopardize the continued existence of federally or state-listed threatened and endangered species on or in proximity to Desert Center DZ. Although written confirmation was not received, the USFWS Carlsbad Field Office provided verbal confirmation that no federally listed species would be affected by the Proposed Action at the Desert Center DZ (Boyarsky 2003).

Therefore, the Proposed Action would have no significant adverse impacts on threatened or endangered species.

Military Training Routes (MTRs)

Vegetation. The absence of ground disturbing activities from the flying operations described in the Proposed Action would lead to no effects on vegetation in the study area.

Wildlife. The most important predictors of response include prior experience with overflights, aircraft approach distance, stage in the breeding cycle, activity or context, and herd age and sex composition. Previous experience with similar overflights is the most important of these indicators. The rate of habituation to aircraft overflights is not known. Animals appear to habituate readily to exposure rates of one to five approaches per day. High rates of exposure (more than ten per day at close range) can, in some cases, constitute harassment of large, free-ranging herbivores.

Aircraft overflights within 650 to 1,640 feet increase the heart rates and elevate cortisol levels of large herbivores. These short-term physiological responses are mediated by the experience of the animals. If animals are overflown by aircraft at altitudes of approximately 156 to 330 feet, there is no evidence that mothers and young are separated, that animals collide with obstructions (unless confined), or that they traverse dangerous ground at a high rate of speed.

Studies on the effects of overflights on small mammals, especially rodents, have been motivated by a desire to remove these animals from the vicinity of airfields because they attract raptors and other animals hazardous to aircraft. Several studies of the abundance of rodents exposed to high levels of aircraft noise in the vicinity of airfields have failed to find any significant effect on populations. Long-term laboratory studies of small mammals exposed intermittently to high levels of noise demonstrate no changes in longevity. The physiological "fight-or-flight" response, while marked, does not appear to have any long-term health consequences. Small mammals habituate with difficulty to sound levels greater than 100 dB (MAFB 1995b).

Reproductive losses have been reported in one study of small territorial song birds (passerines) after exposure to low-altitude overflights. Studies of such effects are few. In general, natural mortalities of both adults and young are high and variable in most passerines. A consensus of the research indicates that passerines cannot be driven any great distance from a favored food by a nonspecific disturbance. Passerines avoid intermittent or unpredictable sources of disturbance more than predictable ones, but return rapidly to feed or roost once the disturbance ceases (MAFB 1995b).

Migratory waterfowl respond to disturbances more readily than other species of waterbirds. Most species of waterfowl, if startled to the point of being flushed, quickly resume their normal activities once the aircraft has left the area. Studies measuring changes in habitat use and energetic costs have not demonstrated meaningful effects. Canada geese and ducks are rarely disturbed by low-altitude overflights (Gladwin et al. 1998).

Extensive studies conducted on the effects of aircraft overflight disturbances on raptors have indicated reactions to low level aircraft, but no reproductive failure resulting from these behavioral reactions (Ellis 1981 and Lamp 1989). Adults are very reluctant to leave the nest, and generally remain away for one minute or less. They habituate to overflights rapidly, sometimes tolerating aircraft approaches of 65 feet or less (Fraser et al. 1985). Additional data suggests that raptors are extremely tolerant to noise levels that would likely be unacceptable to humans (Ellis 1981 and Lamp 1989). Raptor responses to aircraft disturbance tend to decline during the course of the breeding season, due either to energy conservation or habituation (MAFB 1995b).

Effects of overflights on amphibians and reptiles have rarely been evaluated. Since amphibians and reptiles do not exhibit a well-developed acoustic startle response, they are often regarded as non-susceptible to noise impacts (MAFB 1995b).

The studies discussed above support the conclusion that no significant, adverse impacts on wildlife underlying the MTR corridors would be expected as a result of the Proposed Action.

Threatened and Endangered Species. The foregoing observations apply equally to wildlife listed as threatened or endangered. Impacts to threatened and endangered species as a result of the use of MTRs within the study area would not be expected. Studies conducted concerning the impact of noise on wildlife have shown a variety of animal responses to aircraft overflights (or simulated aircraft noise) by different types of animals. A study conducted on the impacts of overflights to bald eagles suggested that the eagles were not sensitive to this type of disturbance. During the study, observations were made of over 850 overflights of active bald eagle nests. Only two eagles rose out of their incubation or brooding postures. This study also showed that perched adults were flushed on 10 percent of the time during aircraft overflights (Fraser et al. 1985). Evidence also suggests that golden eagles are not highly sensitive to noise or other aircraft disturbances (Ellis 1981, Holthuijzen 1990). An additional study has shown that eagles are particularly resistant to being flushed from their nests (Awbrey and Bowles 1990). Variations in responses have also been documented among homogenous species under similar environmental conditions (MAFB 1995b). The review of literature leads to the conclusion that, although overflights are often initially startling, animals generally adapt to them very well under most circumstances. In addition, the maximum sound level (L_{dnmr}) calculated for the aircraft operations within all of the training areas that are part of the Proposed Action would remain the same or increase by less than one percent (see Section 3.2). The Proposed Action is not likely to jeopardize the continued existence of federally or state-listed threatened and endangered species underlying the MTR corridors. Although written confirmation was not received, the USFWS Carlsbad Field Office provided verbal confirmation that no federally listed species underlying the MTR corridors would be affected by the Proposed Action (Boyarsky 2003).

Therefore, there would be no significant, adverse effects to threatened or endangered species underlying the MTR corridors under the Proposed Action.

Domestic Livestock. There have been numerous studies on the effects of aircraft noise on domestic livestock. Studies conducted on the responses of cattle and sheep to subsonic aircraft flying at altitudes of 150 to 600 feet and noise levels of 75 to 109 dB were observed to have no adverse effects on either species. Adaptation to the overflights at the end of the study was observed when both species appeared to be less disturbed (Gladwin et al. 1988). Milk production has not shown any changes due to the impacts of jet aircraft noise and flyovers (Manci et al.

1988). In fact, milk release actually improved (Gladwin et al. 1988). Simulated aircraft noise at levels of 120-135 dB had no adverse effect on the rate of feed utilization, weight gain, or food intake of pigs, nor was there any injury or anatomical change to the inner ear (Manci et al. 1988). The reproduction rates of pigs, boars, and sows exposed to simulated aircraft and other sounds varying from 100-120 dB were not affected (Gladwin et al. 1988). Simulated aircraft noise with sound intensities of 96 dB had no measurable effect on the hatchability of incubating eggs or the quality of chicks produced. Also, the growth rates of young chickens up to ten weeks were not affected by exposure to various sound intensities of reproduced jet aircraft noise (Manci et al. 1988). Pregnancy outcome, behavior, rate of habituation, and cardiac function of pregnant mares were studied in relation to the effects of simulated aircraft noise. Mares delivered normal foals without assistance. Heart rates were found to increase during noise periods, but some adaptation to the noise was observed after successive episodes. Anxiety and movement decreased as the mares continued to be subjected to the noise (LeBlanc et al. 1991).

The studies discussed above support the conclusion that no significant, adverse impacts on domestic animals underlying the MTR corridors would be expected from the Proposed Action.

4.9 Cultural Resources

4.9.1 Evaluation Criteria

The analysis of potential impacts to cultural resources associated with the beddown of C-17 aircraft at March ARB includes the following scenarios:

- Potential for direct impacts associated with the proposed construction, demolition, or alteration of existing buildings at March ARB
- Potential for indirect impacts associated with the degradation of setting resulting from noise and visual intrusion from proposed aircraft operations within the MTRs and the DZ
- Potential for indirect impacts associated with structural damage resulting from noise and low frequency vibration from proposed aircraft operations within the MTRs and the DZ

Potential direct impacts to significant cultural resources within the area of construction associated with the beddown of C-17 aircraft at March ARB include the proposed alteration of portions of three NRHP eligible buildings (Buildings 355, 420, and 453) that are located within, and are contributing elements of, the March Field Historic District. Potential indirect impacts include removal and replacement of an ineligible building (Building 2307) that is outside of the March

Field Historic District and its buffer zone, the construction of a new facility on the site of Building 2307, and the alteration of seven ineligible buildings that are outside of the March Field Historic District and its buffer zone. The demolition and alteration of buildings outside of the historic district potentially represent indirect impacts to historic resources due to the potential for degrading the visual setting of the March Field Historic District. The introduction of noise or low frequency vibrations associated with the proposed operation of C-17 aircraft in the vicinity represents a potential indirect impact due to the possibility that such noise or low frequency vibrations could physically damage significant cultural resources located within the March Field Historic District.

4.9.2 March ARB

Construction activities associated with the proposed beddown of C-17 aircraft at March ARB represent no impact to cultural resources based on the results of an analysis of the potential direct and indirect impacts associated with this aspect of the proposed project. Table 4-16 lists the NRHP eligible buildings that would be altered by construction related activities associated with the proposed beddown of C-17 aircraft at March ARB.

Table 4-16. Impacts to NRHP Eligible Buildings Resulting from Alterations

Building Number	Building Use	Proposed Action	Impact
355	Maintenance Shop	Alteration of interior maintenance shops	None
420	Life Support	Alteration of interior maintenance shops	None
453	Maintenance Shop	Alteration of building interior	None

Chapter 4 (Compliance Procedures) of the cultural resources management plan for March AFB (MAFB 1996b) contains a detailed presentation of the federally mandated compliance procedures, regulations, and policies that must be followed in association with the approval and implementation of proposed projects at the base. According to information contained in Section 4.2.2.3 of Chapter 4 of the plan, the proposed interior renovations of Buildings 355, 420, and 453 would represent no impact to cultural resources, due to the fact that the interiors of these buildings have been previously modified, and that these buildings do not retain interior features that are associated with their NRHP eligibility status. The demolition of Building 2307, the construction of a new facility at that location, and the alteration of Buildings 600, 1221, 2303, 2306, 2240, 2327, and 2328 would represent no impact to cultural resources because these

buildings are not eligible for nomination to the NRHP and are located outside of the March Field Historic District and its buffer zone. The Proposed Action would have no indirect impact on the setting of the March Field Historic District. Potential indirect impacts to the setting of the March Field Historic District would be avoided through the implementation of an aesthetically compatible design for the replacement facility at the current location of Building 2307 that would not alter the current setting of the area. Selection of this design would be guided by the March ARB Base Civil Engineer (BCE), possibly in conjunction with the Architectural Compatibility Review Board (ACRB), as appropriate.

Due to the extensive and comprehensive nature of the procedures that are contained in Chapter 5 of AFI 32-7065, *Cultural Resources Management*, Chapters 4 and 5 of the Historic Management Plan for March ARB regarding project development, and the Section 106 consultation process, they are not presented in detail in this analysis. However, the procedures described in those documents regarding project proposal and implementation would be implemented in an effort to avoid any potential impacts to cultural resources in association with the proposed project. All construction plans associated with the Proposed Action would be submitted to the March ARB BCE. It would be the responsibility of the March ARB BCE or an officially designated representative to evaluate the potential impacts of the proposed project, initiate the Section 106 consultation process with the SHPO and the ACHP (as appropriate), and insure that compliance with any and all applicable regulations and requirements associated with that process continues throughout all stages of project proposal and implementation.

4.9.3 Training Areas

The proposed beddown of C-17 aircraft at March ARB represents no impact to cultural resources within the areas of the MTRs or the DZ associated with the Proposed Action based on the results of an analysis of the potential direct and indirect impacts to cultural resources associated with the audible or visual aspects of the proposed project.

If the audible or visual aspects of the setting of a cultural resource are fundamental to the resource's NRHP eligibility, then newly introduced audible or visual intrusions that would significantly alter the resource's setting can potentially represent a significant impact to the resource. The significance of such an impact would depend on the characteristic of the affected cultural resource, the degree that such audible or visual intrusions were to exceed current levels, and the cumulative effects of the newly introduced intrusion in conjunction with other types of pre-existing noise sources in the vicinity of the resource. Due to the level of development that is usually present on military installations, the audible or visual setting is not often a determining element in the significance of cultural resources that are located on military installations. In addition, in rural areas that typically surround military installations, noise intrusion from a variety of sources such as farm machinery, POV, and/or commercial vehicles creates a surrounding noise environment that is unlikely to be consistent with the original setting of cultural resources.

Due to the original and current use of March ARB as a military air station, the proposed introduction of C-17 overflights would not significantly alter the pre-existing or current visual or audible environments of significant cultural resources that are present there. Newly introduced visual and audible intrusions within the proposed MTRs and DZ would be consistent with their current settings. Therefore, the Proposed Action would represent no impact to the integrity of cultural resources, and would not jeopardize the NRHP eligibility or potential eligibility of cultural resources that are within the vicinity of these areas.

Based on AFRC policy, C-17 aircraft would not fly lower than 500 feet AGL for any extended period of time, unless the proposed MTRs were environmentally assessed, surveyed, and approved for operations less than 500 feet AGL. Studies have established that for subsonic noise related to vibration to damage above ground structures (including historic buildings), high decibel levels in a low frequency range must be generated at close proximity to the structure for an extended period of time (NPS 1994). Similar studies have shown that aircraft must generate at least 120 dB at a distance of less than 150 feet for an extended period of time in order to cause measurable structural damage to above-ground structures (Battis 1983). A large, high-speed aircraft (such as the C-17) flying directly over a building at greater than 500 feet has less than 0.3 percent chance of measurably damaging even a "fragile" structure (Sutherland 1990).

Low frequency energy and its impact on buildings were explored in detail in association with the introduction of Concorde SST operation in the continental U.S. Studies conducted by the FAA revealed that low frequency vibrations produced by the Concorde, which far exceed those produced by the C-17, caused little or no structural damage to above-ground structures. An analysis conducted at five architectural sites near the proposed subsonic flight path of the Concorde aircraft revealed that structural breakage probabilities resulting from noise-induced vibration of windows, brick chimneys, a stone bridge, and a plaster ceiling were less than 0.001 percent above the average yearly level of deterioration. It was also found that exposure to normal weather conditions (such as thunder or wind loads) produces a higher probability of breakage than exposure to vibrations from the Concorde (FAA 1985).

4.10 Socioeconomics and Environmental Justice

4.10.1 Evaluation Criteria

The significance of construction expenditure impacts is assessed in terms of direct effects on the local economy and related effects on other socioeconomic resources (e.g., housing). The magnitude of potential impacts can vary greatly, depending on the location of a proposed action. For example, implementation of an action that creates ten employment positions may be unnoticed in an urban area, but may have significant impacts in a rural region. If potential socioeconomic changes were to result in substantial shifts in population trends or in adverse effects on regional spending and earning patterns, they would be considered significant.

4.10.2 March ARB

Short-term beneficial effects would be expected. Construction associated with the Proposed Action would generate temporary employment due to use of labor from the regional workforce and slight increased spending in the area due to the purchase of construction and other materials. Over the long-term, there would be a negligible net change in the number of personnel assigned to March ARB. There would be no increase or decrease in manpower authorizations as a result of the Proposed Action. No significant changes in demographics, housing, or public services would be expected, and there would be no shifts in socioeconomic patterns or trends resulting from the Proposed Action. Therefore, overall long-term socioeconomic impacts at March ARB would be negligible.

To comply with EO 12898, ethnicity and poverty status in the study area have been examined and compared to state and national statistics to determine of minority of low-income groups could potentially be disproportionately affected by the Proposed Action. The review indicates that the number of low-income residents in Riverside County is equal to the state average and slightly higher than the national average; however, it is not considered significantly higher. The review also indicates that the number of minority residents in Riverside County is slightly higher than the state and national averages; however, it is not considered significantly higher. Therefore, the percentage of the population in the study area considered to be potentially impacted in relation to environmental justice concerns is considered low. Therefore, minority or low-income populations would not be expected to be adversely or disproportionately impacted.

In addition, EO 13045 requires that Federal agencies identify and assess environmental health and safety risks that might disproportionately affect children. The Proposed Action would not likely pose any adverse or disproportionate environmental health or safety risks to children living in the vicinity of the base. The likelihood of the presence of children at the site where the Proposed Action would occur on base is considered minimal, which further limits the potential for effects. Therefore, no significant adverse impacts would be expected.

4.11 Infrastructure

4.11.1 Evaluation Criteria

Impacts to infrastructure are evaluated on their potential for disruption or improvement of existing levels of service and additional needs for energy and water consumption, wastewater systems, and transportation patterns and circulation. Impacts may arise from physical changes to circulation, construction activities, introduction of construction-related traffic on local roads, or changes in daily or peak-hour traffic volumes, and energy needs created by either direct or indirect workforce and population changes related to base activities. Since no construction activities would occur at the Desert Center DZ, this section will only analyze the environmental impacts to infrastructure on March ARB.

4.11.2 March ARB

Transportation Systems. There would be a temporary increase in the utilization of the installation's roadways as a result of construction traffic. Construction equipment would be driven to the project locations and would be kept on site during the duration of the project. In addition, the number of personnel supporting the C-17 mission would result in no net personnel change from current mission support crews. Therefore, no adverse impacts to transportation systems would result from the Proposed Action.

Electrical Power. The Proposed Action would not result in a net change in electrical power usage; however, the electrical capacity for Building 2328 needs to be doubled to support the mission requirements for the C-17 aircraft (Mamawal 2003). Therefore, no adverse impacts to electrical power would result from the Proposed Action.

Natural Gas. The Proposed Action would not result in a net change in natural gas usage. Therefore, no adverse impacts to natural gas systems would result from the Proposed Action.

Liquid Fuels. Based on the baseline March ARB C-141C JP-8 consumption and anticipated C-17 JP-8 usage for the Proposed Action, it is estimated that the amount of JP-8 usage would increase. Motorized equipment and vehicle operations are estimated to remain nearly unchanged under the Proposed Action.

Current JP-8 fuels management procedures and storage capacity would adequately accommodate the JP-8 fuel requirements of the C-17 aircraft. The base has adequate storage capacity when comparing average daily usage to storage capacity. Therefore, no adverse impacts to liquid fuel systems would result from the Proposed Action.

LOX Systems. The Proposed Action would not result in a net change in LOX usage. Therefore, no adverse impacts to LOX systems would result from the Proposed Action.

Water Supply. The Proposed Action would not result in a net change in water usage. Therefore, no adverse impacts to water supply systems would result from the Proposed Action.

Solid Waste. In considering the basis for evaluating the significance of impacts on solid waste, several items are considered. These items include evaluating the degree to which the proposed construction projects could affect the existing solid waste management program and capacity of the area landfill.

Solid waste generated from the proposed construction activities would consist of building materials such as solid pieces of concrete, metals (conduit, piping, and wiring), and lumber. Analysis of the cumulative impacts associated with implementation of the Proposed Action and other actions is based on the following assumptions (USACE 1976):

- Approximately 4 pounds of construction debris is generated for each ft^2 of floor area for new structures
- Approximately 1 pound of construction debris is generated for each ft^2 of new asphalt
- Approximately 92 pounds of demolition debris is generated for each ft^2 of floor area for old structures

Table 4-17 presents the amount of MSW (tons) generated from the proposed construction and demolition activities using the assumptions detailed above.

Table 4-17. Projected Construction and Demolition Waste Generation

Construction Projects	Project Area (ft^2)	Asphalt Area (ft^2)	Waste (pounds)
Demolish Building 2307	50,322	N/A	4,629,624
Construct C-17 Maintenance and Inspection Hangar (Phases I and II)	60,816	N/A	243,264
Asphalt Construction (Buildings 420 and 2240)	N/A N/A	4,950 47,899	4,950 47,899
		Total MSW (pounds)	**4,925,737**
		Total MSW (tons)	**2,463**

The landfill space required at the El Sobrante Sanitary Landfill and the Badlands Sanitary Landfill would increase 2,463 tons over the next four years (FY 03 to FY 06). The El Sobrante Sanitary Landfill and the Badlands Sanitary Landfill currently have the capacity to handle the additional solid waste stream from the Proposed Action (WM 2003; RCWMD 2003). Therefore, implementation of the Proposed Action at March ARB would not impact the solid waste management program at March ARB or the capacity of the El Sobrante and Badlands Sanitary Landfills.

Sanitary Systems. The Proposed Action would not result in a net change in sanitary system usage. Therefore, no adverse impacts to sanitary systems would result from the Proposed Action.

4.12 Hazardous Materials and Wastes

4.12.1 Evaluation Criteria

Impacts to hazardous material management would be considered significant if the Federal action resulted in noncompliance with applicable Federal and state regulations, or increased the amounts generated or procured beyond current March ARB waste management procedures and capacities. Impact to pollution prevention would be considered significant if the Federal action resulted in worker, resident, or visitor exposure to these materials, or if the action generated quantities of these materials beyond the capability of current management procedures. Impact to the ERP would be considered significant if the Federal action disturbed (or created) contaminated sites resulting in adverse effects to human health or the environment. Impacts to fuels management would be significant if the established management policies, procedures, and handling capacities could not accommodate the activities associated with the Proposed Action.

There are no hazardous materials used or hazardous waste generated by the flying operations at the DZs or within the MTRs; therefore, there are no environmental consequences with respect to hazardous materials and waste management at the DZs or within the MTRs.

4.12.2 March ARB

Hazardous Materials. Products containing hazardous materials would be procured and used during the proposed construction projects and during the operation of the C-17 aircraft. It is anticipated that the quantity of products containing hazardous materials used during the construction of base facilities would be minimal and their use would be of short duration. Contractors would be responsible for the management of hazardous materials, which would be handled in accordance with Federal and state regulations. Therefore, hazardous materials management at March ARB would not be impacted by the proposed construction activities.

Should the proposed basing of C-17 aircraft occur at March ARB, it is anticipated that procurement of products containing hazardous materials would be comparable to those used for the C-141C due to the similarity of the maintenance and support activities for the two aircraft. Additionally, the proposed number of C-17s is less than the number of C-141Cs that are being reassigned or retired from March ARB. Therefore, it is estimated that hazardous material procurement would remain comparable to the baseline condition. The USAF is pursuing aircraft maintenance procedures that would use fewer hazardous materials. As the procedures are developed, it is likely that the quantity of hazardous materials required for C-17 maintenance activities would decrease. Therefore, there would be no impact to hazardous material management at March ARB.

Hazardous Wastes. It is anticipated that the quantity of hazardous wastes generated from proposed construction activities would be negligible. Contractors would be responsible for the disposal of hazardous wastes in accordance with Federal and state laws and regulations. Construction of the proposed facilities would not impact the base's hazardous waste management program.

The C-17 and C-141 aircraft are very similar, and the number of aircraft that would operate under the Proposed Action would be less than the baseline condition. Therefore, it is anticipated that the volume, type, classifications, and sources of hazardous waste associated with the Proposed Action would be similar in nature with the baseline condition waste streams. Hazardous waste would be handled, stored, transported, disposed of, or recycled in accordance with the March

ARB Hazardous Waste Management Plan. If fewer hazardous materials are used for C-17 aircraft maintenance, the quantity of hazardous wastes generated would decrease. However, it is impossible to predict the decreases because the new maintenance procedures have not been finalized.

Pollution Prevention. It is anticipated that the Proposed Action would not impact the Pollution Prevention Program at March ARB. Quantities of hazardous material and chemical purchases, off-base transport of hazardous waste, disposal of MSW, and energy consumption would continue. Operation of the C-17 aircraft at March ARB would require procurement of products containing hazardous materials, generation of hazardous waste, and consumption of energy consistent with the baseline condition associated with the operation of the C-141C aircraft. The Pollution Prevention Program at March ARB would accommodate the Proposed Action.

Asbestos and Lead-Based Paint. Specifications for the proposed construction activities and USAF regulations prohibit the use of ACM and LBP for new construction. Some of the buildings scheduled for demolition or renovation could contain ACM and LBP.

Building 600 has been tested for ACM and LBP. The test results were negative for the entire building with the exception of a positive LBP result on the steel doors and steel doorframes (Mamawal 2003). All other buildings scheduled for renovation and demolition are unknown for ACM and LBP (Mamawal 2003). Sampling for asbestos and LBP would occur concurrent with demolition activities and would be handled in accordance with the Asbestos Management Plan, Lead-Based Paint Management Plan, and USAF policy.

Environmental Restoration Program. All of the construction projects (renovation, demolition, and construction) would be located near ERP Site 8, Flightline Shop Zone (AFBCA OU-2) (see Figure 4-4). These shops have been in operation from 1918 until the present. Wastes spilled on the ground reportedly included fuels, waste oils, spent solvents, paints, and thinners. Some of the contaminated soil has been removed. The design for cleanup of groundwater contaminated by solvents is underway. The design proposes groundwater extraction. ERP Site 8 area has been restricted to industrial use. Only the demolition and construction portions of the Proposed Action would require digging operations within the Flightline Shop Zone. It is unlikely that contamination would be encountered during these construction activities; however, should contamination be encountered, the handling, storage, transportation and disposal activities would be conducted in accordance with applicable Federal, state, and local regulations, AFIs, and March

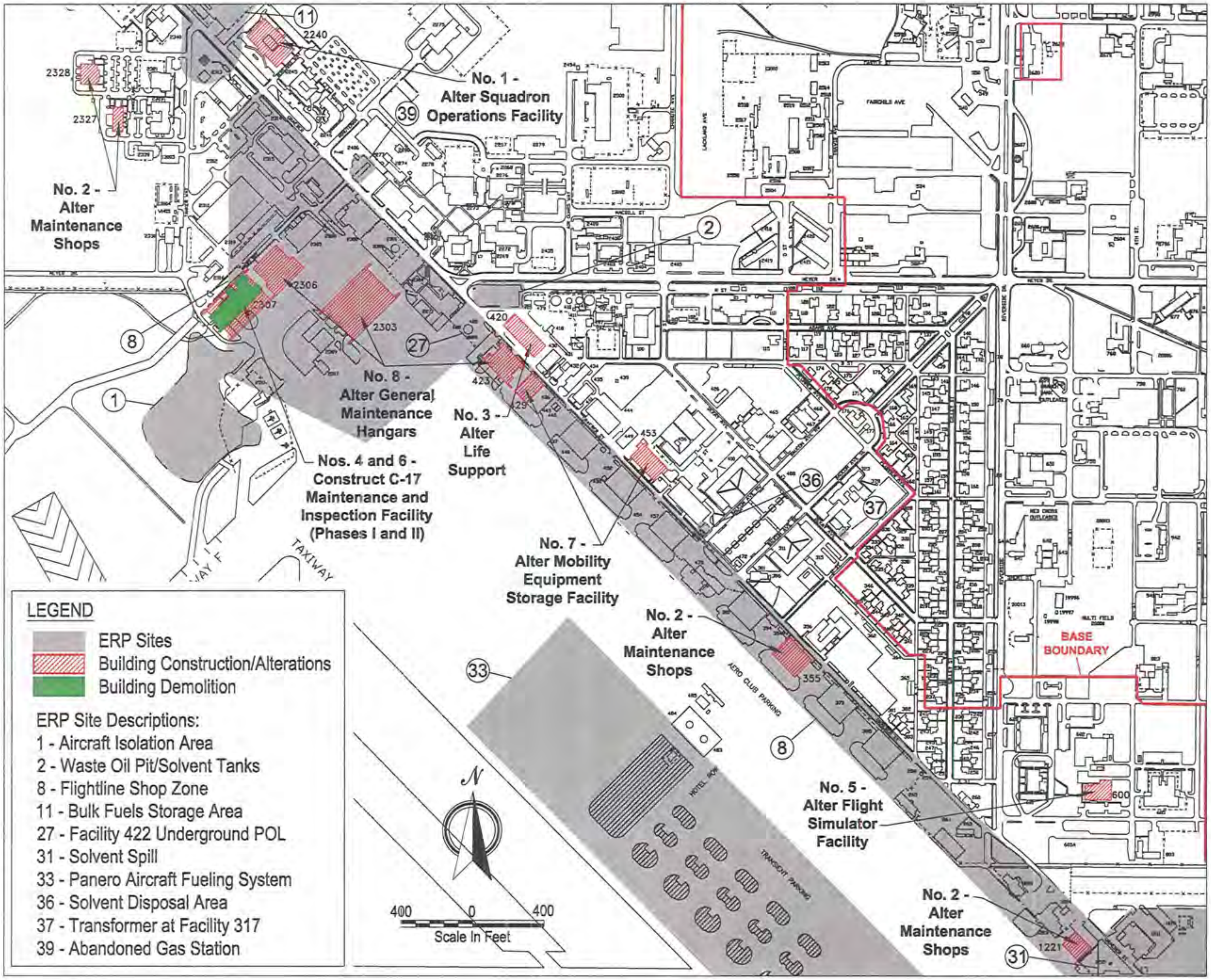

Figure 4-4. Locations of ERP Sites and Proposed Construction Projects at March ARB

ARB programs and procedures. In addition, construction details and appropriate environmental protection measures have been discussed with Federal and state regulators to assure compliance with laws and regulations.

Currently, there are several groundwater and vapor monitoring and extraction wells located near Building 2307 to remediate ERP site contamination. These wells were installed under March ARB's Environmental Restoration Program. These wells may be impacted from construction and demolition activities near Building 2307 under the Proposed Action.

Contaminated soil could be encountered during construction and demolition activities near Building 2307. Should contamination be encountered, the contractor should contact Base Environmental Flight before proceeding. If contamination is encountered, handling, storage, transportation, and disposal activities would be conducted in accordance with applicable Federal, state, and local regulations, AFIs, and March ARB programs and procedures.

Because ERP monitoring and extraction wells could be impacted from construction and demolition activities, the proposed new C-17 hangar should be designed to protect the access to and the integrity of these monitoring and extraction wells.

4.13 No Action Alternative

Under the No Action Alternative, the strategic airlift mission at March ARB would continue until the remaining C-141C aircraft are retired or their useful life is extended. Replacement of these aircraft by C-17 aircraft would not occur. The C-141C aircraft would draw-down as set by the current schedule. The C-141C operations at March ARB would continue flying until FY 06. By that time, the C-141C may no longer be able to be supported with spare parts, and the C-141C fleet at March ARB would be retired. All other missions operating at March ARB would remain. AFRC would support West Coast airlift mission requirements using other AFRC airlift assets. These aircraft would require increased flying time to make up for the lost capability once supported by the C-141C aircraft at March ARB.

Airspace Management. Under the No Action Alternative, C-17 aircraft would not be beddown at March ARB. Use of the MTRs would not be required. This would have a beneficial effect on the areas under the MTRs.

Air Quality. The No Action Alternative at March ARB would include the gradual draw-down of the existing C-141C aircraft from the current levels to none by the end of 2005. As these aircraft are retired, there would be an overall reduction in the operational activities and use of facilities, buildings, and equipment at the base. As a result, regulated pollutant emissions from flight operations, AGE, external combustion devices, surface coating, fuel handling activities, and construction would decrease from current levels.

The draw-down and retirement of the C-141C aircraft would result in a significant decrease in the number of annual sorties conducted at the Desert Center DZ. Without the C-141C aircraft from March ARB (all retired after 2006), the use of this facility (and associated regulated pollutant emissions) would be reduced by more than 90 percent compared to current baseline levels. As a result, the No Action Alternative would result in a net overall improvement in local and regional ambient air quality. In addition, the use of the MTRs would also be phased-out under this alternative. The net changes in air pollutant emissions associated with the No Action Alternative would result in an overall improvement in ambient air quality within all affected Air Basins and AQCRs overflown by the MTRs.

Noise. Under the No Action Alternative, the strategic airlift mission at March ARB would continue until the remaining C-141C aircraft are retired or their useful life is extended. No C-17 aircraft would be stationed at March ARB to replace the C-141C aircraft, thus C-17 flying activities on the proposed MTRs and DZs would not occur. Although all other flying missions operating at March ARB would remain, noise levels would be expected to decrease in the vicinity of the airfield, MTRs, and DZs with the reduction of the C-171C aircraft operations at March ARB.

Infrastructure. Under the No Action Alternative, there would be no change in baseline conditions and none of the proposed construction projects would occur. Therefore, there would be no impact on the March ARB's infrastructure and utilities as a result of the No Action Alternative. However, the amount of all types of fuel used at March ARB would be reduced due to the reassignment and/or retirement of C-141C aircraft.

Hazardous Materials and Waste. Under the No Action Alternative, hazardous waste generation at the base would decrease due to the planned reassignment or retirement of C-141C aircraft. In addition, procurement of products containing hazardous materials would decrease due to the continuing retirement of C-141C aircraft from March ARB. With fewer and fewer maintenance activities occurring at the base, the requirement for products containing hazardous materials would decrease.

5. Cumulative and Adverse Impacts

Cumulative impacts on environmental resources result from incremental effects of proposed actions, when combined with other past, present, and reasonably foreseeable future projects in the area. Cumulative impacts can result from individually minor, but collectively substantial, actions undertaken over a period of time by various agencies (Federal, state, and local) or individuals. Informed decision-making is served by consideration of cumulative impacts resulting from projects that are proposed, under construction, recently completed, or anticipated to be implemented in the reasonably foreseeable future.

There are other known actions anticipated at March ARB during the same period as the Proposed Action:

- Joint Use of March ARB by commercial aircraft associated with the March Joint Powers Authority

The breadth of the land underlying the military airspace utilized by the 452 AMW poses a nearly infinite number of other actions possibly having cumulative effects with the Proposed Action. AFRC has not attempted to catalogue and evaluate all such actions. In addition, there are no known new proposals or projects slated in the vicinity of Desert Center DZ.

As stated in Section 1.3, C-17 aircraft require the use of an ALZ for training purposes. There are no ALZs located within 30 minutes flying time of March ARB. As a result, an ALZ would need to be constructed; however, a location for the ALZ has yet to be determined. Due to the lack of availability of complete information, the proposed construction of an ALZ will undergo analysis for decision-making at a later time (40 CFR 1502.22(b)). In this particular case, the basing of the C-17s is ripe for decision, but the decisions to support the proposed construction of an ALZ have not been resolved and are therefore, not ripe for decision at this time. As a result, analyses specific to the proposed ALZ will be presented in a separate NEPA document that will include a cumulative impacts analysis of the entire Proposed Action (32 CFR 989.10).

5.1 Unavoidable Adverse Impacts

Unavoidable adverse impacts would result from implementation of the Proposed Action. None of these impacts would be significant.

Noise. The noise resulting from anticipated aircraft operations is an unavoidable condition. The C-17 is a quieter aircraft than the C-141 and would result in a reduced noise environment at March ARB. Noise is not considered a significant impact.

Geological Resources. Under the Proposed Action, construction activities, such as grading, excavating, and recontouring of the soil, would result in soil disturbance. Implementation of best management practices during construction would limit potential impacts resulting from construction activities. Standard erosion control means would also reduce potential impacts related to these characteristics. Although unavoidable, impacts on soils at the base is not considered significant.

Biological Resources. Site grading associated with construction projects would remove minimal vegetation and associated small animal life now occupying and utilizing the affected acres. All of the affected sites are in the area of the base that is classified as industrial use, and are already heavily disturbed. This area does not presently provide significant habitat for many species. Although unavoidable, this adverse condition is not considered significant.

Safety. The potential for aircraft mishaps, the potential for accidents or spills at the fuel storage facility, and the generation of hazardous wastes are unavoidable conditions associated with the Proposed Action. However, the potential for these unavoidable situations would not significantly increase over baseline conditions and, therefore, are not considered significant.

Energy. The use of nonrenewable resources is an unavoidable occurrence, although not considered significant. The Proposed Action would require the use of fossil fuels, a nonrenewable natural resource. Energy supplies, although relatively small, would be committed to the Proposed Action or No Action Alternative.

5.2 Compatibility of the Proposed Action and Alternatives with the Objectives of Federal, Regional, State, and Local Land Use Plans, Policies, and Controls

Impacts to the ground surface as a result of the Proposed Action would occur entirely within the boundaries of March ARB. Construction of new facilities and modification of existing facilities would not result in any significant or incompatible land use changes on or off base. The basing and operation of C-17 aircraft would not alter the relationships of the general land use areas that have been designated in the base planning guidance documents. The land use categories incorporate developed and undeveloped lands. These land use designations were established to segregate aircraft facilities from other military base support areas. Facilities planned for C-17 operations have been sited according to these existing land use zones. Consequently, development of C-17 facilities would not be in conflict with base land use policies or objectives. The Proposed Action would not conflict with any applicable off-base land use ordinances or designated clear zones.

5.3 Relationship Between the Short-term Use of the Environment and Long-term Productivity

Short-term uses of the biophysical components of man's environment include direct construction-related disturbances and direct impacts associated with an increase in population and activity that occurs over a period of less than 5 years. Long-term uses of man's environment include those impacts occurring over a period of more than 5 years, including permanent resource loss.

Several kinds of activities could result in short-term resource uses that compromise long-term productivity. Filling of wetlands or loss of other especially important habitats and consumptive use of high-quality water at nonrenewable rates are examples of actions that affect long-term productivity.

The Proposed Action would not result in an intensification of land use at March ARB and in the surrounding area. Development of the Proposed Action or No Action Alternative would not represent a significant loss of open space. The sites are designated for industrial uses and were not planned for use as open space. Therefore, it is anticipated that neither the Proposed Action nor the No Action Alternative would result in any cumulative land use or aesthetic impacts. Long-term productivity of this site would be increased by the development of the Proposed Action.

5.4 Irreversible and Irretrievable Commitments of Resources

The irreversible environmental changes that would result from implementation of the Proposed Action involve the consumption of material resources, energy resources, land, biological habitat, and human resources. The use of these resources is considered to be permanent.

Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effects that use of these resources will have on future generations. Irreversible effects primarily result from use or destruction of a specific resource that cannot be replaced within a reasonable time frame (e.g., energy and minerals).

Material Resources. Material resources utilized for the Proposed Action include building materials (for construction of facilities), concrete and asphalt (for roads), and various material supplies (for infrastructure). Most of the materials that would be consumed are not in short supply, would not limit other unrelated construction activities, and would not be considered significant.

Energy Resources. Energy resources utilized for the Proposed Action would be irretrievably lost. These include petroleum-based products (such as gasoline, jet fuel and diesel), natural gas, and electricity. During construction, gasoline and diesel would be used for the operation of construction vehicles. During operation, gasoline would be used for the operation of private and government-owned vehicles. Natural gas and electricity would be used by operational activities. Consumption of these energy resources would not place a significant demand on their availability in the region. Therefore, no significant impacts would be expected.

Biological Habitat. The Proposed Action would not result in the loss of vegetation or wildlife habitat on proposed construction sites. Proposed construction is occurring on already disturbed land that is classified as industrial use. Furthermore, the Proposed Action would not remove a significant amount of open space or undeveloped land currently functioning as biological habitat.

Human Resources. The use of human resources for construction and operation is considered an irretrievable loss, only in that it would preclude such personnel from engaging in other work activities. However, the use of human resources for the Proposed Action represents employment opportunities, and is considered beneficial.

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APPENDIX A

INTERAGENCY AND INTERGOVERNMENTAL COORDINATION FOR ENVIRONMENTAL PLANNING

January 3, 2003

Horst Greczmiel
Council on Environmental Quality (CEQ)
360 Old Executive Office Building, NW
Washington, DC 20501

Dear Mr. Greczmiel

The Air Force Reserve Command is preparing an Environmental Assessment (EA) for the Beddown of C-17 Aircraft at March Air Reserve Base, California. The Description of Proposed Action and Alternatives (DOPAA) is included with this correspondence as Attachment 1.

The environmental impact analysis process for this proposal is being conducted by the Air Force Reserve Command in accordance with the Council on Environmental Quality guidelines pursuant to the requirements of the National Environmental Policy Act of 1969. In accordance with Executive Order 12372, *Intergovernmental Review of Federal Programs*, we request your participation by reviewing the attached DOPAA and solicit your comments concerning the proposal and any potential environmental consequences. Please provide written comments or information regarding the action at your earliest convenience but no later than February 3, 2003. Also enclosed is a listing of those Federal, state, and local agencies that have been contacted (see Attachment 2). If there are any additional agencies that you feel should review and comment on the proposal, please include them in your distribution of this letter and the attached materials.

Please address questions concerning or comments on the proposal to our consultant, engineering-environmental Management, Inc. (e^2M). The point-of-contact at e^2M is Mr. Brian Hoppy. He can be reached at (610) 649-8064. Please forward your written comments to Mr. Hoppy, in care of e^2M, Inc., 355 West Lancaster Avenue, Building E, 2nd Floor East, Haverford, Pennsylvania 19041. Thank you for your assistance.

Sincerely,
engineering-environmental Management, Inc.

Brian K. Hoppy

Brian Hoppy, Vice President
Project Manager

Attachments:
1. Description of Proposed Action and Alternatives
2. Distribution List

C-17 BEDDOWN AT MARCH ARB, CALIFORNIA
ENVIRONMENTAL ASSESSMENT

Interagency and Intergovernmental Coordination for Environmental Planning List

---

Federal – Headquarters Level

Horst Greczmiel
Council on Environmental Quality (CEQ)
360 Old Executive Office Building, NW
Washington, DC 20501

Dr. Willie Taylor
U.S. Department of the Interior
Office of Environmental Policy and Compliance
Main Interior Building, MS 2340
1849 C Street, NW
Washington, DC 20240

Ms. Andree DuVarney
National Environmental Coordinator
Natural Resource Conservation Service (NRCS)
U.S. Department of Agriculture
14th and Independence Ave., SW
PO Box 2890
Washington, DC 20013

Mr. Rhey Solomon
Director, NEPA Staff
Forest Service
U.S. Department of Agriculture
PO Box 96090
Washington, DC 20090-6090

Mr. Richard Sanderson
Director, Office of Federal Activities
U.S. Environmental Protection Agency (USEPA)
Federal Agency Liaison Division, 2251-A
401 M Street, SW
Washington, DC 20460

Ms. Ann M. Hooker
Environmental Specialist, NEPA Liaison
Federal Aviation Administration (FAA)
Office of Environment and Energy (AEE300)
800 Independence Avenue, SW
Washington, DC 20591

Mr. Ralph Thompson
FAA – Airport Program (APP600)
800 Independence Avenue, SW
Washington, DC 20591

Mr. A. Forester Einarsen
NEPA Coordinator
U.S. Army Corps of Engineers (USACE)
Office of Environmental Policy (CECW-AR-E)
20 Massachusetts Avenue
Washington, DC 20314-1000

Mr. Don Klima
Director, Office of Planning and Review
Advisory Council on Historic Preservation
1100 Pennsylvania Ave., NW #809
The Old Post Office Building
Washington, DC 20004

Federal – Local Level

Mr. Mark Bagdovitz
Chief, Branch of Federal Activities
USFWS Region 1
911 Northeast 11th Avenue
Portland, OR 97232-4181

Steve Hilfert,
Chief, Ecological Services
USFWS Region 2
P.O. Box 1306
Albuquerque, NM 87103

Carlsbad Fish and Wildlife Office
Ecological Services Field Office
2730 Loker Avenue West
Carlsbad, California 92008-6603

Arizona Ecological Services Field Office
USFWS
2321 W. Royal Palm Road, Suite 103
Phoenix, AZ 85021

Nevada Ecological Services Field Office
USFWS
1340 Financial Boulevard, Suite 234
Reno, Nevada 89502-7147

Ms. Lisa Hanf
Federal Activities Office
Mail Code CMD-2
USEPA Region 9
75 Hawthorn Street
San Francisco, CA 94105

Dick Andrews
USDA Forest Service
Pacific Southwest Region (R5)
1323 Club Drive
Vallejo, CA 94529

Bureau of Land Management
California State Office
2800 Cottage Way, Suite W-1834
Sacramento, CA 95825-1886

Bureau of Land Management
California Desert District Office
6221 Box Springs Blvd.
Riverside, CA 92507

Bureau of Land Management
Palm Springs/South Coast Field Office
690 W. Garnet Avenue
N. Palm Springs, CA 92258

Lt Col Ann Marie Matonak
AF Rep
FAA Western-Pacific Region, AWP-910
P.O. Box 92007, WPC
Los Angeles, CA 90009-2007

William C. Withycombe
Regional Administrator
FAA Western-Pacific Region
15000 Aviation Blvd.
Lawndale, CA 90261

State Level – California

Dr. Knox Mellon
State Historic Preservation Office
California Department of Parks and Recreation
Office of Historic Preservation
1416 9th Street, Room 1442-7
Sacramento, CA 95814

Ms. Terry Roberts
Chief, California State Clearinghouse
Governor's Office of Planning and Research
P.O. Box 3044
Sacramento, CA 95812-3044

Dr. Barry Wallerstein
Executive Officer
South Coast AQMD
21865 E. Copley Dr.
Diamond Bar, CA 91765-4182

Alan C. Lloyd, Ph.D.
Chairman
California Air Resources Board
P.O. Box 2815
Sacramento, CA 95812

State Level – Arizona

Joe Roth
State Historic Preservation Office
Arizona State Parks
1300 W. Washington
Phoenix, AZ 85007

Ms. Jacqueline E. Schafer
Director, Arizona Department of Environmental Quality
3033 North Central Avenue
Phoenix, AZ 85012

State Level – Nevada

Ronald M. James
State Historic Preservation Officer and Historian
Department of Cultural Affairs
100 North Stewart Street
Carson City, NV 89701-4285

Ms. Heather K. Elliott
Clearinghouse Coordinator, Nevada State Clearinghouse
Department of Administration
209 East Musser Street, Room 200
Carson City, NV 89701

Local – March ARB Area

Barbara Boxer
112 Hart Senate Office Building
Washington, DC 20510

Dianne Feinstein
331 Hart Senate Office Building
Washington, DC 20510

43rd Congressional District
Ken Calvert
2201 Rayburn House Office Building
Washington, DC 20515-0543

Mayor Ron Loveridge
City of Riverside
3900 Main Street
Riverside, CA 92522

Dan Fairbanks
March Joint Powers Authority
P.O. Box 7480
Moreno Valley, California 92522

Ken Gutierrez
Deputy Planning Director
City of Riverside Planning Department
3900 Main Street
3rd Floor
Riverside, CA 92522

Aleta J. Laurence
Planning Director
Riverside County Department of Planning
4080 Lemon Street
Riverside, CA 92502-1629

Linda Guillis
Community and Economic Development Director
City of Moreno Valley
14177 Frederick Street
Moreno Valley, CA 92553-9014

Olivia Gutierrez
Planning Director
City of Perris
101 North "D" Street
Perris, CA 92570-1998

The Draft Finding of No Significant Impact (FONSI) and Environmental Assessment (EA) were made available for public review from February 25 through March 27, 2003. The below Notice of Availability was published in *The Press Enterprise* on February 25, 2003.

B 2 TUESDAY, FEBRUARY 25, 2003 M **COMMUNITY CONNECTION** THE PRESS-ENTERPRISE

PAID ADVERTISEMENT

PUBLIC NOTICE

Notice of Availability Draft Finding of No Significant Impact for the Environmental Assessment for the Beddown of C-17 Aircraft 452nd Air Mobility Wing March Air Reserve Base, California

MARCH AIR RESERVE BASE, CA - An Environmental Assessment (EA) for the Beddown of C-17 Aircraft at March Air Reserved Base, California has been prepared. March Air Reserve Base is proposing to issue a Finding of No Significant Impact (FONSI) based on this EA. The analysis considered potential effects of the Proposed Action and the No Action Alternative on twelve resource areas: airspace management, safety, air quality, noise, land use, geological resources, water resources, biological resources, cultural resources, socioeconomics and environmental justice, infrastructure, and hazardous materials and wastes. The results, as found in the EA, show that the proposed action would not have an adverse impact on the environment - indicating that a FONSI would be appropriate. An Environmental Impact Statement should not be necessary to implement the proposed action.

Copies of the Draft FONSI and EA showing the analysis are available for review at the Moreno Valley Public Library - 25480 Alessandro Blvd., Moreno Valley, CA 92553-4368.

Public comments on the Draft FONSI and EA will be accepted through March 27, 2003.

Written comments and inquiries on the FONSI and EA should be directed to Mr. James O'Neill, 452 SPTG/CEV, 610 Meyer Drive, MARCH ARB, CA 92518-2166, (909) 655-5069.

In addition, the following Privacy Advisory was published as part of the Cover Sheet to the Draft EA:

Privacy Advisory

Your comments on this EA are requested. Letters or other written comments provided may be published in the EA. Comments will normally be addressed in the EA and made available to the public. Any personal information provided will be used only to identify your desire to make a statement during the public comment period or to fulfill requests for copies of the EA or associated documents. Private addresses will be compiled to develop a mailing list for those requesting copies of the EA. However, only the names of the individuals making comments and specific comments will be disclosed; personal home addresses and phone numbers will not be published in the EA.

CITY OF RIVERSIDE

"People Serving People"

March 27, 2003

Brian Hoppy, Vice President
engineering-environmental Management, Inc.
355 West Lancaster Ave., Bldg E, 2nd Floor East
Haverford, PA 19041

Subject: Environmental Assessment of the Beddown of C-17 Aircraft at March Air Force Base

Dear Mr. Hoppy:

We have reviewed the above document and believe that it satisfactorily addresses the issues outlined in our previous letter dated January 14, 2003. It is our understanding that the number of Air Force related flights at March Air Reserve Base (MARB) will decrease based on the current proposal, and that the areas of the City exposed to in excess of dNL 65 dBA will decrease decrease. We note that the document indicates no changes to the land use categories of the 1998 AICUZ Report for MARB and no change to the Accident Potential Zones (APZ) shown in that document.

Should you have any questions regarding our comments please call me at (909) 826-5989 or e-mail me at caaron@ci.riverside.ca.us .

Sincerely,

Craig Aaron

Craig Aaron
Principal Planner

PLANNING DEPARTMENT

3900 Main Street • Riverside, California 92522 • (909) 826-5371
Fax: (909) 826-5981 • www.riverside-ca.org

United States Department of the Interior
U.S. Fish and Wildlife Service
Arizona Ecological Services Field Office
2321 West Royal Palm Road, Suite 103
Phoenix, Arizona 85021-4951
Telephone: (602) 242-0210 Fax: (602) 242-2513

In Reply Refer to:

AESO/SE
02-21-03-I-0098

January 16, 2003

Mr. Brian Hoppy, Vice President Project Manager
Engineering Environmental Management Inc.
355 West Lancaster Avenue
Building E., 2nd Floor East
Haverford, Pennsylvania 19041

RE: March Air Reserve Base C-17 Beddown Environmental Assessment Threatened and Endangered Species Information Request

Dear Mr. Hoppy:

Thank you for your recent request for information on threatened or endangered species, or those that are proposed to be listed as such under the Endangered Species Act of 1973, as amended (Act), which may occur in your project area. The Arizona Ecological Service Field Office has posted lists of the endangered, threatened, proposed, and candidate species occurring in each of Arizona's 15 counties on the Internet. Please refer to the following web page for species information in the county where your project occurs: **http://arizonaes.fws.gov**

If you do not have access to the Internet or have difficulty obtaining a list, please contact our office and we will mail or fax you a list as soon as possible.

After opening the web site, click the Threatened and Endangered button on the left hand side of the page. Then scroll to the bottom of the page where there is a map of Arizona. You can either click on your county of choice on the map or from the list. The arrows on the left will guide you through information on species that are listed, proposed, candidates, or have conservation agreements. Here you will find information on the species' status, a physical description, all counties where the species occurs, habitat, elevation, and some general comments. Additional information can be obtained by going back to the main page. On the left side of the screen, click on Document Library, then click on Documents by Species, then click on the name of the species of interest to obtain General Species Information, or other documents that may be available. Click on the cactus icon to view the desired document.

Please note that your project area may not necessarily include all or any of these species. The information provided includes general descriptions, habitat requirements, and other information for each species on the list. Under the General Species Information, citations for the Federal

Register (FR) are included for each listed and proposed species. The FR is available at most public libraries. This information should assist you in determining which species may or may not occur within your project area. Site-specific surveys could also be helpful and may be needed to verify the presence or absence of a species or its habitat as required for the evaluation of proposed project-related impacts.

Endangered and threatened species are protected by Federal law and must be considered prior to project development. If the action agency determines that listed species or critical habitat may be adversely affected by a federally funded, permitted, or authorized activity, the action agency will need to request formal consultation with us. If the action agency determines that the planned action may jeopardize a proposed species or destroy or adversely modify proposed critical habitat, the action agency will need to enter into a section 7 conference. The county list may also contain candidate species. Candidate species are those for which there is sufficient information to support a proposal for listing. Although candidate species have no legal protection under the Act, we recommend that they be considered in the planning process in the event that they become listed or proposed for listing prior to project completion.

If any proposed action occurs in or near areas with trees and shrubs growing along watercourses, known as riparian habitat, we recommend the protection of these areas. Riparian areas are critical to biological community diversity and provide linear corridors important to migratory species. In addition, if the project will result in the deposition of dredged or fill materials into waterways, we recommend you contact the Army Corps of Engineers which regulates these activities under Section 404 of the Clean Water Act.

The State of Arizona and some of the Native American Tribes protect some plant and animal species not protected by Federal law. We recommend you contact the Arizona Game and Fish Department and the Arizona Department of Agriculture for State-listed or sensitive species, or contact the appropriate Native American Tribe to determine if sensitive species are protected by Tribal governments in your project area. We further recommend that you invite the Arizona Game and Fish Department and any Native American Tribes in or near your project area to participate in your informal or formal Section 7 Consultation process.

For future projects, you do not need to contact our office to obtain a species list for a new project. However, for additional communications regarding this project, please refer to consultation number 02-21-03-I-0098. We appreciate your efforts to identify and avoid impacts to listed and sensitive species in your project area. If we may be of further assistance, please feel free to contact Tom Gatz for projects in northern Arizona or along the Colorado River (x240) or Sherry Barrett for projects in southern Arizona.

Sincerely,

Jacqueline Henson

Steven L. Spangle
Field Supervisor

cc: John Kennedy, Habitat Branch, Arizona Game and Fish Department, Phoenix, AZ

"People Serving People"

CITY OF RIVERSIDE

RECEIVED
JAN 2 0 2003

January 14, 2003

Brian Hoppy, Vice President
engineering-environmental Management, Inc.
355 west Lancaster Avenue, Bldg. E, 2nd Floor East
Haverford, PA 19041

RE: Environmental Assessment (EA) for the Beddown of C-17 Aircraft at March Air Reserve Base

Dear Mr. Hoppy:

Thank you for the opportunity to comment on the content of the forthcoming EA for the above-referenced project. The City of Riverside is interested primarily in how the new operations at March will affect noise levels within the City. Also, any differences in flight patterns and the limits of Accident Potential Zones is a concern. Finally, an explanation of whether and how the new operations affect land use issues contained in the 1998 AICUZ Report for March ARB should also be included.

Please send a copy of the EA directly to me when available. Should you have any questions regarding our comments, please call me at (909) 826-5989.

Sincerely,

Craig Aaron

Craig Aaron
Principal Planner

PLANNING DEPARTMENT
3900 MAIN STREET • RIVERSIDE, CALIFORNIA 92522 • (909) 826-5371
FAX: (909) 826-5981 • www.riverside-ca.org

APPENDIX B

AIRSPACE DESCRIPTIONS

Table B-1. Existing IR 214

Originating Activity: Commanding General 3rd Marine Aircraft Wing (G-3) MCAS Miramar, California
Scheduling Activity: Commanding General 3rd Marine Aircraft Wing (G-3) MCAS Miramar, California
Hours of Operation: Even numbered days only

Turn Point	Latitude/Longitude	Width Left/Right	Altitude Structure
A	33°54.00'N 115°20.00'W	4NM/4NM	As assigned to
B	34°00.00'N 11429.00'W	4NM/4NM	200' AGL – 7000' MSL
C	34°05.00'N 113°46.00'W	1NM/4NM	200' AGL – 6000' MSL
D	34°19.00'N 113°08.00'W	1NM/4NM	200' AGL – 6000' MSL
E	34°40.00'N 112°59.00'W	1NM/4NM	200' AGL – 6000' MSL
F	34°56.50'N 113°06.50'W	1NM/1NM	200' AGL – 8000' MSL
G	34°46.00'N 113°51.00'W	1NM/3NM	200' AGL – 8000' MSL
H	34°28.90'N 113°40.00'W	2NM/4NM	200' AGL – 6000' MSL
I	34°06.00'N 114°40.00'W		200" AGL – 6000' MSL

Special Operating Procedures IR-214:

(1) Aircraft shall remain VMC at all times when on this route.
(2) Do not fly below 2000' AGL within 3NM of Vital Junction and Parker Airports.
(3) Do not fly below 1000' AGL within 4 NM of Parker Dam.
(4) Cross a Point 9 NM South of G at or below 6000' MSL
(5) Report at F to Albuquerque on 298.9. if unable, contact Prescott FSS.
(6) Contact Los Angeles Center 285.6 at Parker for return clearance to El Toro.
(7) Special Coordination Instructions-Route conflicts with VR-1265 near A, IR-217 between Points A and B, IR-255 between Points A and B, IR-250 between Points A and B, IR-252 between Points A and B, VR-296 between Points B and C, VR-299 between Points B and C/H and I. VR-1267 at Point C, VR-1268 between C and G/H and I, IR-283 at Point C and between Points H and I, VR-1220 at Point C and between Points D and F/H and I, IR-272 between Points C and D, VR-245 between Points C and D, VR-1203 between Points C and D/G and H, VR-242 between Points C and D, VR-225 between Points D and F, IR-254 between Points D and F and at Point H, and IR-213 between Points G and H.
(8) Avoid Gene Wash Airfield (between Points H and I) by 3 NM when below 3000' AGL.
(9) Critical bald eagle breeding and nesting areas in the vicinity of the Alamo Lake (N34 16.0 W113 34.0) below the Baghdad 1 MOA and to the north toward Mohan Peak (Point F) mid-Dec thru mid-Jun. recommend 1500' AGL when crossing Aquarius Mountains (between Points F and G).

Table B-2. Existing IR 217

Originating Activity: Commanding General 3rd Marine Aircraft Wing (G-3) MCAS Miramar, California
Scheduling Activity: Commanding General 3rd Marine Aircraft Wing (G-3) MCAS Miramar, California
Hours of Operation: Continuous

Turn Point	Latitude/Longitude	Width Left/Right	Altitude Structure
A	34°16.00'N 116°27.00'W	5NM/5NM	As assigned to
B	34°46.00'N 116°33.00'W	5NM/5NM	200' AGL – 7000' MSL
C	34°55.00'N 116°11.00'W	5NM/5NM	200' AGL – 7000' MSL
D	35°28.00'N 115°30.00'W	5NM/5NM	200' AGL – 7000' MSL
E	35°21.00'N 115°04.00'W	5NM/5NM	1500' AGL – 7000' MSL
F	35°03.00'N 114°50.00'W	5NM/5NM	200' AGL – 7000' MSL
G	34°15.00'N 115°05.00'W	5NM/5NM	200' AGL – 6000' MSL
H	33°48.00'N 115°18.00'W	5NM/5NM·	200' AGL – 7000' MSL
I	33°29.00'N 115°44.00'W	5NM/5NM	200' AGL – 7000' MSL
J	33°23.00'N 116°05.00'W	5NM/5NM	200' AGL – 7000' MSL
K	33°07.00'N 116°01.00'W		200' AGL – 7000' MSL

Special Operating Procedures IR-217:

(1) Alternate Exit: I.
(2) Alternate Entry: F and G
(3) Aircraft will remain VMC at all times on this route.
(4) Avoid airports along route by 2000' or 3 NM.
(5) Comply with R-2501 restrictions.
(6) Cross a point 15 miles south of B at or below 7000' MSL.
(7) Attempt contact with Los Angeles ARTCC at D on 360.65.
(8) Contact Los Angeles Center on 285.6 for exit at I or 291.7 for exit at K for return clearance.
(9) Special Coordination Instructions - Route conflicts with IR-212 between Points A and C, IR-217 between A and F, VR-1217 between Points A and C, VR-1218 between Points A and B/C and D. VR-1265 between Points B and D/F and H, VR-1225 between Points C and D/F and G, IR-248 between Points G and I, IR-255 between Points G and H, IR-214 between G and H, VR-296 between Points H and I, IR-218 between Points H and I, IR-216 between Points H and IVR-1266 between Points H and I, VR-289 between Points I and K, IR-252 between Points F and G, and IR-288 between Points I and K.
(10) Light aircraft and glider activity at Desert Sky Ranch 33°28.52'N 115°52.24'W.
(11) Separation Criteria - Scheduling coordinated by user for IR conflicts and See and Avoid for VR conflicts.
(12) When alternate entry Point G is used, cross a point 15 NM north of H at or below 7000' MSL.
(13) CAUTION: 112' Radio Tower located 33°39.20'N 115°27.10'W (Chuckwalla Peak, 3766' MSL, approximately 9 NM past Point H, 2 NM left of centerline).
(14) Contact Yuma Range Control on 274.0 for clearance into R-2507 if exiting at Point I.
(15) CAUTION: 199' Radio Tower located at 33°43.00'N 115°24.32'W between Points H and I approximately 7 NM past Pt. H 1.5 NM left of centerline.
(16) CAUTION: Radio Tower located at 34°08.44'N 115°07.15"W between Point G and H approximately 8 NM past Pt. G 1 NM left of centerline.
(17) CAUTION: 100' Radio Tower located at 35°29.27'N 115°33.27'W 3.5 NM NW of Point D.

Table B-3. Existing VR 289

Originating Activity: 452 OSS/DOT, March ARB, California
Scheduling Activity: 452 OSS/DOT, March ARB, California
Hours of Operation: Continuous

Turn Point	Latitude/Longitude	Width Left/Right	Altitude Structure
A	34°55.00'N 115°04.00'W	5NM/5NM	As assigned to
B	34°51.00'N 115°28.00'W	5NM/5NM	Surface – 4000' MSL
C	34°31.00'N 115°31.00'W	5NM/5NM	Surface – 4500' MSL
D	34°09.00'N 115°34.00'W	5NM/5NM	Surface – 3500' MSL
E	33°53.00'N 115°23.00'W	5NM/5NM	Surface – 4000' MSL
F	33°41.00'N 115°34.00'W	5NM/5NM	Surface – 4000' MSL
G	33°29.00'N 115°44.00'W	5NM/5NM	Surface – 3500' MSL
H	33°35.00'N 116°00.00'W	5NM/5NM	Surface – 2500' MSL
I	33°08.00'N 116°03.00'W	5NM/5NM	Surface – 3000' MSL
J	33°05.00'N 115°59.00'W		Surface – 1000' MSL

Special Operating Procedures VR-289:

(1) Minimum altitude is 300'AGL.
(2) Environmental survey valid for C-141 only.
(3) Tie-in-FSS: Riverside (RAL).
(4) Alternate Entry: G and I.
(5) VR-289 is block scheduled with VR-288, VR-296, VR-299 and VR-1211. Users requesting VR-289 will be assigned, and authorized use of all five of these routes for the period of time required. Users requesting routes which have been previously assigned will be referred to the authorized user for coordination and deconfliction.
(6) This route MARSA through (See and Avoid) from entry to exit point.
(7) CAUTION: Route coincides with or crosses other VR and IR routes.
(8) Numerous other MTRs cross or are coincident with VR-289. See FLIP AP/1B Charts, IFR/VFR Wall Planning Charts and appropriate Sectional/Enroute Low Altitude Charts, (See and Avoid) applies.
(9) Scheduling this route does not automatically grant permission to enter restricted areas. Contact the appropriate Scheduling Activity for entry clearance.
(10) Contact VR-289 Scheduling Agency as far in advance as possible, but no later than one day in advance by 2200Z++.
(11) CAUTION: Frequent VFR fixed wing and helicopter traffic along entire route

Table B-4. Existing VR 296

Originating Activity: 452 OSS/DOT, March ARB, California
Scheduling Activity: 452 OSS/DOT, March ARB, California
Hours of Operation: Continuous

Turn Point	Latitude/Longitude	Width Left/Right	Altitude Structure
A	34°55.00'N 115°04.00'W	5NM/5NM	As assigned to
B	34°15.00'N 115°05.00'W	5NM/5NM	Surface – 4000' MSL
C	34°07.00'N 114°41.00'W	5NM/5NM	Surface – 3500' MSL
D	34°00.00'N 114°13.00'W	5NM/5NM	Surface – 3200' MSL
E	33°25.00'N 114°43.00'W	5NM/5NM	Surface – 2500' MSL
F	33°48.00'N 115°18.00'W	5NM/5NM	Surface – 2500' MSL
G	33°41.00'N 115°34.00'W	5NM/5NM	Surface – 4000' MSL
H	33°29.00'N 115°44.00'W	5NM/5NM	Surface – 3500' MSL
I	33°21.00'N 115°42.00'W	5NM/5NM	Surface – 2000' MSL
J	33°07.00'N 115°42.00'W	5NM/5NM	Surface – 1000' MSL
K	32°59.00'N 115°43.00'W		Surface – 1000' MSL

Special Operating Procedures VR-296:

(1) Minimum altitude is 300' AGL.
(2) Environmental survey valid for C-141 only.
(3) Tie-in FSS: Riverside (RAL).
(4) Alternate Entry: D and J.
(5) Alternate Exit: H.
(6) VR-296 is block scheduled with VR-288, VR-289, VR-299 and of VR-1211. Users requesting VR-296 will be assigned, and authorized use of, all five of these routes for the period of time required. Users requesting routes which have been previously assigned will be referred to the authorized user for coordination and deconfliction.
(7) This route MARSA through (See and Avoid) from entry to exit point.
(8) CAUTION: Route coincides with or crosses other VR and IR routes.
(9) Numerous other MTRs cross or are coincident with VR-296. See FLIP AP/1B Charts, IFR/VFR Wall Planning Charts and appropriate Sectional/Enroute Low Altitude Charts. (See and Avoid) applies.
(10) Scheduling this route does not automatically grant permission to enter restricted areas. Contact the appropriate Scheduling Activity for entry clearance.
(11) Contact VR-296 scheduling agency as far in advance as possible, but no later than one day in advance by 2200Z++.
(12) CAUTION: Frequent VFR fixed wing and helicopter traffic along entire route.

Table B-5. Existing VR 1217

Originating Activity: Commander AFFTC, 412 OSS/OSAA, Edwards AFB, California
Scheduling Activity: Commander AFFTC, 412 OSS/OSR, Edwards AFB, California
Hours of Operation: Sunrise-sunset daily

Turn Point	Latitude/Longitude	Width Left/Right	Altitude Structure
A	34°19.00'N 117°19.00'W	2NM/2NM	As assigned to
B	34°22.00'N 116°52.00'W	5NM/5NM	1500' AGL to
C	34°48.00'N 116°24.00'W	5NM/5NM	500' AGL – 1500' AGL
D	34°55.00'N 116°11.00'W	5NM/5NM	100' AGL – 1500' AGL
E	35°02.00'N 116°45.00'W	5NM/5NM	100' AGL – 1500' AGL
F	35°04.00'N 117°00.00'W		100' AGL – 1500' AGL

Special Operating Procedures:

(1) Maintain 1500' AGL until past Point B on leg B to C.

(2) Aircrews must be aware of airports within or near route corridor limits. Avoid flight within 1500' vertical or 3 NM horizontal of these airports when practical. Particular vigilance must be given to the following airports: 34°22.60'N 117°18.70'W; 34°15.80'N 116°51.30'W; 34°25.10'N 116°37.10'W; 34°57.70'N 116°40.30'W.

(3) Cross I-40 in vicinity of C and I-15 between D and E at or above 500' AGL.

(4) Avoid R-2501 between B and C.

(5) Exit anywhere beyond E.

(6) Alternate Entry: B.

(7) Aircrews transiting R-2508 complex airspace are required to see FLIP, Area Planning, AP/1, California, Flt Haz, R-2508. Schedule R-2508 MOA/Ranges/Restricted Areas through the R-2508 Central Coordinating Facility (CCF) DSN 527-2508.

(8) Avoid Harvard Recreation Area by 1000' AGL and 2 NM, 34°58.00'N 116°40.00'W.

(9) Ultralight activity within 10 NM Rabbit Dry Lake (34°27.00'N 117°00.00'W) up to 10,000' MSL; Most active on weekends and holidays.

(10) Crossing the Barstow MOA eastern boundary, contact either SPORT (272.0/132.75) or JOSHUA (335.6/133.65).

(11) Use caution in the Barstow MOA for helicopters at or below 3,000' AGL crossing Coyote Drylake between Barstow and the National Training Center at Ft. Irwin.

Table B-6. Existing VR 1257

Originating Activity: Commander, Strike Fighter Wing, U.S. Pacific Fleet, NAS Lemoore, California
Scheduling Activity: Commander, Strike Fighter Wing, U.S. Pacific Fleet, NAS Lemoore, California
Hours of Operation: Daylight hours, OT by NOTAM

Turn Point	Latitude/Longitude	Width Left/Right	Altitude Structure
A	36°02.00'N 121°34.00'W	2NM/2NM	As assigned to
B	36°08.00'N 121°15.00'W	2NM/2NM	200' AGL – 1500' AGL
C	36°11.00'N 121°03.00'W	2NM/2NM	1500' AGL to
D	36°12.00'N 120°44.00'W	2NM/2NM	200' AGL – 1500' AGL
E	35°18.00'N 119°47.00'W	2NM/2NM	200' AGL – 1500' AGL
F	35°00.00'N 119°25.00'W	2NM/2NM	200' AGL – 1500' AGL
G	34°51.00'N 118°47.00'W	2NM/2NM	200' AGL – 1500' AGL
H	34°48.00'N 118°33.00'W	2NM/2NM	1000' AGL – 1500' AGL
I	34°35.00'N 118°23.00'W	2NM/2NM	1000' AGL – 1500' AGL
J	34°29.00'N 118°01.00'W	2NM/2NM	1000' AGL – 1500' AGL
K	34°19.00'N 117°19.00'W	2NM/2NM	1000' AGL – 1500' AGL
L	34°25.00'N 116°43.00'W	2NM/2NM	1000' AGL – 1500' AGL
M	34°04.00'N 116°33.05'W	2NM/1NM	200' AGL – 1500' AGL
N	33°52.00'N 116°08.55'W	2NM/1NM	2500' AGL to
O	33°39.00'N 115°48.00'W	2NM/2NM	200' AGL – 1500' AGL
P	33°19.00'N 116°34.00'W	2NM/2NM	1000' AGL – 1500' AGL
Q	33°04.00'N 116°33.00'W	2NM/2NM	200' AGL – 1500' AGL
R	33°04.00'N 116°01.00'W		200' AGL – 1500' AGL

Special Operating Procedures VR-1257:

(1) Weather minimums 3000' ceiling and 5 miles visibility.
(2) Aircraft flying this route at night may be operating without flashing collision avoidance lights. Exercise extreme caution between the hours of Sunset and Sunrise.
(3) Tie-in FSS: Fresno (FAT).
(4) Alternate Entry: E, F, H, K and P.
(5) Alternate Exit: E, H, K, O and Q.
(6) Pilots exiting route at Point R must obtain target times in R-2510 prior to flying route.
(7) Avoid the Monastery in Lucia near Point A.
(8) CAUTION: High density Army Helicopter OPS in and around R-2513 between Points A and B. Cross Points A and B at 1500' AGL.
(9) Maintain centerline between Points B and C.
(10) Avoid King City enroute to Point C by 3 NM.
(11) Avoid airfield and buildings 1 NM southeast of Parkfield between Points D and E.
(12) Cross I-5 between Points F and G at 1500' AGL. CAUTION: Unscheduled blasting at G (34°51.00'N 118°46.00'W) by National Cement Co.(debris up to 2000' AGL).
(13) Cross Hwy 14 between Points I and J at 1500' AGL.
(14) Avoid Aqua Dulce Airport between Points I and J by 3 NM.
(15) Avoid Crystal Airport area west of Point J.
(16) Cross I-15 between Points J and K at 1500' AGL.
(17) Maintain route centerline between Points J and K to avoid glider activity near Crystal Airport and the Table Mountain Observatory 4 miles west of Wrightwood.
(18) When exiting at Point K, beware of aircraft descending from FL 240 to 8000' outbound on the Palmdale 104 radial.
(19) Avoid Morongo Valley at Point M.

Special Operating Procedures VR-1257 (cont):

(20) Cross Point O at 1500' AGL.
(21) CAUTION: Beware extensive glider operations between Points O and Q.
(22) Between Points O and P remain on or left of centerline and cross Hwy between Points O and P at 1500' AGL.
(23) Remain completely east of Hot Springs Mountain Ridge Line (near Point P) to avoid extremely heavy glider traffic from Warner Springs Ranch Airport.
(24) Between Points Q and R avoid Carroll Airport and Aqua Caliente Springs Airport.
(25) CAUTION:
  (a) 110' tower 2 NM east of Point A on route centerline;
  (b) 114' tower 5 NM southeast of Point E on route centerline;
  (c) 120' tower at Point G;
  (d) 199' tower at Point K (34°24.01'N 117°20.36'W);
  (e) 199' tower 1.5 NM northeast of Point M (34°03.54'N 116°32.42'W);
  (f) 140' tower 4.5 NM East of Point O.

Table B-7. Existing VR 1265

Originating Activity: Command General 3rd Marine Aircraft Wing (G-3) MCAS Miramar, California
Scheduling Activity: Command General 3rd Marine Aircraft Wing (G-3) MCAS Miramar, California
Hours of Operation: Continuous

Turn Point	Latitude/Longitude	Width Left/Right	Altitude Structure
A	34°41.00'N 119°21.00'W	2NM/2NM	As assigned to
B	34°45.00'N 118°48.00'W	2NM/2NM	200' AGL – 1500' AGL
C	34°47.00'N 118°36.00'W	2NM/2NM	1000' AGL – 1500' AGL
D	34°35.00'N 118°23.00'W	2NM/2NM	1000' AGL – 1500' AGL
E	34°29.00'N 118°01.00'W	2NM/2NM	1000' AGL – 1500' AGL
F	34°19.00'N 117°19.00'W	2NM/2NM	1000' AGL – 1500' AGL
G	34°27.00'N 117°00.00'W	2NM/2NM	200' AGL – 1500' AGL to 1500' AGL until 10NM past G then 200' AGL – 1500' AGL
H	34°51.00'N 116°34.00'W	2NM/2NM	200' AGL – 1500' AGL
I	34°52.00'N 116°11.00'W	2NM/2NM	200' AGL – 1500' AGL
J	35°28.00'N 115°28.00'W	2NM/2NM	200' AGL – 1500' AGL
K	34°57.00'N 114°49.00'W	2NM/2NM	200' AGL – 1500' AGL
L	34°09.00'N 115°42.00'W	2NM/2NM	200' AGL – 1500' AGL
M	33°52.00'N 115°20.00'W	2NM/2NM	200' AGL – 1500' AGL
N	33°19.00'N 114°46.00'W		200' AGL – 1500' AGL

Special Operating Procedures VR-1265

(1) Weather minimums 3000' and 5 miles.
(2) Avoid Conover Airport between A and B, Aqua Duke Airport between D and E, Hesperia Air Lodge at F, Hart Mine Airport between J and K, and Desert Center Airport between M and N by 2000' or 3 NM.
(3) Fly on or north of centerline between E and F to avoid Table Mountain Observatory at 34°23.00'N 117°39.00'W, and glider activity near Crystal Airport.
(4) Cross I-15 between E and F at 1500' AGL.
(5) Comply with R-2501 restrictions when exiting at H or L.
(6) Contact Los Angeles Center on 285.6 for IFR clearance when exiting R-2501.
(7) Contact Yuma Approach Control on 314.0 or 374.8 for IFR clearance when exiting at Point N.
(8) Alternate Entry: H and L.
(9) Alternate Exit: H and L.
(10) Avoid Newberry Springs 34°49.50'N 116°38.30'W by 1 NM (Noise Sensitive Area).
(11) Special Coordination Instructions-Route conflicts with IR-211 between Points A and C, VR-1262 at Point C, VR-1257 between Points C and F, VR-232 at Point C, IR-200 between Points C and D, IR-425 between Points C and D, VR-1217 at Point F and between H and I, VR-1218 at Point F and between Point I and J, VR-1214 between G and H, IR-218 between M and N, VR-1206 at Point C, IR-212 between H and I, IR-213 between H and J, IR-217 between H and N, IR-216 between L and M, IR-214 at Point M, VR-1225 between I and L, VR-296 between K and L, IR-252 between K, I/M and N, IR-250 between K and L, VR-289 between K and M, IR-248 between L and M, VR-1267 between M and N, and VR-1268 between M and N.
(12) Separation Criteria-scheduling coordinated by user for IR conflicts and See and Avoid for VR conflicts.
(13) CAUTION: Tower located at 35°29.27N 115°33.27'W between Points I and J 4.5 NM northwest of Point J.

APPENDIX C

NOISE TERMINOLOGY AND ANALYSIS METHODOLOGY

This Appendix presents a detailed discussion of noise and its effects on people and the environment. An assessment of aircraft noise requires a general understanding of how sound is measured and how it affects people in the natural environment. The purpose of this Appendix is to address public concerns regarding aircraft noise impacts.

Section C.1 is a general discussion on the properties of noise. Section C.2 summarizes the noise metrics discussed throughout this Environmental Assessment (EA). Section C.3 provides federal land use compatibility guidelines that are used in applying aircraft noise impacts to land use planning in the airport environment.

C.1 GENERAL

Noise, often defined as unwanted sound, is one of the most common environmental issues associated with aircraft operations. Of course, aircraft are not the only source of noise in an urban or suburban surrounding, where interstate and local roadway traffic, rail, industrial, and neighborhood sources also intrude on the everyday quality of life. Nevertheless, aircraft are readily identifiable to those affected by their noise, and typically are singled out for special attention and criticism. Consequently, aircraft noise problems often dominate analyses of environmental impacts.

Sound is a physical phenomenon, and consists of minute vibrations that travel through a medium, such as air, and are sensed by the human ear. Whether that sound is interpreted as pleasant or unpleasant depends largely on the listener's current activity, past experience, and attitude toward the source of that sound. It is often true that one person's music is another person's noise.

The measurement and human perception of sound involves two basic physical characteristics, intensity and frequency. The intensity is a measure of the strength or amplitude of the sound vibrations and is expressed in terms of sound pressure. The higher the sound pressure, the more energy carried by the sound and the louder is the perception of that sound. The second important physical characteristic is sound frequency which is the number of times per second the air vibrates or oscillates. Low-frequency sounds are characterized as rumbles or roars, while high-frequency sounds are typified by sirens or screeches.

The loudest sounds which can be detected comfortably by the human ear have intensities which are 1,000,000,000,000 times larger than those of sounds which can just be detected. Because of this vast range, any attempt to represent the intensity of sound using a linear scale becomes very unwieldy. As a result, a logarithmic unit known as the decibel (dB) is used to represent the intensity of a sound. Such a representation is called a sound level.

Because of the logarithmic nature of the decibel unit, sound levels cannot be added or subtracted directly and are somewhat cumbersome to handle mathematically. However, some simple rules of thumb are useful in dealing with sound levels. First, if a sound's intensity is doubled, the sound level increases by 3 dB, regardless of the initial sound level. For example:

60 dB + 60 dB = 63 dB, and

80 dB + 80 dB = 83 dB

The total sound level produced by two sounds of different levels is usually only slightly more than the higher of the two. For example:

60.0 dB + 70.0 dB = 70.4 dB

Because the addition of sound levels behaves differently than that of ordinary numbers, such addition is often referred to as "decibel addition" or "energy addition." The latter term arises from the fact that what we are really doing when we add decibel values is first converting each decibel value to its corresponding acoustic energy, then adding the energies using the normal rules of addition, and finally converting the total energy back to its decibel equivalent.

An important facet of decibel addition arises later when the concept of time-average sound levels is introduced to explain Day-Night Average Sound Level (DNL). Because of the logarithmic units, the time-average sound level is dominated by the louder levels that occur during the averaging period. As a simple example, consider a sound level which is 100 dB and lasts for 30 seconds, followed by a sound level of 50 dB which also lasts for 30 seconds. The time-average sound level over the total 60-second period is 97 dB, not 75 dB.

A sound level of 0 dB is approximately the threshold of human hearing and is barely audible under extremely quiet listening conditions. Normal speech has a sound level of approximately 60 dB. Sound levels above about 120 dB begin to be felt inside the human ear as discomfort and eventually pain at still higher levels.

The minimum change in the time-average sound level of individual events which an average human ear can detect is about 3 dB. A change in sound level of about 10 dB is usually perceived by the average person as a doubling (or halving) of the sound's loudness, and this relation holds true for loud sounds and for quieter sounds.

Sound frequency is pitch measured in terms of hertz (Hz). The normal human ear can detect sounds which range in frequency from about 20 Hz to about 15,000 Hz. All sounds in this wide range of frequencies, however, are not heard equally well by the human ear, which is most sensitive to frequencies in the 1,000 to 4,000 Hz range. To account for the varied frequency sensitivity of people, we use the A-weighted scale that approximates the average, healthy human ear. The A-weighting de-emphasizes the low and high frequency portion of the noise signal and emphasizes the mid-frequency portion. Sound levels measured using A-weighting are most properly called A-weighted sound levels while sound levels measured without any frequency weighting are most properly called sound levels. However, since most environmental impact analysis documents deal only with A-weighted sound levels, the adjective "A-weighted" is often omitted, and A-weighted sound levels are referred to simply as sound levels. In some instances, the author will indicate that the levels have been A-weighted by using the abbreviation dBA or dB(A), rather than the abbreviation dB, for decibel. As long as the use of A-weighting is understood to be used, there is no difference implied by the terms "sound level" and "A-weighted sound level" or by the units dB, dBA, and dB(A). The A-weighting function de-emphasizes higher and especially lower frequencies to which humans are less sensitive. Because the A-weighting is closely related to human hearing characteristics, it is appropriate to use A-weighted sound levels when assessing potential noise effects on humans and many terrestrial wildlife species. In this document, all sound levels are A-weighted and are reported in dB.

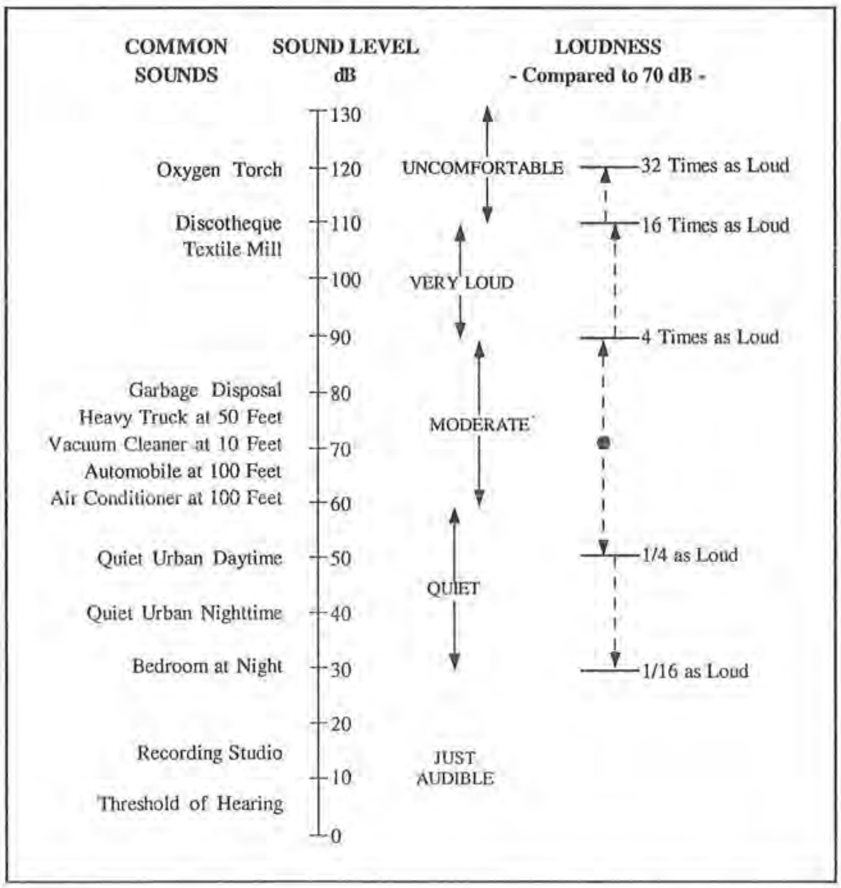
Sound levels do not represent instantaneous measurements but rather averages over short periods of time. Two measurement time periods are most common – 1 second and 1/8 of a second. A measured sound level averaged over 1 second is called a slow response sound level; one averaged over 1/8 of a second is called a fast response sound level. Most environmental noise studies use slow response measurements, and the adjective "slow response" is usually omitted. It is easy to understand why the proper descriptor "slow response A-weighted sound level" is usually shortened to "sound level" in environmental impact analysis documents.

C.2 Noise Metrics

A "metric" is defined as something "of, involving, or used in measurement." As used in environmental noise analyses, a metric refers to the unit or quantity that measures or represents the effect of noise on people. Noise measurements typically have involved a confusing proliferation of noise metrics as individual researchers have attempted to understand and represent the effects of noise. As a result, past literature describing environmental noise or environmental noise abatement has included many different metrics. Recently, however, various federal agencies involved in environmental noise mitigation have agreed on common metrics for environmental impact analyses documents, and both the Department of Defense (DoD) and the Federal Aviation Administration (FAA) have specified those which should be used for federal aviation noise assessments. These metrics are as follows.

C.2.1 Maximum Sound Level

The highest A-weighted sound level measured during a single event in which the sound level changes value as time goes on (e.g., an aircraft overflight) is called the maximum A-weighted sound level or maximum sound level, for short. It is usually abbreviated by ALM, L_{max}, or LA_{max}. The typical A-weighted levels of common sounds are shown in Figure C-1. The maximum sound level is important in judging the interference caused by a noise event with conversation, TV or radio listening, sleep, or other common activities.



Source: Harris 1979

Figure C-1. Typical A-Weighted Sound Levels of Common Sounds

C.2.2 Sound Exposure Level

Individual time-varying noise events have two main characteristics: 1) a sound level which changes throughout the event, and 2) a period of time during which the event is heard. Although the maximum sound level, described above, provides some measure of the intrusiveness of the event, it alone does not completely describe the total event. The period of time during which the sound is heard is also significant. The sound exposure level (abbreviated SEL or LAE) combines both of these characteristics into a single metric.

Sound exposure level is a logarithmic measure of the total acoustic energy transmitted to the listener during the event. Mathematically, it represents the sound level of the constant sound that would, in one second, generate the same acoustic energy as did the actual time-varying noise event. Since aircraft overflights usually last longer than one second, the SEL of an overflight is usually greater than the maximum sound level of the overflight.

Sound exposure level is a composite metric which represents both the intensity of a sound and its duration. It does not directly represent the sound level heard at any given time, but rather provides a measure of the net impact of the entire acoustic event. It has been well established in the scientific community that SEL measures this impact much more reliably than just the maximum sound level. Because the SEL and the maximum sound level are both A-weighted sound levels expressed in dBs, there is sometimes confusion between the two, so the specific metric used should be clearly stated.

C.2.3 Day-Night Average Sound Level

Time-average sound levels are the measurements of sound levels which are averaged over a specified length of time. These levels provide a measure of the average sound energy during the measurement period.

For the evaluation of community noise effects, and particularly aircraft noise effects, the day-night average sound level (abbreviated DNL or L_{dn}) is used. Day-night average sound level averages aircraft sound levels at a location over a complete 24-hour period, with a 10-dB adjustment added to those noise events which take place between 10:00 p.m. and 7:00 a.m. (local time) the following morning. This 10-dB "penalty" represents the added intrusiveness of sounds which occur during normal sleeping hours, both because of the increased sensitivity to noise during those hours and because ambient sound levels during nighttime are typically about 10 dB lower than during daytime hours.

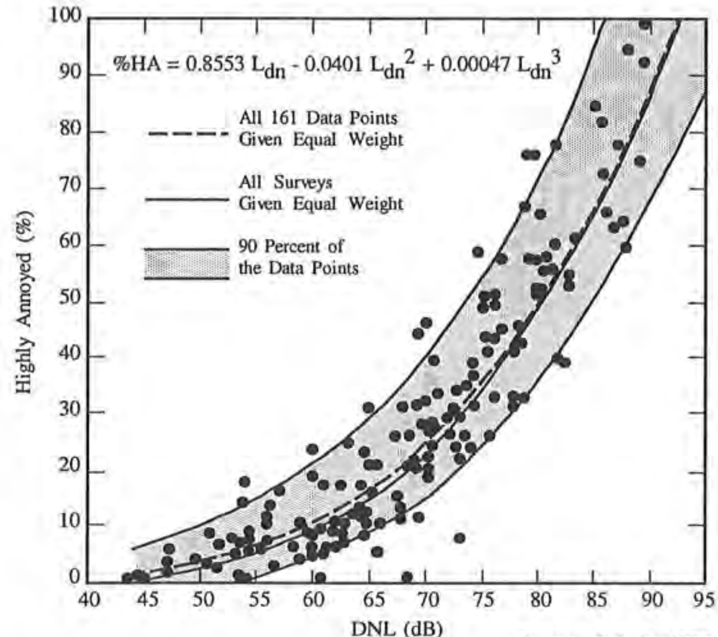
Ignoring the 10-dB nighttime adjustment for the moment, DNL may be thought of as the continuous A-weighted sound level which would be present if all of the variations in sound level which occur over a 24-hour period were smoothed out so as to contain the same total sound energy.

Day-night average sound level provides a single measure of overall noise impact, but does not provide specific information on the number of noise events or the individual sound levels which occur during the day. For example, a DNL of 65 dB could result from a very few noisy events, or a large number of quieter events.

As noted earlier for SEL, DNL does not represent the sound level heard at any particular time, but rather represents the total sound exposure. Scientific studies and social surveys which have been conducted to appraise community annoyance to all types of environmental noise have found the DNL to be the best measure of that annoyance. Its use is endorsed by the scientific community (American National Standards Institute [ANSI] 1980, 1988; U.S. Environmental Protection Agency [USEPA] 1974; Federal Interagency Committee on Urban Noise [FICUN] 1980; Federal Interagency Committee on Noise [FICON] 1992).

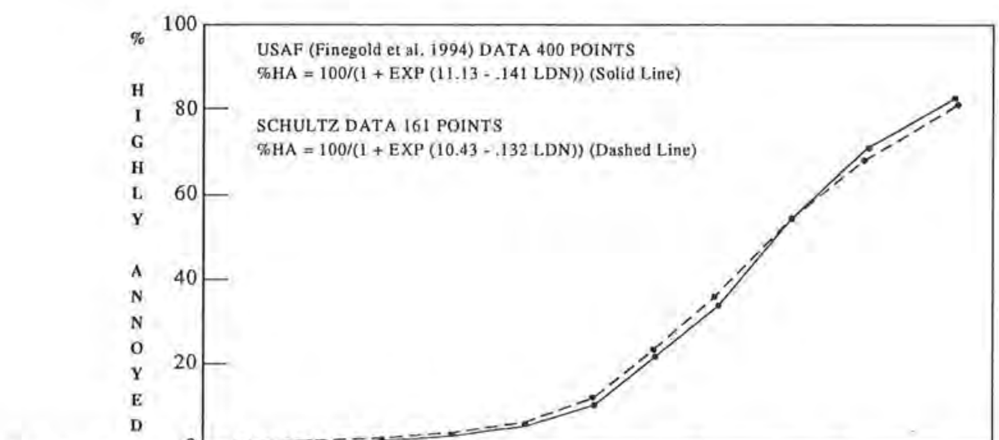
There is, in fact, a remarkable consistency in the results of attitudinal surveys about aircraft noise conducted in different countries to find the percentages of groups of people who express various degrees of annoyance when exposed to different levels of DNL. This is illustrated in Figure C-2, which summarizes the results of a large number of social surveys relating community responses to various types of noises, measured in DNL.

Figure C-2 is taken from Schultz (1978) and shows the original curve fit. A more recent study has reaffirmed this relationship (Fidell et al. 1991). Figure C-3 shows an updated form of the curve fit (Finegold et al. 1992) in comparison with the original. The updated fit, which does not differ substantially from the original, is the current preferred form. In general, correlation coefficients of 0.85 to 0.95 are found between the percentages of groups of people highly annoyed and the level of average noise exposure. The correlation coefficients for the annoyance of individuals are relatively low, however, on the order of 0.5 or less. This is not surprising, considering the varying personal factors which influence the manner in which individuals react to noise. Nevertheless, findings substantiate that community annoyance to aircraft noise is represented quite reliably using DNL.



Source: Schultz 1978

Figure C-2. Community Surveys of Noise Annoyance



Day - Night Average Sound Level in dB		40	45	50	55	60	65	70	75	80	85	90
Calculated %HA Points	USAF	0.41	0.831	1.66	3.31	6.48	12.29	22.1	36.47	53.74	70.16	82.64
	SCHULTZ	0.576	1.11	2.12	4.03	7.52	13.59	23.32	37.05	53.25	68.78	81

Sources: Schultz 1978 and Finegold et al. 1994

Figure C-3. Response of Communities to Noise and Comparison of Original Schultz 1978 and Current AF Curve Fits

This relation between community annoyance and time-average sound level has been confirmed, even for infrequent aircraft noise events. A National Aeronautics and Space Administration (NASA) study (Fields and Powell 1985) reported the reactions of individuals in a community to daily helicopter overflights, ranging from 1 to 32 per day. The stated reactions to infrequent helicopter overflights correlated quite well with the daily time-average sound levels over this range of numbers of daily noise events.

The use of DNL has been criticized recently as not accurately representing community annoyance and land-use compatibility with aircraft noise. Much of that criticism stems from a lack of understanding of the basis for the measurement or calculation of DNL. One frequent criticism is based on the inherent feeling that people react more to single noise events and not as much to "meaningless" time-average sound levels.

Time-average noise metric, such as DNL, takes into account both the noise levels of all individual events which occur during a 24-hour period and the number of times those events occur. As described briefly above, the logarithmic nature of the decibel unit causes the noise levels of the loudest events to control the 24-hour average.

As a simple example of this characteristic, consider a case in which only one aircraft overflight occurs in daytime during a 24-hour period, creating a sound level of 100 dB for 30 seconds. During the remaining 23 hours, 59 minutes, and 30 seconds of the day, the ambient sound level is 50 dB. The DNL for this 24-hour period is 65.5 dB. Assume, as a second example, that 10 such 30-second overflights occur in daytime hours during the next 24-hour period, with the same ambient sound level of 50 dB during the remaining 23 hours and 55 minutes of the day. The DNL for this 24-hour period is 75.4 dB. Clearly, the averaging of noise over a 24-hour period does not ignore the louder single events and tends to emphasize both the sound levels and number of events. This is the basic concept of a time-average sound metric, and specifically the DNL.

C.3 LAND USE COMPATIBILITY

As noted above, the inherent variability between individuals makes it impossible to predict accurately how any individual will react to a given noise event. Nevertheless, when a community is considered as a whole, its overall reaction to noise can be represented with a high degree of confidence. As described above, the best noise exposure metric for this correlation is the DNL. In June 1980, an *ad hoc* Federal Interagency Committee on Urban Noise (FICUN) published guidelines for considering noise in land use planning (FICUN 1980). These guidelines related DNL to compatible land uses in urban areas. The committee was composed of representatives from the DoD, Department of Transportation, Department of Housing and Urban Development; the USEPA; and the Veterans Administration. Since the issuance of these guidelines, federal agencies have generally adopted these guidelines to make recommendations to the local communities on land use compatibilities.

The FAA included the committee's guidelines in the Federal Aviation Regulations (Harris 1984). These guidelines are reprinted in Table C-1, along with the explanatory notes included in the regulation. Although these guidelines are not mandatory (see Notes in Table C-1), they provide the best means for evaluating noise impact in airport communities. In general, residential land uses normally are not compatible with outdoor DNL (L_{dn} values) above 65 dB, and the extent of land areas and populations exposed to DNL of 65 dB and higher provides the best means for assessing the noise impacts of alternative aircraft actions.

In 1990, the FICON was formed to review the manner in which aviation noise effects are assessed and presented. This group released its report in 1992 and reaffirmed the use of DNL as the best metric for this purpose (FICON 1992).

Analyses of aircraft noise impacts and compatible land uses around DoD facilities are normally made using NOISEMAP (Moulton 1992). This computer-based program calculates DNL at many points on the ground around an airfield and draws contours of equal levels for overlay onto land-use maps of the same scale. The program mathematically calculates the DNL of all aircraft operations for a 24-hour period, taking into consideration the number and types of aircraft, their flight paths and engine thrust settings, and the time of day (daytime or nighttime) that each operation occurs.

Day-night average sound levels may also be measured directly around an airfield, rather than calculated with NOISEMAP; however, the direct measurement of annualized DNL is difficult and costly since it requires year-round monitoring or careful seasonal sampling. NOISEMAP provides an accurate projection of aircraft noise around airfields.

NOISEMAP also has the flexibility of calculating sound levels at any specified ground location so that noise levels at representative points under flight paths can be ascertained. NOISEMAP is most accurate for comparing "before and after" noise impacts which would result from proposed airfield changes or alternative noise control actions, so long as the various impacts are calculated in a consistent manner.

Table C-1. Land Use Compatibility Guidelines with Yearly Day-Night Average Sound Levels

LAND USE	YEARLY DAY-NIGHT AVERAGE SOUND LEVELS IN DECIBELS					
	BELOW 65	65-70	70-75	75-80	80-85	OVER 85
Residential						
Residential, other than mobile homes and transient lodgings	Y	N(1)	N(1)	N	N	N
Mobile home parks	Y	N	N	N	N	N
Transient lodgings	Y	N(1)	N(1)	N(1)	N	N
Public Use						
Schools	Y	N(1)	N(1)	N	N	N
Hospitals & nursing homes	Y	25	30	N	N	N
Churches, auditoria, & concert halls	Y	25	30	N	N	N
Government services	Y	Y	25	30	N	N
Transportation	Y	Y	Y(2)	Y(3)	Y(4)	Y(4)
Parking	Y	Y	Y(2)	Y(3)	Y(4)	N
Commercial Use						
Offices, business, & professional	Y	Y	25	30	N	N
Wholesale & retail-building materials, hardware, and farm equipment	Y	Y	Y(2)	Y(3)	Y(4)	N
Retail trade-general	Y	Y	25	30	N	N
Utilities	Y	Y	Y(2)	Y(3)	Y(4)	N
Communication	Y	Y	25	30	N	N
Manufacturing and Production						
Manufacturing, general	Y	Y	Y(2)	Y(3)	Y(4)	N
Photographic & optical	Y	Y	25	30	N	N
Agriculture (except livestock) & forestry	Y	Y(6)	Y(7)	Y(8)	Y(8)	Y(8)
Livestock farming & breeding	Y	Y(6)	Y(7)	N	N	N
Mining & fishing, resource production & extraction	Y	Y	Y	Y	Y	Y
Recreational						
Outdoor sports arenas & spectator sports	Y	Y(5)	Y(5)	N	N	N
Outdoor music shells, amphitheaters	Y	N	N	N	N	N
Nature exhibits & zoos	Y	Y	N	N	N	N
Amusements, parks, resorts, & camps	Y	Y	Y	N	N	N
Golf courses, riding stables, & water recreation	Y	Y	25	30	N	N

Key:
Y (Yes) = Land use and related structures compatible without restrictions.
N (No) = Land use and related structures are not compatible and should be prohibited.
NLR = Noise Level Reduction (outdoor to indoor) to be achieved through incorporation of noise attenuation into the design and construction of the structure.
25 or 30 = Land use and related structures generally compatible; measures to achieve NLR of 25, 30, or 35 dB must be incorporated into design and construction of structures.
Notes:
(1) Where the community determines that residential or school uses must be allowed, measures to achieve outdoor-to-indoor NLR of at least 25 and 30 dB should be incorporated into building codes and be considered in individual approvals. Normal residential construction can be expected to provide an NLR of 20 dB; thus, the reduction requirements often are stated as 5, 10, or 15 dB over standard construction and normally assume mechanical ventilation and closed windows year-round. However, the use of NLR criteria will not eliminate outdoor noise problems.
(2) Measures to achieve NLR of 25 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas, or where the normal noise level is low.
(3) Measures to achieve NLR of 30 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas, or where the normal noise level is low.
(4) Measures to achieve NLR of 35 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas, or where the normal level is low.
(5) Land-use compatible, provided special sound reinforcement systems are installed.
(6) Residential buildings require an NLR of 25 dB.
(7) Residential buildings require an NLR of 30 dB.
(8) Residential buildings not permitted.

Source: USDOT 1984 and FAA 1985

APPENDIX D

Clean Air Act – General Conformity Analysis

TABLE OF CONTENTS

LIST OF TABLES

EXECUTIVE SUMMARY

Agency: United States Air Force (USAF)

Action: The USAF's Proposed Action would replace 16 retiring C-141C aircraft at March Air Reserve Base (ARB) with eight C-17 Primary Authorized Aircraft (PAAs). In addition, the ten existing KC-135R PAA would be reduced to eight KC-135R PAA. This Proposed Action consists of three parts: basing of C-17 aircraft and related construction activities at March ARB; use of an existing drop zone (DZ); and use of existing military training airspace and military training routes (MTRs). Because the aircraft deployment, construction activity, changes in the use of MTRs and DZ constitute Federal agency actions, the USAF is required to meet the general conformity requirements under 40 Code of Federal Regulations (CFR) Part 93, Subpart B and applicable federally enforceable local agency regulations.

Contact: Mr. Tom Pilcher, HQ AFRC/CEVX, 255 Richard Ray Blvd. Robbins AFB, GA 31098-1635; (478) 327-1058, (478)-327-0108 (Fax); Tom.Pilcher@afrc.af.mil

Designation: Clean Air Act General Conformity Analysis

Project Abstract: The Proposed Action is to replace 16 retiring C-141 aircraft at March ARB with eight C-17 PAA. In addition, the ten existing KC-135R PAA would be reduced to eight KC-135R PAA. The proposal is for the 452th Air Mobility Wing (AMW) at March ARB to operate the new C-17 Globemaster III aircraft while transferring or retiring the 16 existing C-141 Starlifter aircraft. The number of C-141 Starlifters would draw down to four aircraft by the arrival of the first new C-17 at March ARB in the third quarter of Fiscal Year (FY) 05. By end of the first quarter of FY06, all C-141s would be retired and the base would have eight C-17 PAA. Related construction activities during this aircraft conversion would include eight projects to demolish, remodel, or construct various structures and facilities in support of the C-17 mission at March ARB.

The Proposed Action consists of three parts: basing of C-17 aircraft and related construction activities at March ARB; use of existing Desert Center DZ; and use of existing military training airspace and MTRs. The conformity analyses addresses the short term and long term regulated pollutant emissions expected to result from construction requirements and operational activities associated with the Proposed Action.

Based upon the conformity applicability criteria requirements and the non-attainment status of the areas affected by March ARB operations, this conformity analysis focuses upon potential air emissions of: ozone precursors, (i.e., volatile organic components [VOC] and nitrogen oxides [NO_x], particulate matter less than 10 microns [PM_{10}], and carbon monoxide [CO]).

This analysis does not address the pollutants for which all affected areas are in "attainment" – sulfur oxides (SO_x), nitrogen dioxide (NO_2), and Lead (Pb).

Emissions of all non-attainment pollutants (NO_x, VOC, PM_{10}, and CO) in the vicinity of March ARB (South Coast Air Basin – Riverside County) are expected to be reduced as a result of the Proposed Action. Similarly, the emissions at the Desert Center DZ (located in an attainment area of the Mojave Desert Air Basin) would also experience an overall reduction in all regulated pollutant emissions. The proposed project resulted in net changes to the non-attainment pollutant emissions for all areas affected by the MTRs. As detailed in the calculations, for three of the 10 affected air basins or Air Quality Control Regions (AQCRs), all pollutant emissions would be reduced. For the remaining seven air basins/AQCRs, the "worst case" increase in pollutant-specific emissions would be less than 3 tons per year in any one basin and less than 0.01 percent of any basin's regional emission inventory.

The conformity analysis completed for this project concluded that the Proposed Action at March ARB, the MTRs, and the Desert Center DZ would conform to the applicable State Implementation Plans (SIPs) and Clean Air Act (CAA) requirements based upon the conformity criterion listed under paragraphs 40 CFR Part 93.158 (a)(5)(1). Specifically, the emissions analyses concluded that total projected emissions of all non-attainment pollutants from March ARB, the MTRs, and the DZ would not exceed the applicable *de minimis* thresholds triggering a conformity determination. Further, the emissions from these three elements of the Federal action would not cause March ARB to exceed the applicable SIP emissions budgets allocated to the base.

The conformity analysis demonstrated that the proposed aircraft operations at March ARB, the MTRs, and the DZ would not cause or contribute to any new violations or increase the frequency or severity of existing violations of the National Ambient Air Quality Standards (NAAQS) nor delay the timely attainment of the Federal ambient air quality standards in the region. The conformity analysis also determined that the Proposed Action would be consistent with the applicable SIP measures through compliance with the South Coast Air Quality Management District (SCAQMD) rules and permitting requirements.

Conformity Analysis:

After careful and thorough consideration of the facts contained herein, and following consideration of the views of those agencies having jurisdiction by law or special expertise with respect to air quality impacts and the SIP, the project proponent finds that the proposed Federal actions are consistent with the objectives as set forth in Section 176(c) of the CAA, as amended, and its implementing regulation, 40 CFR Part 93, Subpart B, *Determining Conformity of General Federal Actions to State and Local Implementation Plans*, and said actions conform to the applicable SIP in accordance with the law.

The conformity analysis is based upon the total direct and indirect emissions associated with the proposed conversion of 16 C-141C to eight C-17 aircraft at March ARB and the elimination of two of the 10 KC-135R aircraft. Future activity levels and aircraft operations associated with March ARB and MTRs addressed by this action may differ from those analyzed in this conformity analysis. Therefore, this analysis applies as long as total emissions remain at or below the SIP budget and applicable *de minimis* thresholds as analyzed herein. If the Proposed Action is changed so that there would be an increase in the total direct and indirect emissions reported in this analysis, a new conformity analysis would be performed.

1. INTRODUCTION

The Clean Air Act Amendments (CAAA) of 1990 require Federal agencies to ensure that their actions conform to the applicable State Implementation Plan (SIP). The SIP is a U.S. Environmental Protection Agency (USEPA)-approved plan developed by state or local agencies. It provides for implementation, maintenance, and enforcement of the National Ambient Air Quality Standards (NAAQS). The SIP includes emission limitations, rules, schedules, and specific control measures to attain and maintain the NAAQS. Conformity to a SIP, as defined in the CAA, means conforming to the SIP's purpose of reducing the severity and number of violations of the NAAQS to achieve attainment of such standards.

As a Federal agency and proponent of a "Federal action," the U.S. Air Force (USAF) must complete a conformity analysis to determine whether the basing of C-17 Globemaster III aircraft and associated regulated pollutant emissions at March ARB would conform to the South Coast Air Quality Management District (SCAQMD) SIP. This project includes the replacement of 16 C-141C Starlifter aircraft with eight C-17 Globemaster III aircraft as well as the demolition, modification, and construction of various facilities and buildings. The Proposed Action also includes the reduction in the fleet of 10 existing KC-135R aircraft to 8 KC-135R aircraft. Eight construction projects would be needed to provide adequate facilities for the C-17 airframe and required personnel training and support operations. Military personnel authorizations would remain the same as current March ARB personnel numbers. Other elements of the Proposed Action include the C-17 use of the existing Desert Center DZ and existing military training routes (MTRs). All elements of the Proposed Action could impact areas covered by the SIP, so a conformity analysis is required.

1.1 BACKGROUND

The CAA and its amendments were passed by Congress and corresponding rules were promulgated by USEPA because it has been determined that certain pollutants have the potential to cause an adverse affect on public health and the environment when certain concentrations are exceeded in ambient air. In order to control and regulate these "criteria pollutants" and better maintain healthful air, NAAQS were established for six criteria pollutants. These pollutants include: carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), particulate matter less than 10 microns in diameter (PM_{10}), sulfur oxides (SO_x), and lead (Pb). Ozone is not typically emitted directly from emission sources, but rather is formed in the atmosphere by photochemical reactions involving sunlight and other emitted pollutants or "ozone precursors." These ozone precursors consist primarily of nitrogen oxides (NO_x) and volatile organic compounds (VOCs), which are emitted directly from a wide range of stationary and mobile sources. Therefore, ozone concentrations in the atmosphere are controlled through limiting the emissions of NO_x and VOCs.

Air quality conformity provisions first appeared in the CAA of 1977. These provisions stated that no Federal agency could engage in, support in any way, provide financial assistance for, license, permit, or approve any activity that did not conform to a SIP after approval and promulgation. Section 176 (42 United States Code 7506c) of the CAA, as amended in 1990, further explained conformity to an implementation plan as meaning conformity to the plan's purpose of eliminating or reducing the severity and violations of the NAAQS, and achieving timely attainment of these standards. In November 1993, the USEPA promulgated regulations and requirements that clarify the applicability, procedures, and analyses necessary to ensure that Federal facilities comply with the CAA.

In establishing the Final General Conformity Rule, USEPA requires Federal agencies to evaluate a proposed Federal action and ensure that it does not result in any of the following scenarios:

1. Cause a new violation of a National Ambient Air Quality Standard (NAAQS)
2. Contribute to an increase in the frequency or severity of violations of NAAQS
3. Delay the timely attainment of any NAAQS, interim progress milestones, or other milestones toward achieving compliance with the NAAQS

The General Conformity Rule requires that Federal agencies consider total direct and indirect emissions of criteria pollutants. Conformity must be shown for those pollutants (or precursors) emitted in areas designated as non-attainment for those pollutants as well as pollutants for which an area has been redesignated from non-attainment to attainment (i.e., a maintenance area).

The Conformity Rule requires that Federal agencies do a conformity applicability analysis to determine whether a formal conformity determination is required. Where the direct and indirect emissions associated with a proposed action do not exceed *de minimis* threshold levels promulgated in 40 Code of Federal Regulations (CFR), 93.153(b). The Proposed Action is deemed to be in conformity and no further action is required. Table D-1 below presents the applicable *de minimis* thresholds under the General Conformity Rule.

If net changes in non-attainment pollutants do not exceed these *de minimis* threshold levels, the Conformity Rule also requires an analysis of "regional significance." This includes a comparison of the net emissions changes to the total emissions inventory of non-attainment pollutants for an affected non-attainment or maintenance area. If the net emissions changes associated with the Proposed Action are below *de minimis* thresholds and will not increase regional emissions by 10 percent, the action is not considered regionally significant and is exempt from further conformity rule requirements.

Table D-1. General Conformity Rule *de minimis* Emission Thresholds

Criteria Pollutant	Status	Degree or Classification	*De minimis* Limit Threshold (tpy)
Ozone (NO_x or VOCs)	Non-attainment	Extreme	10
		Severe	25
		Serious	50
		Moderate/marginal (inside ozone transport region)	50 (VOCs)/100 (NO_x)
		All others	100
	Maintenance	Inside ozone transport region	50 (VOCs)/100 (NO_x)
		Outside ozone transport region	100
Carbon Monoxide (CO)	Non-attainment/ maintenance	All	100
Particulate Matter (PM_{10})	Non-attainment	Serious	70
		Moderate	100
	Maintenance	N/A	100
Sulfur Dioxide (SO_2)	Non-attainment/ maintenance	All	100
Nitrogen Dioxide (NO_x)	Non-attainment/ maintenance	All	100

Source: 40 CFR 93.153 (b)(2)

When applicable, another required analysis is a comparison of the Federal action's emissions to any existing SIP emission budgets that have been established specifically for the Federal facility or the affected region. If the action would cause an increase in emissions such that the established SIP emissions budgets would be exceeded, a formal conformity determination and other applicable rule requirements would apply.

1.2 PURPOSE

The purpose of this general conformity analysis is to document the USAF's compliance with CAA requirements in accordance with 40 CFR Part 93, Subpart B and SCAQMD Regulation XIX. This conformity analysis will analyze the air quality impact of emissions of non-attainment pollutants (i.e., NO_x VOC, CO, and PM_{10}) resulting from the Proposed Action. Further, this evaluation will determine whether the Proposed Action at March ARB, the Desert Center DZ, and MTRs would conform to the applicable SIP elements. This analysis of conformity for the Proposed Action has been done in coordination with the Headquarters (HQ) Air Force Reserve Command (AFRC), the SCAQMD, and March ARB.

1.3 DOCUMENT ORGANIZATION

The remainder of Section 1 presents the purpose and background for the document, describes the Proposed Action at March ARB, and summarizes the existing air quality conditions in the region. Chapter 2.0 of this document outlines the regulatory requirements of the general conformity rule and the relationships to this conformity determination.

Chapter 3.0 details the applicability of the conformity rule to the Proposed Action. Chapter 4.0 provides the conformity analyses results for the Proposed Action, and an assessment of the projects' consistency with the applicable SIP requirements. Finally, Attachments 1 through 3 detail the emissions calculation methodologies and results used for this conformity analysis.

1.4 EXISTING AIR QUALITY

Air Basins/Air Quality Control Regions

March ARB is in Riverside County, California, which is located in the South Coast Air Basin (SOCAB). Air quality resources in the SOCAB are managed by the SCAQMD. Based on historical ambient air quality monitoring records, this basin has been designated by the USEPA as an "extreme" non-attainment area for ozone; a "serious" non-attainment area for CO, and a "serious" non-attainment area for PM_{10}. The SOCAB is in attainment for all other criteria pollutants, which include SO_x, NO_2, and Pb.

The MTRs included in the Proposed Action affect 10 different air basins or Air Quality Control Regions (AQCRs) located in California, Arizona, and Nevada. Of these, seven areas (or portions of these regions) have been designated as non-attainment or maintenance areas for O_3; six are non-attainment for PM_{10}, and two are non-attainment for CO. One of the regions is either in attainment or is unclassified by the USEPA for each of the criteria air pollutants and is therefore considered to be "in attainment" for this conformity analysis. All of the air basins or AQCRs associated with the Proposed Action are in attainment with NAAQS for SO_x, NO_2, and lead). Therefore, this analysis addresses only the O_3 precursors (VOCs and NO_x), PM_{10}, and CO in the affected areas.

Nonattainment Pollutants

O_3 is a secondary pollutant formed in the atmosphere by photochemical reactions of previously emitted pollutants (mainly VOCs and NO_x) and sunlight. A brown odorless gas, O_3 can cause irritation of the respiratory tract in humans and animals, and can damage vegetation. The maximum effect of the precursor emissions on O_3 formation may be many miles from the source because ozone is a by-product of a photochemical reaction.

CO is a colorless odorless gas that is generally a product of incomplete combustion of fossil fuels (gasoline, natural gas, oil, coal, etc.). Approximately 90 percent of the SCAQMD's regional inventory of CO is generated by mobile sources (i.e., motor vehicles and aircraft). At elevated concentrations, CO can displace oxygen in the bloodstream and cause acute and chronic health problems.

PM_{10} is respirable particulate matter that is less than 10 microns in diameter. Due to their size, these particulates are known to enter deep in lung tissue and cause health problems to humans. PM_{10} is generated by many types of fume and dust producing activities including industrial and agricultural activities, commercial operations, and atmospheric chemical reactions. Additionally, natural activities (e.g., wind, ocean spray, and wildfires) can also introduce PM_{10} into the atmosphere.

State Implementation Plan (SIP) – SCAQMD

In accordance with Federal and state CAA requirements, the SCAQMD (and all agencies responsible for CAA implementation in non-attainment areas) must develop and implement a plan to reduce and maintain regulated air pollution levels that are less than the NAAQS. In 1989, the SCAQMD developed the region's first Air Quality Management Plan (AQMP) and, in doing so, established specific controls, procedures, and requirements for reducing regulated air pollutant emissions into the atmosphere from mobile and stationary sources. The 1989 AQMP was updated based on new state-specific changes resulting from the 1988 California Clean Air Act as well as the Federal CAAA of 1990. Incorporating the resulting regulatory changes, the new AQMP for SOCAB was adopted on 12 July 1991.

In 1994, the SCAQMD adopted a revised AQMP that included major changes and revisions from the previous plans. As required by the CAAA, the 1994 AQMP included an O_3 attainment demonstration. At that time, the SCAQMD also developed specific attainment plans for CO, NO_2, and PM_{10} that included various control measures and requirements from the 1991 AQMP. Following local agency adoption of the 1994 AQMP, the State of California Air Resources Board (CARB) incorporated key elements of the plan into the California Ozone SIP and approved it in November 1994. The USEPA then approved and promulgated the 1994 AQMP as the California Ozone SIP. This approval was effective on 7 February 1997.

To further address progress and additional control requirements in the basin, in the SCAQMD developed and approved the 1997 AQMP in November 1996. This AQMP was then approved by CARB as part of the State's O_3 and PM_{10} SIP and was later approved by USEPA in September 2001.

Unlike previous AQMPs, the 1997 AQMP included a specific emissions budget for military aircraft operations at March ARB. This budget included projected pollutant emissions over the 20-year period between 2000 and 2020. Table D-2 below presents this approved SIP budget as well as the 1990 baseline SIP budget for O_3 precursor pollutant emissions that was used in a conformity determination completed for March ARB in 1997 (AFCEE 1997).

Table D-2. SIP Annual Emissions Budget for March ARB

Annual Emissions Budget (tpy)				
SIP Budget Year	**NO_x (tpy)**	**VOC (tpy)**	**CO (tpy)**	**PM_{10} (tpy)**
1990 Previously Assessed Ozone Pollutant SIP Baseline[1]	1010.7	2282.1	n/a	n/a
2000-2020 SIP Budget[2] for March ARB (Military Aircraft Ops Only)	501.8	203.4	645.4	15.2

Notes: [1] Based on 1997 Final Clean Air Act Conformity Determination for March ARB. May 1997, based on 1990 base year (Table 4-1).
[2] SCAQMD SIP Budget for Aircraft Operations Only at March ARB – provided by SCAQMD (HSAIO 2002)

tpy – tons per year

2. GENERAL CONFORMITY DETERMINATION REQUIREMENTS

2.1 REGULATORY BACKGROUND

The USEPA has promulgated rules that establish the conformity determination criteria and procedures for Federal actions, pursuant to Section 176(c) of the CAA. The General Conformity Rule defines the "general" conformity criteria and procedures for Federal agencies that propose to implement non-transportation projects.

The General Conformity Rule applies to Federal actions in areas that are failing to meet one or more of the Federal air quality standards (designated as non-attainment areas), and/or areas that are subject to attainment maintenance plans (designated as maintenance areas). As noted in Section 1, in the Proposed Action affects ten different air basins or AQCRs located in California, Arizona, and Nevada. Of these, seven areas, or portions thereof, have been designated as non-attainment or maintenance areas for O_3; six are non-attainment for PM_{10}, and two are non-attainment for CO. The remaining region is either in attainment or is unclassified by the USEPA for each of the criteria pollutants. This conformity applicability analysis will evaluate the conformity of the Proposed Action for each non-attainment pollutant in the affected regions.

The following subsections describe the general conformity rule procedures and criteria, and how they specifically pertain to this conformity analysis

2.2 EXEMPTIONS AND APPLICABILITY

Source Exemptions

The general conformity provisions identify specific Federal actions or portions of actions that are exempt from the conformity procedural requirement, because the USEPA has deemed these actions to conform. These actions include those that must undergo thorough air quality analysis to comply with other statutory requirements; actions that would result in no emission increase, or an increase in emissions that is clearly *de minimis*; or actions presumed to conform by the agency through separate rule-making actions. These exemptions include the transfer of ownership of real property under 40 CFR Part 93.153(c)(2)(xiv and xx), as well as leasing agreements pending environmental restoration under 40 CFR Part 93.153(c)(2)(xix).

The only source exemption potentially applicable to the USAF's Proposed Action for basing of C-17 aircraft at March ARB is the exemption for major new or modified stationary sources, which are subject to permits under SCAQMD's Regulation IX New Source Review (NSR) program or Prevention of Significant Deterioration (PSD) program. New or modified stationary sources that could potentially be included in this Proposed Action may include comfort heating boilers, standby electrical generators, or additional aircraft painting activities.

De Minimis and Regional Significance Thresholds

In addition to the specific source exemptions identified in the conformity rule, Federal actions may be exempt from the conformity requirements if the action meets the applicability criteria for *de minimis* emission levels and regional significance thresholds. The applicability determination procedures presented in the rule include the following elements:

- Define the applicable emission sources for the Federal action
- Quantify the total direct and indirect emissions of non-attainment pollutants from these sources
- Compare these emission rates against the appropriate *de minimis* emission levels or regionally significant thresholds

If the total direct and indirect emissions of non-attainment pollutants reach or exceed these applicability threshold values, a Conformity Determination must be prepared by the Federal agency before undertaking the action.

The conformity rule defines direct and indirect emissions based upon the timing and location of the emissions. "Direct" emissions are those that are caused or initiated by Federal actions, and occur at the same time and place as the action. "Indirect" emissions are those that occur in the future or at a distance from the Federal action. In addition, the conformity rule limits the scope of indirect emissions to those that can be quantified and are ***reasonably foreseeable*** by the agency at the time of analysis, and those emissions that the Federal agency can practicably control and maintain control of through its continuing program responsibility.

The definitions of direct and indirect emissions do not distinguish among specific source categories; point, area, and mobile sources are given equal consideration in the conformity requirements. All substantive procedural requirements of the general conformity rule apply to the total of the net increases and decreases in direct and indirect emissions resulting from the action.

If the total of direct and indirect emissions from the action meet or exceed the *de minimis* or regional significant thresholds, the agency must perform a conformity determination to demonstrate the positive conformity of the Federal action. The *de minimis* emission levels vary by the criteria pollutant and the severity of the region's non-attainment conditions. Regionally significant thresholds represent 10 percent of the applicable SIP emissions inventory for non-attainment pollutants.

Section 3.0 presents the specific emission thresholds and the applicability analysis results for the Proposed Action.

2.3 CAA GENERAL CONFORMITY CRITERIA

If the Proposed Action is not exempt from the conformity demonstration requirements, the General Conformity Rule defines conformity and provides five basic criteria to determine whether a Federal action conforms to an applicable SIP. These criteria assess conformity based upon emission analyses and/or dispersion modeling for the non-attainment pollutants. If the Federal action meets the conformity criteria and requirements, the action is demonstrated to conform to the applicable SIP. If the action cannot meet the criteria and requirements, the agency must develop an enforceable implementation plan to effectively mitigate (e.g., completely offset) the increased emissions from the Proposed Action to meet the conformity requirements. The Federal action cannot proceed unless positive conformity can be demonstrated.

The General Conformity Rule provides the option to select any one of several criteria to analyze the conformity of the Proposed Action. Presented in 40 CFR, Section 93.158, the criteria are primarily based upon the type of pollutant and the status of the applicable SIP. If the applicability analysis concludes that further conformity analyses are required to demonstrate positive conformity (i.e., de minimis or regional significance thresholds are exceeded) the following conformity criteria (paraphrased below) can be used to demonstrate conformity for a proposed action in an O_3 non-attainment area:

1. The total direct and indirect emissions for the Proposed Action are specifically identified and accounted for in the applicable SIP's attainment or maintenance demonstration. [40 CFR, Section 93.158(a)(1)].
2. The total direct and indirect emissions of ozone precursors are fully offset within the same non-attainment or maintenance area through a revision to the applicable SIP or a similarly enforceable measure so that there is a no net increase in emissions [40 CFR, Section 93.158(a)(2)].
3. The State has made a revision to the area's attainment or maintenance demonstration after 1990 and the State **either**:

a. Determines and documents that the action, together with all other emissions in the non-attainment (or maintenance) area would not exceed the emissions budget specified in the applicable SIP; **or**

b. Determines that the action, together with all other emissions in the nonattainment (or maintenance) area would exceed the emissions budget specified in the applicable SIP but the State's Governor or designee for SIP actions makes a written commitment to the USEPA to demonstrate CAA conformity through specific measures and scheduled actions [40 CFR, Section 93.158(a)(5)(i)(A & B)].

4. The Federal action fully offsets its entire emissions within the same non-attainment area through a revision to the SIP a similar measure so that there is no net increase in non-attainment pollutant emissions [40 CFR, Section 93.158(a)(5)(iii)].

5. The State has not made a revision to the approved SIP since 1990, and the total emissions from the action do not increase emissions above the baseline emissions which are either:

   a. CY1990 emissions or another calendar year that was the basis for the non-attainment area designation) [40 CFR, Section 93.158(a)(5)(iv)(A)] or

   b. Historic activity levels and emissions calculated for future years using appropriate emission factors and methods for future years.

6. Dispersion modeling analysis demonstrates that direct and indirect emissions from the Federal action will not cause or contribute to violations of Federal ambient air quality standards.

2.4 OTHER STATE IMPLEMENTATION PLAN CONSISTENCY REQUIREMENTS

The conformity analysis must also demonstrate that total direct and indirect emissions from the Federal the applicable SIP requirements and milestones, including:

- Reasonable further progress schedules
- Assumptions specified in the attainment or maintenance demonstration
- SIP prohibitions, numerical emission limits, and work practice requirements

SCAQMD has promulgated a general conformity requirement (SCAQMD Regulation XIX, Rule 1901) that incorporates, by reference, the general conformity requirements of 40 CFR 93.

3. APPLICABILITY ANALYSIS

This section of the conformity analysis describes the applicability analysis of the Proposed Action to the General Conformity Rule requirements.

3.1 SOURCES INCLUDED IN THE CONFORMITY ANALYSIS

In accordance with the General Conformity Rule, total direct and indirect emissions resulting from proposed Federal action includes numerous types of stationary and mobile sources. These emissions occur during construction and operational conditions with the Proposed Action. As defined by the rule and applied to the Proposed Action at March ARB, direct emissions would result from nonpermitted emissions sources as well as proposed C-17 flight operations. Examples of direct emissions sources include aerospace ground equipment (AGE) devices, small space heating units, petroleum storage tanks, and fuel cell repair operations. Indirect pollutant emissions for the proposed project include activities that the USAF can control as part of the Federal action and include government-owned vehicles (GOVs), privately-owned vehicles (POVs), and various military support activities at the base.

3.2 TOTAL DIRECT AND INDIRECT EMISSION CALCULATIONS

The estimates of the net changes in non-attainment pollutant emissions that would result from implementation of the Proposed Action at March ARB, the Desert Center DZ, and the affected MTRs are presented in Attachments 1 through 3 of this Appendix. These calculations are based on a comparison of future activities to current operations at March ARB, including operations and support of the existing 16 C-141C aircraft that are scheduled to be phased out and replaced by eight C-17 aircraft. Recent Federal actions to convert from C-141s to C-17 operations at McGuire Air Force Base (AFB), New Jersey; Charleston AFB, South Carolina; and McChord AFB, Washington were reviewed to evaluate the impacts of this conversion process and project similar operations at March ARB. The resulting analyses indicate that potential non-stationary pollutant impacts would result with four elements of the Proposed Action: 1) construction activities at March ARB, 2) airfield operations at March ARB, 3) Desert Center DZ changes; and 4) MTR changes. The net changes in direct and indirect VOC, NO_x, CO, and PM_{10} emissions during these stages are presented below.

Construction Activities – South Coast Air Basin (March ARB only)

There are eight construction projects included in the Proposed Action. Construction would occur only at March ARB, so the South Coast Air Basin would be the only affected non-attainment area. One of these projects includes the demolition of an existing hangar, one two-phase project includes the construction and improvement of a new C-17 Inspection and Maintenance Hangar. The remaining six projects are limited to interior renovations and the paving of relatively small asphalt parking areas.

Because there are relatively few projects, the total base wide enclosed building area (i.e., area requiring heat and other utilities) would increase by only about 10,500 square feet. This does not represent a significant change under the Proposed Action.

The construction activities would occur during a four-year period from calendar year (CY) 2003 through CY06. PM_{10} emissions would be generated in the form of fugitive dust from grading, site preparation, material storage, and equipment movement. All criteria pollutants would also be emitted during construction as combustion by-products from diesel and gasoline-fueled construction equipment and contractor commuting vehicles. VOC evaporative emissions would occur due to building painting and asphalt paving operations.

Table D-3 presents the estimated annual emissions of the non-attainment pollutants generated during construction activities at March ARB. As shown, the greatest total annual pollutant emission rates are projected to occur during CY05.

Table D-3. Construction Activity Emissions from the Proposed Action at March ARB

Annual Construction Emissions (tpy)				
Construction Period (Calendar Year)	**NO_x (tpy)**	**VOC (tpy)**	**CO (tpy)**	**PM_{10} (tpy)**
2003	2.41	2.07	1.89	1.78
2004	3.39	3.39	2.46	2.85
2005	5.34	2.52	4.96	0.58
2006	3.92	1.66	3.66	0.29

[1] Construction emissions are based on proposed construction and demolition activity and applicable USEPA emission factors & accepted engineering methods.

tpy - tons per year

Airfield Flight Operations – South Coast Air Basin (March ARB)

The replacement of C-141s with C-17s would not be an instantaneous event, but rather would take place as a gradual transition, with C-141s being retired two or three at a time over a two year period, starting in the fourth quarter of CY03. The buildup of the C-17s would overlap with the draw-down of the C-141s. The first C-17 would be expected in early-CY05, with additional aircraft arriving at a rate of approximately one per month over the following nine months.

C-17 operational activities would not commence until construction activities would be nearly completed. Though airfield operations and training flights would not cease during the transition, the expected pattern of draw-down/buildup would result in a period of relatively low operations activity during the period of maximum construction activity. Operational activities analyzed for the Proposed Action include two main categories: 1) airfield operations at March ARB; and 2) aircraft flight operations on MTRs in the SOCAB. All six regulated criteria pollutants are emitted from these activities as by-products of jet fuel combustion.

Aircraft support operations, including AGE, fuel storage and handling, government-owned on-road and off-road vehicle use, surface coating, and fuel cell maintenance, have been reviewed. Emissions from all these operations would be expected to decline slightly as a result of the Proposed Action, but the declines would not be significant, relative to normal year-to-year variations. Very small net increases in fuel-fired external combustion and internal combustion emissions would be expected result from the action due to the slight increase in enclosed space. However, these emissions would be negligibly small. Of all the emission-related activities at March ARB, only airfield operations, which include landings and takeoffs (LTOs) and touch-and-gos (TGOs), would change significantly as a result of the Proposed Action. Table D-4 presents estimates of current airfield operations emissions as well as projections of the net changes in airfield operations emissions (relative to the baseline year) as a result of the Proposed Action.

Table D-4. Baseline and Net Changes in Military Airfield Operation Emissions Associated with the Proposed Action at March ARB - South Coast Air Basin

Airfield Operation Emissions (tpy)				
Projected Year	NO_x (tpy)	VOC (tpy)	CO (tpy)	PM_{10} (tpy)
Current/Baseline (2000/ 2001) Airfield Emissions:	227.46	183.12	467.75	101.91
2003	-7.12	-10.18	-16.92	-4.32
2004	-46.27	-66.16	-109.95	-28.06
2005	-70.42	-131.67	-214.63	-49.95
2006	-70.75	-161.51	-265.11	-57.34

[1] See Attachments 2 and 3 for detailed emission calculations.
tpy – tons per year

As shown in Table D-4, the expected emissions of all non-attainment pollutants associated with the Proposed Action are less than current emissions. This is due to the overall gradual reduction in the total number of aircraft and total proposed airfield operations. Detailed emission calculations for proposed airfield operations are presented in Attachment 3 to this conformity analysis.

For the purposes of this analysis, an air pollutant 'mixing height' of 3,000 feet (ft) above ground level (AGL) has been assumed. That is, aircraft emissions released above this altitude are not considered to have any impact on ground-level air quality. Therefore, airfield activity emissions are tabulated from the ground up to 3,000 feet AGL. Similarly, aircraft emissions on MTRs are tabulated only for flight activities less than 3,000 feet AGL.

As noted above, the overall net direct and indirect emissions changes in the South Coast Air Basin (March ARB) associated with the Proposed Action also include emissions changes from proposed changes in MTR operations in the region. Table D-5 lists the current estimated MTR aircraft emissions in the SOCAB as well as the estimated change to those emissions over the 2003-2006 timeframe for this Proposed Action.

Table D-5. Baseline and Net Changes in Military Training Route (MTR) Emissions Associated with the Proposed Action at March ARB – for Routes in South Coast Air Basin

MTR Emissions in South Coast Air Basin (tpy)				
Projected Year	**NO_x (tpy)**	**VOC (tpy)**	**CO (tpy)**	**PM_{10} (tpy)**
Current/Baseline (2000/ 2001) MTR Emissions:	0.31	0.01	0.03	0.03
2003	0.00	0.00	0.00	0.00
2004	0.00	0.00	0.00	0.00
2005	+0.36	0.01	+0.03	+0.13
2006	+0.83	+0.02	+0.06	+0.29

[1] See Attachments 2 and 3 for detailed emission calculations of MTR emissions in the South Coast Air Basin.
tpy – tons per year

The changes in MTR activities under the Proposed Action would have relatively little impact on air pollutants in the SOCAB. This is because the MTRs used by the existing C-141s, and the MTRs to be used by the C-17s, for the most part, do not include low-level flight activities over the SOCAB.

Desert Center DZ and MTR Operations – Mojave Desert Air Basin

The Proposed Action at the Desert Center DZ includes the continued dropping of various materials (pallets, water tanks, bags, etc.) from cargo aircraft during military training exercises. The Proposed Action includes a gradual reduction in the number of C-141 sorties and airdrop passes and gradual increase in similar C-17 operations. Projected DZ training requirements under the Proposed Action will result in a decrease of approximately 65 percent in the total number of current/existing airdrop passes at this location. The DZ is located in a portion of the Mojave Desert Air Basin that is in attainment for all regulated pollutants, although portions of the basin have been designated as "severe" non-attainment for ozone and "moderate" non-attainment for PM_{10}.

Most of the regulated air pollutant emissions associated with the use of the DZ are generated by aircraft during airdrop exercises that are executed from flight paths below 3,000 ft AGL. Emissions are calculated using standard engine-specific emission factors, route characteristics, air speeds, thrust settings, and durations for typical airdrop exercises.

A second source of air pollutants associated with DZ activities are the vehicles that are used to retrieve the dropped materials from the site. For this analysis, it was conservatively assumed that three vehicle types (heavy duty off-road forklifts, heavy duty diesel trucks, and heavy duty passenger vehicles) are used to retrieve these materials from the DZ following airdrop operations.

Table D-6 presents the estimated net changes in regulated pollutant emissions with implementation of the Proposed Action. See Attachment 2 to this conformity analysis for a detailed description of the existing and proposed emissions at the DZ.

As shown, the Proposed Action would result in an overall net decrease in all pollutant emissions associated with the DZ. The Proposed Action would therefore result an overall benefit to ambient air quality to the Mojave Desert Air Basin.

In addition to the specific operations and emissions associated with the Desert Center DZ, the overall net emissions changes in the Mojave Desert Air Basin under the Proposed Action would also include emissions changes from proposed changes in MTR operations. Table D-7 lists the current estimated MTR aircraft emissions in the SOCAB as well as the estimated change to those emissions over the 2003-2006 timeframe under this Proposed Action.

Table D-6. Baseline and Net Changes in Drop Zone (DZ) Emissions Associated with the Proposed Action In Mojave Desert Air Basin

DZ Emissions in Mojave Desert Air Basin (tpy)				
Projected Year	**NO_x (tpy)**	**VOC (tpy)**	**CO (tpy)**	**PM_{10} (tpy)**
Current/Baseline (2000/ 2001) DZ Emissions:	10.98	0.64	4.88	6.71
2003	-0.65	-0.04	-0.30	-0.07
2004	-4.22	-0.26	-1.97	-0.47
2005	-5.34	-0.45	-3.59	-0.83
2006	-2.68	-0.49	-4.06	-0.89

[1] See Attachment 2 to this analysis for detailed emission calculations of MTR emissions in the Mojave Desert Air Basin.

Tpy – tons per year

Table D-7. Baseline and Net Changes in MTR Emissions Associated with the Proposed Action – in Mojave Desert Air Basin

MTR Emissions in Mojave Desert Air Basin (tpy)				
Projected Year	**NO_x (tpy)**	**VOC (tpy)**	**CO (tpy)**	**PM_{10} (tpy)**
Current/Baseline (2000/2001) MTR Emissions:	78.55	2.93	21.29	32.23
2003	-1.99	-0.10	-0.80	-0.24
2004	-14.77	-0.69	-5.23	-1.69
2005	-14.51	-1.12	-9.51	-2.52
2006	-1.72	-1.12	-10.71	-2.18

[1] See Attachment 2 to this analysis for detailed emission calculations of MTR emissions in the Mojave Desert Air Basin.

tpy – tons per year

As noted in this table, the Proposed Action would result in an overall net decrease in all pollutant emissions associated with the MTRs throughout the four-year period required to implement the Proposed Action.

Flight Operations – Military Training Routes (All Air Basins)

Regulated pollutant emissions from current and proposed operations were calculated for each of the MTRs affected by the Proposed Action. These calculations reflect final conversion of the C-141 aircraft to C-17 and the reduction in KC-135R aircraft (reduction by two) and are presented in Attachment 2 to this conformity analysis.

Table D-8 presents the net change in MTR NO_x emissions for each of the affected basins and compares those estimates to the regional inventories and to the applicable *de minimis* thresholds for each of the affected Basins or AQCRs. Similarly, Tables D-9, D-10, and D-11 presents the net changes in VOCs, CO, and PM10 emissions, respectively, for each air basin and similar regional significance and *de minimis* threshold comparisons for all affected Air Basins. Tables D-8 through and D-11 show that the Proposed Action MTR emissions of all non-attainment pollutants (NO_x, VOC, CO, and PM_{10}) are estimated to be well below *de minimis* thresholds and regional significance.

Because MTR emissions would ramp from current levels toward the changes shown in Tables D-8 through D-11, with no intermediate values higher than the completed action values shown, it is not necessary to make these comparisons for intermediate years. Furthermore, because the regional significance tests using recent-year emission inventories for these regions show the Proposed action to be several orders of magnitude below regional significance, it is not necessary to repeat these comparisons for future year SIP inventories, which will be in the same order of magnitude as the inventories used in these analyses. Estimates of aircraft emissions on MTRs are detailed in Attachment 2 to this draft conformity determination.

Table D-8. Nitrogen Oxides (NO_x) Emissions – Regional Significance Analysis and Comparison to Conformity *de minimis* Thresholds for Affected Regions

Air Basin Name	Ozone Attainment Status [1, 2]	1999 Regional Inventory (tpy)	De Minimis Threshold (tpy)	Proposed Action NO_x Emissions Net Change [5] (tpy)	% of AQCR Total Emissions Inventory
North Central Coast Air Basin	Maintenance	29,067	100	2.32	0.0080%
South Central Coast Air Basin	Severe**	130,764	25	2.80	0.0021%
South Coast Air Basin [4]	Extreme	505,723	10	-69.10	-0.0137%
San Diego Air Basin	Serious	116,430	50	1.93	0.0017%
Salton Sea Air Basin	Severe	32,694	25	-8.28	-0.0253%
Mojave Desert Air Basin [3]	Severe	116,810	25	-6.12	-0.0052%
San Joaquin Valley Air Basin	Severe	155,122	25	1.23	0.0008%
Las Vegas Intrastate AQCR	Attainment	94,410	Not Applic.	0.16	0.0002%
Mojave-Yuma AQCR	Attainment	24,434	Not Applic.	-5.32	-0.0218%
Northern Arizona AQCR	Attainment	197,559	Not Applic.	1.27	0.0006%

Notes:

[1] There are no NO_x (NO_2) nonattainment areas. The *de minimis* threshold for NOx emissions is defined by the ozone attainment status.

[2] Where areas within an air basin or AQCR have different attainment status, the worst-case status was used in this table.

[3] Proposed Action Delta value for Mojave Desert Air Basin includes the DZ and MTR net emissions changes from Tables D-6 and D-7, respectively.

[4] Proposed Action Delta value for SOCAB includes the airfield and MTR net emission change from Tables D-4 and D-5, respectively.

[5] Note that this table format does not evaluate the interim-year emissions increases from construction that are shown in Table D-3. However, a comparison of Table D-3 to D-4 shows that the net emissions change for each calendar year is negative, relative to current conditions.

Table D-9. Volatile Organic Compounds (VOC) Emissions – Regional Significance Analysis and Comparison to Conformity *de minimis* Thresholds for Affected Regions

Air Basin Name	Ozone Attainment Status [1, 2]	1999 Regional Inventory (tpy)	De Minimis Threshold (tpy)	Proposed Action VOC Emissions Net Change [5] (tpy)	% of AQCR Total Emissions Inventory
North Central Coast Air Basin	Maintenance	23,781	100	0.05	0.0002%
South Central Coast Air Basin	Severe**	45,511	25	0.05	0.0001%
South Coast Air Basin [4]	Extreme	330,114	10	-161.48	-0.0489%
San Diego Air Basin	Serious	81,719	50	0.03	0.0000%
Salton Sea Air Basin	Severe	21,257	25	-0.57	-0.0027%
Mojave Desert Air Basin [3]	Severe	66,836	25	-2.72	-0.0041%
San Joaquin Valley Air Basin	Severe	103,924	25	0.02	0.0000%
Las Vegas Intrastate AQCR	Attainment	53,913	Not Applic.	0.00	0.0000%
Mojave-Yuma AQCR	Attainment	19,526	Not Applic.	-0.33	-0.0017%
Northern Arizona AQCR	Attainment	69,940	Not Applic.	0.02	0.0000%

Notes:

[1] There are no VOC nonattainment areas. The *de minimis* threshold for VOC emissions is defined by the ozone attainment status.

[2] Where areas within an air basin or AQCR have different attainment status, the worst-case status was used in this table.

[3] Proposed Action Delta value for Mojave Desert Air Basin includes the DZ and MTR net emissions changes from Tables D-6 and D-7, respectively.

[4] Proposed Action Delta value for SOCAB includes the airfield and MTR net emission change from Tables D-4 and D-5, respectively.

[5] Note that this table format does not evaluate the interim-year emissions increases from construction that are shown in Table D-3. However, a comparison of Table D-3 to D-4 shows that the net emissions change for each calendar year is negative, relative to current conditions.

Table D-10. Carbon Monoxide (CO) Emissions – Regional Significance Analysis and Comparison to Conformity *de minimis* Thresholds for Affected Regions

Air Basin Name	CO Attainment Status	1999 Regional Inventory (tpy)	De Minimis Threshold (tpy)	Proposed Action CO Emissions Net Change [3] (tpy)	% of AQCR Total Emissions Inventory
North Central Coast Air Basin	Attainment	162,759	Not Applic.	0.18	0.0001%
South Central Coast Air Basin	Attainment	324,026	Not Applic.	0.22	0.0001%
South Coast Air Basin [2]	Serious	2,525,710	70	-264.98	-0.0105%
San Diego Air Basin	Attainment	615,683	Not Applic.	0.10	0.0000%
Salton Sea Air Basin	Attainment	159,223	Not Applic.	-4.70	-0.0030%
Mojave Desert Air Basin [1]	Attainment	433,169	Not Applic.	-25.48	-0.0059%
San Joaquin Valley Air Basin	Attainment	667,765	Not Applic.	0.10	0.0000%
Las Vegas Intrastate AQCR	Serious	350,402	100	0.01	0.0000%
Mojave-Yuma AQCR	Attainment	140,309	Not Applic.	-2.65	-0.0019%
Northern Arizona AQCR	Attainment	711,437	Not Applic.	0.05	0.0000%

Notes:

[1] Proposed Action Delta value for Mojave Desert Air Basin includes the DZ and MTR net emissions changes from Tables D-6 and D-7, respectively.

[2] Proposed Action Delta value for SOCAB includes the Airfield and MTR net emission change from Tables D-4 and D-5, respectively.

[3] Note that this table format does not evaluate the interim-year emissions increases from construction that are shown in Table D-3. However, a comparison of Table D-3 to D-4 shows that the net emissions change for each calendar year is negative, relative to current conditions.

Table D-11. Particulate Matter Less Than 10 microns (PM_{10}) Emissions – Regional Significance Analysis and Comparison to Conformity *de minimis* Thresholds for Affected Regions

Air Basin Name	PM_{10} Attainment Status [1]	1999 Regional Inventory (tpy)	De Minimis Threshold (tpy)	Proposed Action PM_{10} Emissions Net Change [4] (tpy)	% of AQCR Total Emissions Inventory
North Central Coast Air Basin	Attainment	58,146	Not Applic.	0.81	0.0014%
South Central Coast Air Basin	Attainment	64,935	Not Applic.	0.97	0.0015%
South Coast Air Basin [3]	Serious	158,114	70	-56.76	-0.0359%
San Diego Air Basin	Attainment	105,429	Not Applic.	0.60	0.0006%
Salton Sea Air Basin	Serious*	36,218	70	-7.36	-0.0203%
Mojave Desert Air Basin [2]	Moderate	65,926	100	-31.97	-0.0485%
San Joaquin Valley Air Basin	Serious	217,463	70	0.43	0.0002%
Las Vegas Intrastate AQCR	Serious	67,265	70	0.03	0.0000%
Mojave-Yuma AQCR	Moderate	22,528	100	-4.39	-0.0195%
Northern Arizona AQCR	Attainment	119,476	Not Applic.	0.24	0.0002%

Notes:

[1] Where areas within an air basin or AQCR have different attainment status, the worst-case status was used in this table.

[2] Proposed Action Delta value for Mojave Desert Air Basin includes the DZ and MTR net emissions changes from Tables D-6 and D-7, respectively.

[3] Proposed Action Delta value for SOCAB includes the airfield and MTR net emission change from Tables D-4 and D-5, respectively.

[4] Note that this table format does not evaluate the interim-year emissions increases from construction that are shown in Table D-3. However, a comparison of Table D-3 to D-4 shows that the net emissions change for each calendar year is negative, relative to current conditions.

3.3 APPLICABILITY ANALYSIS RESULTS

March ARB Operations

The results of the applicability analysis indicate that total cumulative peak year direct and indirect emissions at March ARB (i.e., the sum of construction, airfield operations, and MTRs) within the SOCAB will not exceed the de minimis threshold levels for any non-attainment pollutant. Therefore, a conformity determination is not required for the Proposed Action in order to show positive conformity within the SOCAB.

Desert Center DZ Operations

The Desert Center DZ is located within a geographic area of the Mojave Desert Air Basin that is in attainment with all criteria pollutants. Therefore, general conformity is not applicable to this aspect of the Proposed Action. Further, the results of the applicability analysis indicate that implementation of the Proposed Action would result in reductions in emissions of all criteria pollutants during the transition and through the life of the action. Therefore, a conformity determination is not required for this element of the Proposed Action in order to show positive conformity.

MTR Operations

The total emissions resulting from the proposed changes in MTR operations would be well below the applicable de minimis and regional significance levels in all non-attainment areas affected by MTR uses (See Tables D-8 through D-11 for a pollutant-specific summary for each region). Therefore, no further conformity analyses are required for these areas.

4. CONFORMITY ANALYSIS AND RESULTS

This section presents the conclusion of the conformity analysis for the Proposed Action. The purpose of this analysis is to determine whether the Proposed Action would conform to the applicable SIP, based upon the criteria established in the General Conformity Rule and promulgated in 40 CFR 93.158.

The regulatory basis and specific criteria for this analysis was presented in Section 2.0 above. This section presents the methods and results of the conformity analysis for the following criteria:

> *Demonstration that direct and indirect emissions associates with the proposed federal action will not exceed the conformity de-minimis thresholds in any affected Air Quality Control Region, and therefore in any affected non-attainment or maintenance area.[See: 40 CFR 93.158(a)(5)(i)(A)].*

This criteria is satisfied by the information presented in Section 3 - Tables D-4 through D-11.

Based upon the conformity analyses results summarized in the previous sections, the Proposed Action at March AFB meets the conformity criterion for consistency with the California SIP requirements and the existing 1997 AQMP adopted by the SCAQMD and South Coast Area Governments.

Based upon the emission analyses discussed above, the reasonably foreseeable project emissions of non-attainment pollutants would not exceed the General Conformity Rule *de minimis* levels nor would they represent an increase of 10 percent or more of the regional emissions inventory for any region affected by the Proposed Action.

5. REFERENCES

AFCEE 1997	Air Force Center for Environmental Excellence (AFCEE). 1997. General Conformity Determination, Proposed Mulitple Uses of March Air Reserve Base, Riverside County, California. May 1997
HSAIO 2002	Hsaio, Kathy. Personal communication (email) from Ms. Kathy Hsaio, SCAQMD, to Mr. Allan Priest, e^2M, regarding the SCAQMD SIP budget for March ARB. 7 June 2002.

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Attachment 1 to Appendix D - Conformity Analysis

Emissions Estimates for March ARB C-17 EA - Construction

This workbook contains

Summary	(this worksheet) Summarizes total emissions by calendar year.
Combustion	(one sheet for each calendar year) Estimates emissions from non-road equipment exhaust as well as painting.
Grading	(one sheet for each calendar year) Estimates the number of days of site preparation, to be used for estimating heavy equipment exhaust and earthmoving dust emissions)
Fugitive	(one sheet for each calendar year) Estimates fine particulate emissions from earthmoving, vehicle traffic, and windblown dust.

Summary of Construction Emissions

CY2003	NOx (ton)	HC (ton)	CO (ton)	SO2 (ton)	PM10 (ton)
Combustion	2.41	2.07	1.89	0.13	0.18
Fugitive Dust					1.60
TOTAL CY2003	2.41	2.07	1.89	0.13	1.78

CY2004

Combustion	3.39	3.39	2.46	0.18	0.28
Fugitive Dust					2.57
TOTAL CY2004	3.39	3.39	2.46	0.18	2.85

CY2005

Combustion	5.34	2.52	4.96	0.26	0.39
Fugitive Dust					0.18
TOTAL CY2005	5.34	2.52	4.96	0.26	0.58

CY2006

Combustion	3.92	1.66	3.66	0.19	0.29
Fugitive Dust					0.00
TOTAL CY2006	3.92	1.66	3.66	0.19	0.29

The following assumptions have been made for the construction projects.
1) If a project involves only interior renovations it was not included in the total disturbed acreage calculations nor was it included in the mobile equipment (i.e bulldozers and forklifts) calculations.
2) Interior renovation square footage was entered into this model as 25% of the total area of the facility being renovated because this model is designed to calculate emissions based on the total square footage of new construction projects.

Proposed Construction and Demolition Projects at March ARB
Includes:

100% of the demolition of Building 2307:	50,332 ft2
25% of the interior renovations to Building 600:	5,269 ft2
25% of interior alterations to Bldg 2328 (Avionics):	1,077 ft2
25% of interior alterations to Bldg 2327 (Hydraulics):	861 ft2
25% of interior alterations to Bldg 355 (Survival Equipment):	3,256 ft2
25% of interior alterations to Bldg 420:	6,999 ft2
100% of the asphalt overlay for Bldg 420:	4,950 ft2

Construction Site Air Emissions
Combustion Emissions of ROG, NOx, SO2, CO and PM10 Due to Construction

8-Jan-03

User Inputs:

Total Building Area:	67,794	ft^2	(Demolition of Bldg 2307 and interior renovations projects)
Total Paved Area:	4,950	ft^2	(Building 420 asphalt overlay)
Total Disturbed Area:	1.27	acres	(Total Demolition Building Area and Total Paved Area, excluding renovation projects for Buildings 600, 2328, 2327, 355 and 420 which are exclusively interior projects)
Construction Duration:	0.5	years	(assumed June 03 to Dec 03)
Annual Construction Activity:	115	days/yr	(assumed June 03 to Dec 03)

Results:[Average per Year Over the Construction Period]

	ROG	NOx	SO2	CO	PM10
Emissions, lbs/day	36.00	41.94	2.18	32.90	3.18
Emissions, tons/yr	2.07	2.41	0.13	1.89	0.18

Calculation of Unmitigated Emissions

Summary of Input Parameters

	ROG	NOx	SO2	CO	PM10
Total acres disturbed:	1.27	1.27	1.27	1.27	1.27
Total acres paved:	0.11	0.11	0.11	0.11	0.11
Total building space, ft^2:	67,794	67,794	67,794	67,794	67,794
Total years:	0.50	0.50	0.50	0.50	0.50
Area graded, acres in 1 yr:	1.27	1.27	1.27	1.27	1.27
Area paved, acres in 1 yr:	0.11	0.11	0.11	0.11	0.11
Building space, ft^2 in 1 yr:	67,794	67,794	67,794	67,794	67,794

Annual Emissions by Source (lbs/day)

	ROG	NOx	SO2	CO	PM10
Grading Equipment	0.3	2.0	0.1	0.4	0.4
Asphalt Paving	0.0	0.0	0.0	0.0	0.0
Stationary Equipment	11.4	9.3	0.6	2.0	0.5
Mobile Equipment	3.0	30.6	1.4	30.5	2.3
Architectural Coatings (Non-Res)	21.2	0.0	0.0	0.0	0.0
Total Emissions (lbs/day):	**36.0**	**41.9**	**2.2**	**32.9**	**3.2**

Emission Factors

Reference: Air Quality Thresholds of Significance, SMAQMD, 1994.

	SMAQMD Emission Factor									
Source	ROG		NOx		SO2 *		CO *		PM10	
Grading Equipment	2.50E-01	lbs/acre/day	1.60E+00	lbs/acre/day	0.11	lbs/acre/day	0.35	lbs/acre/day	2.80E-01	lbs/acre/day
Asphalt Paving	2.62E-01	lbs/acre/day	NA		NA		NA		NA	
Stationary Equipment	1.68E-04	lbs/day/ft²	1.37E-04	lbs/day/ft²	9.11E-06	lbs/day/ft²	2.97E-05	lbs/day/ft²	8.00E-06	lbs/day/ft²
Mobile Equipment	1.60E-04	lbs/day/ft²	1.61E-03	lbs/day/ft²	7.48E-05	lbs/day/ft²	0.0016	lbs/day/ft²	1.20E-04	lbs/day/ft²
Architectural Coatings (Non-Res)	8.15E-02	lbs/day/ft	NA		NA		NA		NA	

* Factors for grading equipment and stationary equipment are calculated from AP-42 for diesel engines using ratios with the NOx factors.
Factors for mobile equipment are calculated from ratios with Mobile5a 2001 NOx emission factors for heavy duty trucks for each site.

Construction Fugitive Dust Emissions

Calculation of PM10 Emissions Due to Site Preparation (Uncontrolled).
Worksheet Revised 16 June 1997.

User Input Parameters / Assumptions

Acres graded per year:	1.27	acres/yr	(From "Combustion" worksheet)
Grading days/yr:	4	days/yr	(From "Grading" worksheet)
Exposed days/yr:	90	assumed days/yr graded area is exposed	
Grading Hours/day:	8	hr/day	
Soil piles area fraction:	0.10	(assumed fraction of site area covered by soil piles)	
Soil percent silt, s:	8.5	%	(mean silt content; expected range: 0.5 to 23, AP-42 Table 13.2.2-1)
Soil percent moisture, M:	10	%	(assumed based on the dry climate of southern California)
Annual rainfall days, p:	40	days/yr rainfall exceeds 0.01 inch/day	(AP-42 Fig 13.2.2-1)
Wind speed > 12 mph %, I:	30	%	Ave. of wind speed at LAX & Barstow/Daggett, www.epa.gov/ttnnaaqs/ozone/areas/windr/23174.gif
Fraction of TSP, J:	0.5	(SCAQMD recommendation)	
Mean vehicle speed, S:	5	mi/hr	(On-site)
Dozer path width:	8	ft	
Qty construction vehicles:	0.15	vehicles	(From "Grading" worksheet)
On-site VMT/vehicle/day:	5	mi/veh/day	(Excluding bulldozer VMT during grading)
PM10 Adjustment Factor k	2.6	lb/VMT	(AP-42 Table 13.2.2-2 9/98 for PM10)
PM10 Adjustment Factor a	0.8	(dimensionless)	(AP-42 Table 13.2.2-2 9/98 for PM10)
PM10 Adjustment Factor b	0.4	(dimensionless)	(AP-42 Table 13.2.2-2 9/98 for PM10)
PM10 Adjustment Factor c	0.3	(dimensionless)	(AP-42 Table 13.2.2-2 9/98 for PM10)
Mean Vehicle Weight W	40	tons	assumed for aggegate trucks

Emissions Due to Soil Disturbance Activities

Operation Parameters (Calculated from User Inputs)

Grading duration per acre	25.2	hr/acre	
Bulldozer mileage per acre	1	VMT/acre	(Miles traveled by bulldozer during grading)
Construction VMT per day	1	VMT/day	
Construction VMT per acre	2.4	VMT/acre	(Travel on unpaved surfaces within site)

Equations Used (Corrected for PM10)

Operation	Empirical Equation	Units	AP-42 Section (5th Edition)
Bulldozing	$0.75(s^{1.5})/(M^{1.4})$	lbs/hr	Table 11.9-18.24, Overburden
Grading	$(0.60)(0.051)s^{2.0}$	lbs/VMT	Table 11.9-18.24
Vehicle Traffic	$[k(s/12)^{a}\,(W/3)^{b}/(M/0.2)^{c}\,]\,[(365\text{-}P)/365]$	lbs/VMT	Section 13.2.2

Source: Compilation of Air Pollutant Emission Factors, Vol. I, USEPA AP-42, Section 11.9 dated 7/98 and Section 13.2 dated 9/98

Calculation of PM10 Emission Factors for Each Operation

Operation	Emission Factor (mass/ unit)	Operation Parameter	Emission Factor (lbs/ acre)
Bulldozing	0.74 lbs/hr	25.2 hr/acre	18.6 lbs/acre
Grading	0.77 lbs/VMT	1 VMT/acre	0.8 lbs/acre
Vehicle Traffic	1.53 lbs/VMT	2.4 VMT/acre	3.7 lbs/acre

This worksheet based on template received from HQ-AFRC in August of 2000
Vehicle Traffic calculation updated in 2001 to reflect latest U.S. EPA AP-42 Revision

Emissions Due to Wind Erosion of Soil Piles and Exposed Graded Surface

Reference: Air Quality Thresholds of Significance, SMAQMD, 1994.

Soil Piles EF = 1.7(s/1.5)[(365 - H)/235](I/15)(J) = (s)(365 - H)(I)(J)/(3110.2941), p. A9-99.

Soil Piles EF = 13.3 lbs/day/acre covered by soil piles

Consider soil piles area fraction so that EF applies to graded area

Soil piles area fraction: 0.10 (Fraction of site area covered by soil piles)
Soil Piles EF = 1.33 lbs/day/acres graded

Graded Surface EF = 26.4 lbs/day/acre (recommended in CEQA Manual, p. A9-93).

Calculation of Annual PM10 Emissions

Source	Emission Factor	Graded Acres/yr	Exposed days/yr	Emissions lbs/yr	Emissions tons/yr
Bulldozing	18.6 lbs/acre	1.27	NA	24	0.01
Grading	0.8 lbs/acre	1.27	NA	1	0.00
Vehicle Traffic	3.7 lbs/acre	1.27	NA	5	0.00
Erosion of Soil Piles	1.3 lbs/acre/day	1.27	90	152	0.08
Erosion of Graded Surface	26.4 lbs/acre/day	1.27	90	3,015	1.51
TOTAL				3,197	1.60

This worksheet based on template received from HQ-AFRC in August of 2000
Vehicle Traffic calculation updated in 2001 to reflect latest U.S. EPA AP-42 Revision

Construction (Grading) Schedule

Estimate of time required to grade a specified area.
31-Jan-02

Input Parameters

Construction area	1.27 acres/yr	(from "Combustion" Worksheet)
Qty Equipment:	0.15	(calculated based on acres disturbed)

Assumptions.
Terrain is mostly flat.
An average of 6" soil is excavated from one half of the site and backfilled to the other half of the site; no soil is hauled off-site or borrowed.
200 hp bulldozers are used for site clearing.
300 hp bulldozers are used for stripping, excavation, and backfill.
Vibratory drum rollers are used for compacting.
Stripping, Excavation, Backfill and Compaction require an average of two passes each.
Excavation and Backfill are assumed to involve only half of the site.

Calculation of days required for one piece of equipment to grade the specified area.

Reference: Means Heavy Construction Cost Data, 6th Ed., R. S. Means, 1992.

Means Line No.	Operation	Description	Output	Units	Acres per equip-day)	equip-days per acre	Acres/yr	Equip-days per year
021 108 0550	Site Clearing	Dozer & rake, medium brush	0.6	acre/day	0.6	1.67	1.27	2.12
021 144 0300	Stripping	Topsoil & stockpiling, adverse soil	1,650	cu. yd/day	2.05	0.49	1.27	0.62
022 242 5220	Excavation	Bulk, open site, common earth, 150' hau	800	cu. yd/day	0.99	1.01	0.63	0.64
022 208 5220	Backfill	Structural, common earth, 150' haul	1,950	cu. yd/day	2.42	0.41	0.63	0.26
022 226 5020	Compaction	Vibrating roller, 6 " lifts, 3 passes	1,950	cu. yd/day	2.42	0.41	1.27	0.52
TOTAL								4.16

Calculation of days required for the indicated pieces of equipment to grade the designated acreage.

(Equip)(day)/yr:	4.16
Qty Equipment:	0.15
Grading days/yr:	4.16

Round to	4	grading days/yr

Proposed Construction and Demolition Projects at March ARB
Includes:

67% of the construction of the new C-17 Maintenance and Inspection Hanger:	40,747 ft2
25% of the interior renovation to Bldg 2240:	9,580 ft2
100% of the expansion of the existing parking lot at blg 2240:	47,899 ft2

Construction Site Air Emissions
Combustion Emissions of ROG, NOx, SO2, CO and PM10 Due to Construction

8-Jan-03

User Inputs:

Total Building Area:	50,326	ft^2	(Construction of new C-17 Maintenance and Inspection Hangar will take 18 months to complete [67% in CY04 and 33% in CY 05] and all interior renovations projects)
Total Paved Area:	47,899	ft^2	(Buiding 420 asphalt overlay and Building 2240 parking lot expansion)
Total Disturbed Area:	2.0	acres	(Total Building Area of New Hangar and Total Paved Area, excluding renovation projects for building 2240 which is an exclusively interior project)
Construction Duration:	1.0	years	(assumed)
Annual Construction Activity:	230	days/yr	(assumed)

Results:[Average per Year Over the Construction Period]

	ROG	NOx	SO2	CO	PM10
Emissions, lbs/day	29.46	29.48	1.57	21.42	2.41
Emissions, tons/yr	3.39	3.39	0.18	2.46	0.28

Calculation of Unmitigated Emissions

Summary of Input Parameters

	ROG	NOx	SO2	CO	PM10
Total new acres disturbed:	2.04	2.04	2.04	2.04	2.04
Total new acres paved:	1.10	1.10	1.10	1.10	1.10
Total new building space, ft^2:	50,326	50,326	50,326	50,326	50,326
Total years:	1.00	1.00	1.00	1.00	1.00
Area graded, acres in 1 yr:	2.04	2.04	2.04	2.04	2.04
Area paved, acres in 1 yr:	1.10	1.10	1.10	1.10	1.10
Building space, ft^2 in 1 yr:	50,326	50,326	50,326	50,326	50,326

Annual Emissions by Source (lbs/day)

	ROG	NOx	SO2	CO	PM10
Grading Equipment	0.5	3.3	0.2	0.7	0.6
Asphalt Paving	0.3	0.0	0.0	0.0	0.0
Stationary Equipment	8.5	6.9	0.5	1.5	0.4
Mobile Equipment	1.9	19.3	0.9	19.2	1.4
Architectural Coatings (Non-Res)	18.3	0.0	0.0	0.0	0.0
Total Emissions (lbs/day):	**29.5**	**29.5**	**1.6**	**21.4**	**2.4**

Emission Factors
Reference: Air Quality Thresholds of Significance, SMAQMD, 1994.

	SMAQMD Emission Factor									
Source	ROG		NOx		SO2 *		CO *		PM10	
Grading Equipment	2.50E-01	lbs/acre/day	1.60E+00	lbs/acre/day	0.11	lbs/acre/day	0.35	lbs/acre/day	2.80E-01	lbs/acre/day
Asphalt Paving	2.62E-01	lbs/acre/day	NA		NA		NA		NA	
Stationary Equipment	1.68E-04	lbs/day/ft^2	1.37E-04	lbs/day/ft^2	9.11E-06	lbs/day/ft^2	2.97E-05	lbs/day/ft^2	8.00E-06	lbs/day/ft^2
Mobile Equipment	1.60E-04	lbs/day/ft^2	1.61E-03	lbs/day/ft^2	7.48E-05	lbs/day/ft^2	0.0016	lbs/day/ft^2	1.20E-04	lbs/day/ft^2
Architectural Coatings (Non-Res)	8.15E-02	lbs/day/ft	NA		NA		NA		NA	

* Factors for grading equipment and stationary equipment are calculated from AP-42 for diesel engines using ratios with the NOx factors.
Factors for mobile equipment are calculated from ratios with Mobile5a 2001 NOx emission factors for heavy duty trucks for each site.

Construction Fugitive Dust Emissions

Calculation of PM10 Emissions Due to Site Preparation (Uncontrolled).
Worksheet Revised 16 June 1997.

User Input Parameters / Assumptions

Acres graded per year:	2.0	acres/yr	(From "Combustion" worksheet)
Grading days/yr:	7	days/yr	(From "Grading" worksheet)
Exposed days/yr:	90	assumed days/yr graded area is exposed	
Grading Hours/day:	8	hr/day	
Soil piles area fraction:	0.10	(assumed fraction of site area covered by soil piles)	
Soil percent silt, s:	8.5	%	(mean silt content; expected range: 0.5 to 23, AP-42 Table 13.2.2-1)
Soil percent moisture, M:	10	%	(assumed based on the dry climate of southern California)
Annual rainfall days, p:	40	days/yr rainfall exceeds 0.01 inch/day	(AP-42 Fig 13.2.2-1)
Wind speed > 12 mph %, I:	30	%	Ave. of wind speed at LAX & Barstow/Daggett, www.epa.gov/ttnnaaqs/ozone/areas/windr/23174.gif
Fraction of TSP, J:	0.5	(SCAQMD recommendation)	
Mean vehicle speed, S:	5	mi/hr	(On-site)
Dozer path width:	8	ft	
Qty construction vehicles:	0.24	vehicles	(From "Grading" worksheet)
On-site VMT/vehicle/day:	5	mi/veh/day	(Excluding bulldozer VMT during grading)
PM10 Adjustment Factor k	2.6	lb/VMT	(AP-42 Table 13.2.2-2 9/98 for PM10)
PM10 Adjustment Factor a	0.8	(dimensionless)	(AP-42 Table 13.2.2-2 9/98 for PM10)
PM10 Adjustment Factor b	0.4	(dimensionless)	(AP-42 Table 13.2.2-2 9/98 for PM10)
PM10 Adjustment Factor c	0.3	(dimensionless)	(AP-42 Table 13.2.2-2 9/98 for PM10)
Mean Vehicle Weight W	40	tons	assumed for aggegate trucks

Emissions Due to Soil Disturbance Activities

Operation Parameters (Calculated from User Inputs)

Grading duration per acre	27.5	hr/acre	
Bulldozer mileage per acre	1	VMT/acre	(Miles traveled by bulldozer during grading)
Construction VMT per day	1	VMT/day	
Construction VMT per acre	4.2	VMT/acre	(Travel on unpaved surfaces within site)

This worksheet based on template received from HQ-AFRC in August of 2000
Vehicle Traffic calculation updated in 2001 to reflect latest U.S. EPA AP-42 Revision

Equations Used (Corrected for PM10)

Operation	Empirical Equation	Units	AP-42 Section (5th Edition)
Bulldozing	$0.75(s^{1.5})/(M^{1.4})$	lbs/hr	Table 11.9-18.24, Overburden
Grading	$(0.60)(0.051)s^{2.0}$	lbs/VMT	Table 11.9-18.24
Vehicle Traffic	$[k(s/12)^{a}(W/3)^{b}/(M/0.2)^{c}][(365-P)/365]$	lbs/VMT	Section 13.2.2

Source: Compilation of Air Pollutant Emission Factors, Vol. I, USEPA AP-42, Section 11.9 dated 7/98 and Section 13.2 dated 9/98

Calculation of PM10 Emission Factors for Each Operation

Operation	Emission Factor (mass/ unit)	Operation Parameter	Emission Factor (lbs/ acre)
Bulldozing	0.74 lbs/hr	27.5 hr/acre	20.4 lbs/acre
Grading	0.77 lbs/VMT	1 VMT/acre	0.8 lbs/acre
Vehicle Traffic	1.53 lbs/VMT	4.2 VMT/acre	6.4 lbs/acre

This worksheet based on template received from HQ-AFRC in August of 2000
Vehicle Traffic calculation updated in 2001 to reflect latest U.S. EPA AP-42 Revision

Emissions Due to Wind Erosion of Soil Piles and Exposed Graded Surface

Reference: Air Quality Thresholds of Significance, SMAQMD, 1994.

Soil Piles EF = 1.7(s/1.5)[(365 - H)/235](I/15)(J) = (s)(365 - H)(I)(J)/(3110.2941), p. A9-99.

Soil Piles EF = 13.3 lbs/day/acre covered by soil piles

Consider soil piles area fraction so that EF applies to graded area

Soil piles area fraction: 0.10 (Fraction of site area covered by soil piles)
Soil Piles EF = 1.33 lbs/day/acres graded

Graded Surface EF = 26.4 lbs/day/acre (recommended in CEQA Manual, p. A9-93).

Calculation of Annual PM10 Emissions

Source	Emission Factor	Graded Acres/yr	Exposed days/yr	Emissions lbs/yr	Emissions tons/yr
Bulldozing	20.4 lbs/acre	2.04	NA	42	0.02
Grading	0.8 lbs/acre	2.04	NA	2	0.00
Vehicle Traffic	6.4 lbs/acre	2.04	NA	13	0.01
Erosion of Soil Piles	1.3 lbs/acre/day	2.04	90	244	0.12
Erosion of Graded Surface	26.4 lbs/acre/day	2.04	90	4,835	2.42
TOTAL				5,135	2.57

This worksheet based on template received from HQ-AFRC in August of 2000
Vehicle Traffic calculation updated in 2001 to reflect latest U.S. EPA AP-42 Revision

Construction (Grading) Schedule

Estimate of time required to grade a specified area.
31-Jan-02

Input Parameters

Construction area	2.0 acres/yr	(from "Combustion" Worksheet)
Qty Equipment:	0.24	(calculated based on acres disturbed)

Assumptions.

Terrain is mostly flat.
An average of 6" soil is excavated from one half of the site and backfilled to the other half of the site; no soil is hauled off-site or borrowed.
200 hp bulldozers are used for site clearing.
300 hp bulldozers are used for stripping, excavation, and backfill.
Vibratory drum rollers are used for compacting.
Stripping, Excavation, Backfill and Compaction require an average of two passes each.
Excavation and Backfill are assumed to involve only half of the site.

Calculation of days required for one piece of equipment to grade the specified area.

Reference: Means Heavy Construction Cost Data, 6th Ed., R. S. Means, 1992.

Means Line No.	Operation	Description	Output	Units	Acres per equip-day)	equip-days per acre	Acres/yr	Equip-days per year
021 108 0550	Site Clearing	Dozer & rake, medium brush	0.6	acre/day	0.6	1.67	2.04	3.39
021 144 0300	Stripping	Topsoil & stockpiling, adverse soil	1,650	cu. yd/day	2.05	0.49	2.04	0.99
022 242 5220	Excavation	Bulk, open site, common earth, 150' hau	800	cu. yd/day	0.99	1.01	1.02	1.03
022 208 5220	Backfill	Structural, common earth, 150' haul	1,950	cu. yd/day	2.42	0.41	1.02	0.42
022 226 5020	Compaction	Vibrating roller, 6 " lifts, 3 passes	1,950	cu. yd/day	2.42	0.41	2.04	0.84
TOTAL								6.68

Calculation of days required for the indicated pieces of equipment to grade the designated acreage.

(Equip)(day)/yr:	6.68
Qty Equipment:	0.24
Grading days/yr:	6.68

Round to	7	grading days/yr

This worksheet based on template received from HQ-AFRC in August of 2000

Proposed Construction and Demolition Projects at March ARB
Includes:

25% of the interior renovations to Bldgs. 453 and 429:	6,362 ft2
33% of the interior construction to the C-17 Maintenance and Inspection Hanger:	20,069 ft2

Construction Site Air Emissions
Combustion Emissions of ROG, NOx, SO2, CO and PM10 Due to Construction

26-Jan-01

User Inputs:

Total Building Area:	26,431 ft²	(Construction of new C-17 Maintenance and Inspection Hangar will take 18 months to complete [67% in CY04 and 33% in CY 05] and all interior renovations projects) interior renovations to bldg. 453)
Total Paved Area:	0 ft²	
Total Disturbed Area:	0.15 acres	(excludes renovations to building 453 which will be interior)
Construction Duration:	1.0 years	(assumed)
Annual Construction Activity:	230 days/yr	(assumed)

Results:[Average per Year Over the Construction Period]

	ROG	NOx	SO2	CO	PM10
Emissions, lbs/day	21.96	46.41	2.23	43.15	3.42
Emissions, tons/yr	2.52	5.34	0.26	4.96	0.39

Calculation of Unmitigated Emissions

Summary of Input Parameters

	ROG	NOx	SO2	CO	PM10
Total new acres disturbed:	0.15	0.15	0.15	0.15	0.15
Total new acres paved:	0.00	0.00	0.00	0.00	0.00
Total new building space, ft^2:	26,431	26,431	26,431	26,431	26,431
Total years:	1.00	1.00	1.00	1.00	1.00
Area graded, acres in 1 yr:	0.15	0.15	0.15	0.15	0.15
Area paved, acres in 1 yr:	0.00	0.00	0.00	0.00	0.00
Building space, ft^2 in 1 yr:	26,431	26,431	26,431	26,431	26,431

Annual Emissions by Source (lbs/day)

	ROG	NOx	SO2	CO	PM10
Grading Equipment	0.0	0.2	0.0	0.1	0.0
Asphalt Paving	0.0	0.0	0.0	0.0	0.0
Stationary Equipment	4.4	3.6	0.2	0.8	0.2
Mobile Equipment	4.2	42.6	2.0	42.3	3.2
Architectural Coatings (Non-Res)	13.2	0.0	0.0	0.0	0.0
Total Emissions (lbs/day):	**22.0**	**46.4**	**2.2**	**43.1**	**3.4**

Emission Factors
Reference: Air Quality Thresholds of Significance, SMAQMD, 1994.

	SMAQMD Emission Factor									
Source	ROG		NOx		SO2 *		CO *		PM10	
Grading Equipment	2.50E-01	lbs/acre/day	1.60E+00	lbs/acre/day	0.11	lbs/acre/day	0.35	lbs/acre/day	2.80E-01	lbs/acre/day
Asphalt Paving	2.62E-01	lbs/acre/day	NA		NA		NA		NA	
Stationary Equipment	1.68E-04	lbs/day/ft²	1.37E-04	lbs/day/ft²	9.11E-06	lbs/day/ft²	2.97E-05	lbs/day/ft²	8.00E-06	lbs/day/ft²
Mobile Equipment	1.60E-04	lbs/day/ft²	1.61E-03	lbs/day/ft²	7.48E-05	lbs/day/ft²	0.0016	lbs/day/ft²	1.20E-04	lbs/day/ft²
Architectural Coatings (Non-Res)	8.15E-02	lbs/day/ft	NA		NA		NA		NA	

* Factors for grading equipment and stationary equipment are calculated from AP-42 for diesel engines using ratios with the NOx factors.
Factors for mobile equipment are calculated from ratios with Mobile5a 2001 NOx emission factors for heavy duty trucks for each site.

Construction Fugitive Dust Emissions

Calculation of PM10 Emissions Due to Site Preparation (Uncontrolled).
Worksheet Revised 16 June 1997.

User Input Parameters / Assumptions

Acres graded per year:	0.15	acres/yr	(From "Combustion" worksheet)
Grading days/yr:	0.48	days/yr	(From "Grading" worksheet)
Exposed days/yr:	90	assumed days/yr graded area is exposed	
Grading Hours/day:	8	hr/day	
Soil piles area fraction:	0.10	(assumed fraction of site area covered by soil piles)	
Soil percent silt, s:	8.5	%	(mean silt content; expected range: 0.5 to 23, AP-42 Table 13.2.2-1)
Soil percent moisture, M:	10	%	(assumed based on the dry climate of southern California)
Annual rainfall days, p:	40	days/yr rainfall exceeds 0.01 inch/day	(AP-42 Fig 13.2.2-1)
Wind speed > 12 mph %, I:	30	%	Ave. of wind speed at LAX & Barstow/Daggett, www.epa.gov/ttnnaaqs/ozone/areas/windr/23174.gif
Fraction of TSP, J:	0.5	(SCAQMD recommendation)	
Mean vehicle speed, S:	5	mi/hr	(On-site)
Dozer path width:	8	ft	
Qty construction vehicles:	0.02	vehicles	(From "Grading" worksheet)
On-site VMT/vehicle/day:	5	mi/veh/day	(Excluding bulldozer VMT during grading)
PM10 Adjustment Factor k	2.6	lb/VMT	(AP-42 Table 13.2.2-2 9/98 for PM10)
PM10 Adjustment Factor a	0.8	(dimensionless)	(AP-42 Table 13.2.2-2 9/98 for PM10)
PM10 Adjustment Factor b	0.4	(dimensionless)	(AP-42 Table 13.2.2-2 9/98 for PM10)
PM10 Adjustment Factor c	0.3	(dimensionless)	(AP-42 Table 13.2.2-2 9/98 for PM10)
Mean Vehicle Weight W	40	tons	assumed for aggegate trucks

Emissions Due to Soil Disturbance Activities

Operation Parameters (Calculated from User Inputs)

Grading duration per acre	26.2	hr/acre	
Bulldozer mileage per acre	1	VMT/acre	(Miles traveled by bulldozer during grading)
Construction VMT per day	0	VMT/day	
Construction VMT per acre	0.3	VMT/acre	(Travel on unpaved surfaces within site)

This worksheet based on template received from HQ-AFRC in August of 2000
Vehicle Traffic calculation updated in 2001 to reflect latest U.S. EPA AP-42 Revision

Equations Used (Corrected for PM10)

Operation	Empirical Equation	Units	AP-42 Section (5th Edition)
Bulldozing	$0.75(s^{1.5})/(M^{1.4})$	lbs/hr	Table 11.9-18.24, Overburden
Grading	$(0.60)(0.051)s^{2.0}$	lbs/VMT	Table 11.9-18.24
Vehicle Traffic	$[k(s/12)^a (W/3)^b/(M/0.2)^c]\,[(365-P)/365]$	lbs/VMT	Section 13.2.2

Source: Compilation of Air Pollutant Emission Factors, Vol. I, USEPA AP-42, Section 11.9 dated 7/98 and Section 13.2 dated 9/98

Calculation of PM10 Emission Factors for Each Operation

Operation	Emission Factor (mass/ unit)	Operation Parameter	Emission Factor (lbs/ acre)
Bulldozing	0.74 lbs/hr	26.2 hr/acre	19.4 lbs/acre
Grading	0.77 lbs/VMT	1 VMT/acre	0.8 lbs/acre
Vehicle Traffic	1.53 lbs/VMT	0.3 VMT/acre	0.5 lbs/acre

This worksheet based on template received from HQ-AFRC in August of 2000
Vehicle Traffic calculation updated in 2001 to reflect latest U.S. EPA AP-42 Revision

Emissions Due to Wind Erosion of Soil Piles and Exposed Graded Surface

Reference: Air Quality Thresholds of Significance, SMAQMD, 1994.

Soil Piles EF = 1.7(s/1.5)[(365 - H)/235](I/15)(J) = (s)(365 - H)(I)(J)/(3110.2941), p. A9-99.

Soil Piles EF = 13.3 lbs/day/acre covered by soil piles

Consider soil piles area fraction so that EF applies to graded area

Soil piles area fraction: 0.10 (Fraction of site area covered by soil piles)
Soil Piles EF = 1.33 lbs/day/acres graded

Graded Surface EF = 26.4 lbs/day/acre (recommended in CEQA Manual, p. A9-93).

Calculation of Annual PM10 Emissions

Source	Emission Factor	Graded Acres/yr	Exposed days/yr	Emissions lbs/yr	Emissions tons/yr
Bulldozing	19.4 lbs/acre	0.15	NA	3	0.00
Grading	0.8 lbs/acre	0.15	NA	0	0.00
Vehicle Traffic	0.5 lbs/acre	0.15	NA	0	0.00
Erosion of Soil Piles	1.3 lbs/acre/day	0.15	90	17	0.01
Erosion of Graded Surface	26.4 lbs/acre/day	0.15	90	347	0.17
TOTAL				367	0.18

This worksheet based on template received from HQ-AFRC in August of 2000
Vehicle Traffic calculation updated in 2001 to reflect latest U.S. EPA AP-42 Revision

Construction (Grading) Schedule

Estimate of time required to grade a specified area.
31-Jan-02

Input Parameters

Construction area	0.15 acres/yr	(from "Combustion" Worksheet)
Qty Equipment:	0.02	(calculated based on acres disturbed)

Assumptions.
Terrain is mostly flat.
An average of 6" soil is excavated from one half of the site and backfilled to the other half of the site; no soil is hauled off-site or borrowed.
200 hp bulldozers are used for site clearing.
300 hp bulldozers are used for stripping, excavation, and backfill.
Vibratory drum rollers are used for compacting.
Stripping, Excavation, Backfill and Compaction require an average of two passes each.
Excavation and Backfill are assumed to involve only half of the site.

Calculation of days required for one piece of equipment to grade the specified area.

Reference: Means Heavy Construction Cost Data, 6th Ed., R. S. Means, 1992.

Means Line No.	Operation	Description	Output	Units	Acres per equip-day)	equip-days per acre	Acres/yr	Equip-days per year
021 108 0550	Site Clearing	Dozer & rake, medium brush	0.6	acre/day	0.6	1.67	0.15	0.24
021 144 0300	Stripping	Topsoil & stockpiling, adverse soil	1,650	cu. yd/day	2.05	0.49	0.15	0.07
022 242 5220	Excavation	Bulk, open site, common earth, 150' hau	800	cu. yd/day	0.99	1.01	0.07	0.07
022 208 5220	Backfill	Structural, common earth, 150' haul	1,950	cu. yd/day	2.42	0.41	0.07	0.03
022 226 5020	Compaction	Vibrating roller, 6 " lifts, 3 passes	1,950	cu. yd/day	2.42	0.41	0.15	0.06
TOTAL								0.48

Calculation of days required for the indicated pieces of equipment to grade the designated acreage.

(Equip)(day)/yr:	0.48
Qty Equipment:	0.02
Grading days/yr:	0.48

Round to	0.00	grading days/yr

Proposed Construction and Demolition Projects at March ARB

Includes:

25% of the interior renovations and modifications to the hanger doors in Bldg. 423:	7,400 ft2
25% of the interior renovations and modifications to the hanger doors in Bldg. 2303:	19,913 ft2
25% of the interior renovations in Bldg. 2306:	11,757 ft2

Construction Site Air Emissions

Combustion Emissions of ROG, NOx, SO2, CO and PM10 Due to Construction

26-Jan-01

User Inputs:

Total Building Area:	39,071	ft^2	(interior renovations projects)
Total Paved Area:	0	ft^2	
Total Disturbed Area:	0.0	acres	(all construction activities will be interior renovations.)
Construction Duration:	0.5	years	(assumed June 06 to Dec 06)
Annual Construction Activity:	115	days/yr	(assumed June 06 to Dec 06)

Results:[Average per Year Over the Construction Period]

	ROG	NOx	SO2	CO	PM10
Emissions, lbs/day	28.92	68.26	3.28	63.71	5.00
Emissions, tons/yr	1.66	3.92	0.19	3.66	0.29

Calculation of Unmitigated Emissions

Summary of Input Parameters

	ROG	NOx	SO2	CO	PM10
Total new acres disturbed:	0.00	0.00	0.00	0.00	0.00
Total new acres paved:	0.00	0.00	0.00	0.00	0.00
Total new building space, ft^2:	39,071	39,071	39,071	39,071	39,071
Total years:	0.50	0.50	0.50	0.50	0.50
Area graded, acres in 1 yr:	0.00	0.00	0.00	0.00	0.00
Area paved, acres in 1 yr:	0.00	0.00	0.00	0.00	0.00
Building space, ft^2 in 1 yr:	39,071	39,071	39,071	39,071	39,071

Annual Emissions by Source (lbs/day)

	ROG	NOx	SO2	CO	PM10
Grading Equipment	0.0	0.0	0.0	0.0	0.0
Asphalt Paving	0.0	0.0	0.0	0.0	0.0
Stationary Equipment	6.6	5.4	0.4	1.2	0.3
Mobile Equipment	6.3	62.9	2.9	62.6	4.7
Architectural Coatings (Non-Res)	16.1	0.0	0.0	0.0	0.0
Total Emissions (lbs/day):	**28.9**	**68.3**	**3.3**	**63.7**	**5.0**

Emission Factors
Reference: Air Quality Thresholds of Significance, SMAQMD, 1994.

	SMAQMD Emission Factor									
Source	ROG		NOx		SO2 *		CO *		PM10	
Grading Equipment	2.50E-01	lbs/acre/day	1.60E+00	lbs/acre/day	0.11	lbs/acre/day	0.35	lbs/acre/day	2.80E-01	lbs/acre/day
Asphalt Paving	2.62E-01	lbs/acre/day	NA		NA		NA		NA	
Stationary Equipment	1.68E-04	lbs/day/ft^2	1.37E-04	lbs/day/ft^2	9.11E-06	lbs/day/ft^2	2.97E-05	lbs/day/ft^2	8.00E-06	lbs/day/ft^2
Mobile Equipment	1.60E-04	lbs/day/ft^2	1.61E-03	lbs/day/ft^2	7.48E-05	lbs/day/ft^2	0.0016	lbs/day/ft^2	1.20E-04	lbs/day/ft^2
Architectural Coatings (Non-Res)	8.15E-02	lbs/day/ft	NA		NA		NA		NA	

* Factors for grading equipment and stationary equipment are calculated from AP-42 for diesel engines using ratios with the NOx factors.
Factors for mobile equipment are calculated from ratios with Mobile5a 2001 NOx emission factors for heavy duty trucks for each site.

Construction Fugitive Dust Emissions

Calculation of PM10 Emissions Due to Site Preparation (Uncontrolled).
Worksheet Revised 16 June 1997.

User Input Parameters / Assumptions

Acres graded per year:	0.0	acres/yr	(From "Combustion" worksheet)
Grading days/yr:	0.0	days/yr	(From "Grading" worksheet)
Exposed days/yr:	90	assumed days/yr graded area is exposed	
Grading Hours/day:	8	hr/day	
Soil piles area fraction:	0.10	(assumed fraction of site area covered by soil piles)	
Soil percent silt, s:	8.5	%	(mean silt content; expected range: 0.5 to 23, AP-42 Table 13.2.2-1)
Soil percent moisture, M:	10	%	(assumed based on the dry climate of southern California)
Annual rainfall days, p:	40	days/yr rainfall exceeds 0.01 inch/day	(AP-42 Fig 13.2.2-1)
Wind speed > 12 mph %, I:	30	%	Ave. of wind speed at LAX & Barstow/Daggett, www.epa.gov/ttnnaaqs/ozone/areas/windr/23174.gif
Fraction of TSP, J:	0.5	(SCAQMD recommendation)	
Mean vehicle speed, S:	5	mi/hr	(On-site)
Dozer path width:	8	ft	
Qty construction vehicles:	0	vehicles	(From "Grading" worksheet)
On-site VMT/vehicle/day:	5	mi/veh/day	(Excluding bulldozer VMT during grading)
PM10 Adjustment Factor k	2.6	lb/VMT	(AP-42 Table 13.2.2-2 9/98 for PM10)
PM10 Adjustment Factor a	0.8	(dimensionless)	(AP-42 Table 13.2.2-2 9/98 for PM10)
PM10 Adjustment Factor b	0.4	(dimensionless)	(AP-42 Table 13.2.2-2 9/98 for PM10)
PM10 Adjustment Factor c	0.3	(dimensionless)	(AP-42 Table 13.2.2-2 9/98 for PM10)
Mean Vehicle Weight W	40	tons	assumed for aggegate trucks

Emissions Due to Soil Disturbance Activities

Operation Parameters (Calculated from User Inputs)

Grading duration per acre	0	hr/acre	
Bulldozer mileage per acre	1	VMT/acre	(Miles traveled by bulldozer during grading)
Construction VMT per day	0	VMT/day	
Construction VMT per acre	0	VMT/acre	(Travel on unpaved surfaces within site)

This worksheet based on template received from HQ-AFRC in August of 2000
Vehicle Traffic calculation updated in 2001 to reflect latest U.S. EPA AP-42 Revision

Equations Used (Corrected for PM10)

Operation	Empirical Equation	Units	AP-42 Section (5th Edition)
Bulldozing	$0.75(s^{1.5})/(M^{1.4})$	lbs/hr	Table 11.9-18.24, Overburden
Grading	$(0.60)(0.051)s^{2.0}$	lbs/VMT	Table 11.9-18.24
Vehicle Traffic	$[k(s/12)^{a} (W/3)^{b}/(M/0.2)^{c}] [(365-P)/365]$	lbs/VMT	Section 13.2.2

Source: Compilation of Air Pollutant Emission Factors, Vol. I, USEPA AP-42, Section 11.9 dated 7/98 and Section 13.2 dated 9/98

Calculation of PM10 Emission Factors for Each Operation

Operation	Emission Factor (mass/ unit)	Operation Parameter	Emission Factor (lbs/ acre)
Bulldozing	0.74 lbs/hr	0 hr/acre	0 lbs/acre
Grading	0.77 lbs/VMT	1 VMT/acre	0.8 lbs/acre
Vehicle Traffic	1.53 lbs/VMT	0 VMT/acre	0 lbs/acre

This worksheet based on template received from HQ-AFRC in August of 2000
Vehicle Traffic calculation updated in 2001 to reflect latest U.S. EPA AP-42 Revision

Emissions Due to Wind Erosion of Soil Piles and Exposed Graded Surface

Reference: Air Quality Thresholds of Significance, SMAQMD, 1994.

Soil Piles EF = 1.7(s/1.5)[(365 - H)/235](I/15)(J) = (s)(365 - H)(I)(J)/(3110.2941), p. A9-99.

Soil Piles EF = 13.3 lbs/day/acre covered by soil piles

Consider soil piles area fraction so that EF applies to graded area

Soil piles area fraction: 0.10 (Fraction of site area covered by soil piles)
Soil Piles EF = 1.33 lbs/day/acres graded

Graded Surface EF = 26.4 lbs/day/acre (recommended in CEQA Manual, p. A9-93).

Calculation of Annual PM10 Emissions

Source	Emission Factor	Graded Acres/yr	Exposed days/yr	Emissions lbs/yr	Emissions tons/yr
Bulldozing	0 lbs/acre	0.00	NA	0.00	0.00
Grading	0.8 lbs/acre	0.00	NA	0.00	0.00
Vehicle Traffic	0.0 lbs/acre	0.00	NA	0.00	0.00
Erosion of Soil Piles	1.3 lbs/acre/day	0.00	90	0.00	0.00
Erosion of Graded Surface	26.4 lbs/acre/day	0.00	90	0.00	0.00
TOTAL				0	0.00

This worksheet based on template received from HQ-AFRC in August of 2000
Vehicle Traffic calculation updated in 2001 to reflect latest U.S. EPA AP-42 Revision

Construction (Grading) Schedule

Estimate of time required to grade a specified area.
31-Jan-02

Input Parameters
Construction area 0.00 acres/yr (from "Combustion" Worksheet)
Qty Equipment: 0.00 (calculated based on acres disturbed)

Assumptions.
Terrain is mostly flat.
An average of 6" soil is excavated from one half of the site and backfilled to the other half of the site; no soil is hauled off-site or borrowed.
200 hp bulldozers are used for site clearing.
300 hp bulldozers are used for stripping, excavation, and backfill.
Vibratory drum rollers are used for compacting.
Stripping, Excavation, Backfill and Compaction require an average of two passes each.
Excavation and Backfill are assumed to involve only half of the site.

Calculation of days required for one piece of equipment to grade the specified area.

Reference: Means Heavy Construction Cost Data, 6th Ed., R. S. Means, 1992.

Means Line No.	Operation	Description	Output	Units	Acres per equip-day)	equip-days per acre	Acres/yr	Equip-days per year
021 108 0550	Site Clearing	Dozer & rake, medium brush	0.6	acre/day	0.6	1.67	0.00	0.00
021 144 0300	Stripping	Topsoil & stockpiling, adverse soil	1,650	cu. yd/day	2.05	0.49	0.00	0.00
022 242 5220	Excavation	Bulk, open site, common earth, 150' hau	800	cu. yd/day	0.99	1.01	0.00	0.00
022 208 5220	Backfill	Structural, common earth, 150' haul	1,950	cu. yd/day	2.42	0.41	0.00	0.00
022 226 5020	Compaction	Vibrating roller, 6 " lifts, 3 passes	1,950	cu. yd/day	2.42	0.41	0.00	0.00
TOTAL								0.00

Calculation of days required for the indicated pieces of equipment to grade the designated acreage.

(Equip)(day)/yr: 0.00
Qty Equipment: 0.00
Grading days/yr: 0.00

Round to 0.00 grading days/yr

Attachment 2 to Appendix D - Conformity Analysis

March C-17 Proposed Action Emissions on Military Training Routes and Drop Zone

This Workbook Contains

TIM by Route	Estimates of total aircraft time by MTR, based on traffic assessed in the most recent EAs identified for these training routes, plus the proposed C-17 MTR activity.
Emissions By Route	Estimates of emissions from all aircraft currently assessed for these training routes, plus the estimated emissions from C-17 activities on these routes.
Emissions by Area	The 7 MTRs fly over a total of 7 different Air Basins in California, one Air Quality Control Region in Nevada and two Air Quality Control Regions in Arizona. The estimated emissions from each of the MTRs are allocated to the overflown regions so that the impacts on each area can be evaluated.
Drop Zone	This worksheet details the drop zone-related aircraft activity and lists the parameters used for estimating emissions and modeling of ground-level impacts. It includes emissions estimates and the results of MAILs dispersion modeling for the drop zone.
Significance Determination	The MTR emissions by area are compared to *de minimis* thresholds in non-attainment areas, and regional significance percentages are computed for each overflown area.
MAILS	Description of the aircraft MTR traffic modeled using the MAILS dispersion model to estimate maximum ground-level impacts due to MTR traffic.
MAILS Outputs	Printouts of MAILS modeling runs.
County Emit	Emissions data from the EPA Tier Emission Inventory Database that were used to estimate regional emission inventories for the purpose of determining regional significance.

Table 1 - Current and Proposed Annual Sortie-Operations for the MTRs

	Current MTR Activity									Total	Proposed	Total
	C-141C (AFRC)	F/A-18C/D (Nav/Mar)	AV-8B (Marine)	F-14A/D (Navy)	A-6E (Navy)	S-3B (Navy)	TA-4/T-45 (Navy)	F-16 (AF)	Other	(Current)	C-17 (AFRC)	Proposed
MTRs												
IR-214					13			14		27	26	53
IR-217		134			67		69	67		337	79	416
VR-289	220	467	389	127	89	71	44		110	1517	27	1324
VR-296	432	117	97	32	22	18	11		27	756	27	351
VR-1217								3		3	79	82
VR-1257		104								104	79	183
VR-1265										0	79	79

Totals Ref: January 2003 DOPA, Table 2-4 (MTR Sortie-Operations)
VR-289 and VR-296 Ops counts Ref: "Environmental Assessment of Military Training Routes for the 452nd Air Mobility Wing", August 1995.
"Other" includes T-38s, F-15Es, F-16s, RF-4s, C-17s, C-130s, and A-10s.

MTR Lengths

Route	Miles	NMs
IR-214	306	266
IR-217	325.35	283
VR-289	179.29	156
VR-296	258.63	225
VR-1217	128.19	111
VR-1257	501.71	436
VR-1265	466.31	405

ref: MTR centerline length computed by Cheryl Myers of e2M, 15 January 2003 email.

Intermediate Table - Minutes per Aircraft Per Sortie-Operation - By Route

Aircraft		C-141	F/A-18	AV-8B	F-14	A-6	S-3	TA-4J	F-16	Other	C-17 VR	C-17 IR
Speed (NM/Hour)[a]		200	450	475	480	450	340	360	*450*	*350*	300	300
Power Setting[b]		70%	90%	95%	90%	92%	87%	90%	*90%*	*90%*	55%	60%
Route Length (NM)[c]												
IR-214	266					35			35			53
IR-217	283		38			38		47	38			57
VR-289	156	47	21	20	19	21	27	26		27	31	
VR-296	225	67	30	28	28	30	40	37		39	45	
VR-1217	111								15		22	
VR-1257	436		58								87	
VR-1265	405										81	

All TIM Minutes are per-Aircraft sortie-operation. Minutes are calculated based on the speed and the route length, as:

[(Nautical Miles)/(Nautical Miles per hour)] * (60 minutes/hour)

a) Mid-point of range of speeds for 300'-3000' corridor from Tables A-3 and A-4 of Oct 2002 Second Site Visit Trip Report for the AFRC C-141 and C-17, and from Table 2-13 of "Environmental Assessment of Military Training Routes for the 452nd Air Mobility Wing", August 1995 for the remaining aircraft.
No flight profile data were located for the F-16, so typical IR/VR route values for fighters were assigned

b) Mid-point of range of power settings for 300'-3000' corridor from Tables A-3 and A-4 of Oct 2002 Site Visit Trip Report for the AFRC C-141 and C-17, and from Table 2-13 of "Environmental Assessment of Military Training Routes for the 452nd Air Mobility Wing", August 1995 for the remaining aircraft.
Note that emissions for the C-17 are based on typical MTR fuel use data provided by USAF AMC (see footnotes to emission factor table)

c) From "MTR Lengths" worksheet in this workbook.

Table 2 - Total Minutes per Year by Aircraft Model - By Route

(NOTE: Includes only the time spent flying below the 3000' ceiling assumed for pollutant mixing)

Information to be used for Air Emissions Estimates												
Aircraft		C-141	F/A-18	AV-8B	F-14	A-6	S-3	TA-4J	F-16	Other	C-17 VR	C-17 IR
Speed (NM/Hour)		200	450	475	480	450	340	360	450	350	300	300
Power Setting		70%	90%	95%	90%	92%	87%	90%	90%	90%	55%	60%
Time below 3000'		70%	100%	90%	40%	100%	100%	100%	100%	100%	80%	80%
Route Length (NM)												
IR-214	266					461			496		0	1,106
IR-217	283		5,051			2,526		3,251	2,526		0	3,574
VR-289	156	7,198	9,701	6,890	989	1,849	1,952	1,143		2,938	673	0
VR-296	225	20,389	3,506	2,478	360	659	714	412		1,040	971	0
VR-1217	111								45		1,408	0
VR-1257	436		6,046								5,511	0
VR-1265	405										5,122	0
Total minutes below 3000'		27,587	24,305	9,368	1,349	5,495	2,666	4,806	3,067	3,978	13,685	4,680

Notes:

The Per-Sortie Time-In-Mode (TIM) for each aircraft model was computed by dividing the route length by the average MTR speed for each aircraft model using the MTR. These per-sortie TIMs (single aircraft minutes/sortie) were used in MRNMAP noise modeling. For emissions estimates, the per-sortie TIMs were multiplied by the MTR traffic numbers for each aircraft model to generate total minutes per year for each aircraft model on each rou

These values represent the most-recently-assessed MTR traffic and the proposed C-17 traffic. Actual current traffic on these routes may be slightly greater than the most-recently-assessed value, but in most cases, current traffic is less than the most-recently-assessed traffic value.

Table 3 - Emission Factors for Aircraft Flown on MTRs

0.1272

Aircraft	# Eng.	Engine	Fuel (Mlb/min)	NOx (lb/Mlb)	HC (lb/Mlb)	CO (lb/Mlb)	SO2 (lb/Mlb)	PM10 (lb/Mlb)	reference
C-130	4	T56-A-15	0.0363	9.69	0.42	1.65	0.96	1.46	(1)
C-141	4	TF33-PW-7A	0.1272	8.47	0.39	2.96	0.96	5.29	(1)
C-17 VR	4	F117--PW-100	0.0833	14.87	0.29	1.15	0.96	5.17	(1)(3)
C-17 IR	4	F117--PW-100	0.1042	21.27	0.26	0.82	0.96	3.96	(1)(3)
F/A-18	2	F414-GE-400	0.1084	15.92	0.27	1.32	0.96	1.57	(1)
AV-8B	1	Rolls-Royce Pegas	0.1698	9.80	0.15	4.10	0.96	*0.09*	(2)
F-14	2	TF30-P-412A	0.0997	16.02	1.20	1.62	0.96	5.50	(4)
A-6	2	J52-PW-P8B	0.1022	12.13	0.59	0.87	0.96	7.75	(4)
S-3	2	TF34-GE-400B	0.0710	5.47	1.51	19.76	0.96	4.48	(4)
TA-4J	1	J-52-P6B	0.0894	7.48	0.56	4.53	0.96	10.00	(4)
F-16	1	F100-PW-229	0.0973	17.53	0.30	0.15	0.96	2.06	(1)
Other	2		0.0990	12.60	0.54	3.54	0.96	4.30	(5)

Notes: "Intermediate" or "climbout" throttle setting emission factors used for these low-altitude MTRs, with the exception of the C-17 (see footnote 3).
Abbreviation "Mlb" = 1000 pounds. The fuel flow data listed above are 'per engine' fuel flow rates.

References:

1) AFIERA 2001, Air Emissions Inventory Guidance Document for Mobile Sources at Air Force Installations, July 2001. PM10 values are Total (as opposed to filterable) PM10.
2) 1 March 1999 letter from Derek Kerby of Rolls-Royce to David Rodriguez of MCAS Yuma.
3) The C-17 has engines sized to allow takeoffs from short "assault" airstrips. As a result, the percent thrust levels used as defaults for other aircraft are inappropriate for C-17 takeoffs from standard runways or maneuvering on training routes.
   C-17 fuel consumption rates are approximately 20,000 lbs/hr for VRs and 25,000 lb/hr for IRs.
   ref: 1/14/02 telecon with Major Golden, AMC Standardization Evaluation HQ AMC DOAT 618-229-3659
   These fuel flow rates are midway between the thrust percentages defined as "Approach" (4279 lb/hr per engine) and "Climbout" 10,919 lb/hr per engine). Therefore, emission factors corresponding to the SR/VR and the IR fuel flows were generated 'between' the approach and climbout data points using linear interpolation.
4) "Summary Tables for Gaseous and Particulate Emissions from Aircraft Engines", Navy AESO Report 6-90, June 1990 w/Sept 1993 Update. Values shown here are midway between the "75% RPM" and "Military" values, where there were no "normal rated" emission factors.
5) In order to approximate emissions from other aircraft on the MTRs, a generic emission factor profile, consisting of simply the average of all the other aircraft, was included in this table.

Table 4 - Emissions by Aircraft Model and Route (Baseline and Proposed Action)

Note that the "Total" values for each Route are for internal Q/A checks only. They are not meaningful with regard to environmental impacts as they contain both Baseline (C-141) and Proposed Action (C-17) emissions.
lb/yr = (minutes/yr)*(EF lb/Mlb)*(Fuel Mlb/min)*(# engines) for each pollutant for each aircraft for each route.

Route		Notes	NOx (lb/yr)	HC (lb/yr)	CO (lb/yr)	SO2 (lb/yr)	PM10 (lb/yr)
IR-214	C-141	(current condition/No Action only)	0	0	0	0	0
	F/A-18	(all scenarios)	0	0	0	0	0
	AV-8B	(all scenarios)	0	0	0	0	0
	F-14	(all scenarios)	0	0	0	0	0
	A-6	(all scenarios)	1,142	56	82	90	730
	S-3	(all scenarios)	0	0	0	0	0
	TA-4J	(all scenarios)	0	0	0	0	0
	F-16	(all scenarios)	847	14	7	46	99
	Other	(all scenarios)	0	0	0	0	0
	C-17 IR	(Proposed Action Only)	9,804	118	377	442	1,827
Total for IR-214			**11,794**	**188**	**466**	**579**	**2,656**
IR-217	C-141	(current condition/No Action only)	0	0	0	0	0
	F/A-18	(all scenarios)	17,432	296	1,445	1,051	1,719
	AV-8B	(all scenarios)	0	0	0	0	0
	F-14	(all scenarios)	0	0	0	0	0
	A-6	(all scenarios)	6,260	304	449	495	4,000
	S-3	(all scenarios)	0	0	0	0	0
	TA-4J	(all scenarios)	2,175	163	1,317	279	2,908
	F-16	(all scenarios)	4,308	74	37	236	506
	Other	(all scenarios)	0	0	0	0	0
	C-17 IR	(Proposed Action Only)	31,674	382	1,218	1,429	5,901
Total for IR-217			**61,850**	**1,218**	**4,467**	**3,491**	**15,034**
VR-289	C-141	(current condition/No Action only)	31,018	1,428	10,840	3,516	19,373
	F/A-18	(all scenarios)	33,479	568	2,776	2,019	3,302
	AV-8B	(all scenarios)	11,468	176	4,798	1,123	105
	F-14	(all scenarios)	3,159	237	319	189	1,085
	A-6	(all scenarios)	4,583	223	329	363	2,928
	S-3	(all scenarios)	1,515	419	5,477	266	1,242
	TA-4J	(all scenarios)	764	57	463	98	1,022
	F-16	(all scenarios)	0	0	0	0	0
	Other	(all scenarios)	7,331	314	2,058	558	2,503
	C-17 VR	(Proposed Action Only)	3,337	65	259	215	1,160
Total for VR-289			**96,654**	**3,486**	**27,319**	**8,348**	**32,719**
VR-296	C-141	(current condition/No Action only)	87,863	4,046	30,705	9,958	54,875
	F/A-18	(all scenarios)	12,099	205	1,003	730	1,193
	AV-8B	(all scenarios)	4,125	63	1,726	404	38
	F-14	(all scenarios)	1,148	86	116	69	394
	A-6	(all scenarios)	1,634	79	117	129	1,044
	S-3	(all scenarios)	554	153	2,003	97	454
	TA-4J	(all scenarios)	276	21	167	35	369
	F-16	(all scenarios)	0	0	0	0	0
	Other	(all scenarios)	2,596	111	729	198	886
	C-17 VR	(Proposed Action Only)	4,814	94	373	311	1,674
Total for VR-296			**115,109**	**4,858**	**36,940**	**11,931**	**60,927**

Table 4 - Emissions by Aircraft Model and Route (Baseline and Proposed Aircraft) Continued

Route		Notes	NOx (lb/yr)	HC (lb/yr)	CO (lb/yr)	SO2 (lb/yr)	PM10 (lb/yr)
VR-1217	C-141	(current condition/No Action only)	0	0	0	0	0
	F/A-18	(all scenarios)	0	0	0	0	0
	AV-8B	(all scenarios)	0	0	0	0	0
	F-14	(all scenarios)	0	0	0	0	0
	A-6	(all scenarios)	0	0	0	0	0
	S-3	(all scenarios)	0	0	0	0	0
	TA-4J	(all scenarios)	0	0	0	0	0
	F-16	(all scenarios)	76	1	1	4	9
	Other	(all scenarios)	0	0	0	0	0
	C-17 VR	(Proposed Action Only)	6,982	136	541	451	2,427
Total for VR-1217			**7,058**	**138**	**542**	**455**	**2,436**
VR-1257	C-141	(current condition/No Action only)	0	0	0	0	0
	F/A-18	(all scenarios)	20,863	354	1,730	1,258	2,057
	AV-8B	(all scenarios)	0	0	0	0	0
	F-14	(all scenarios)	0	0	0	0	0
	A-6	(all scenarios)	0	0	0	0	0
	S-3	(all scenarios)	0	0	0	0	0
	TA-4J	(all scenarios)	0	0	0	0	0
	F-16	(all scenarios)	0	0	0	0	0
	Other	(all scenarios)	0	0	0	0	0
	C-17 VR	(Proposed Action Only)	27,324	533	2,119	1,763	9,500
Total for VR-1257			**48,188**	**887**	**3,849**	**3,022**	**11,557**
VR-1265	C-141	(current condition/No Action only)	0	0	0	0	0
	F/A-18	(all scenarios)	0	0	0	0	0
	AV-8B	(all scenarios)	0	0	0	0	0
	F-14	(all scenarios)	0	0	0	0	0
	A-6	(all scenarios)	0	0	0	0	0
	S-3	(all scenarios)	0	0	0	0	0
	TA-4J	(all scenarios)	0	0	0	0	0
	F-16	(all scenarios)	0	0	0	0	0
	Other	(all scenarios)	0	0	0	0	0
	C-17 VR	(Proposed Action Only)	25,396	496	1,969	1,639	8,829
Total for VR-1265			**25,396**	**496**	**1,969**	**1,639**	**8,829**
All MTRs	C-141	(current condition/No Action only)	118,881	5,474	41,545	13,474	74,248
	F/A-18	(all scenarios)	83,873	1,422	6,954	5,058	8,271
	AV-8B	(all scenarios)	15,593	239	6,523	1,527	143
	F-14	(all scenarios)	4,308	323	436	258	1,479
	A-6	(all scenarios)	13,619	662	977	1,078	8,701
	S-3	(all scenarios)	2,069	572	7,481	363	1,696
	TA-4J	(all scenarios)	3,215	241	1,947	413	4,298
	F-16	(all scenarios)	5,231	90	45	286	615
	Other	(all scenarios)	9,927	425	2,787	756	3,389
	C-17	(Proposed Action Only)	109,333	1,824	6,857	6,251	31,318
Total for All MTRs			**366,048**	**11,271**	**75,552**	**29,465**	**134,158**
		checksums	366,048	11,271	75,552	29,465	134,158

Total for All MTRs - Tons Per Year			NOx (ton/yr)	HC (ton/yr)	CO (ton/yr)	SO2 (ton/yr)	PM10 (ton/yr)
	C-141	(current condition/No Action only)	59.4	2.7	20.8	6.7	37.1
	F/A-18	(all scenarios)	41.9	0.7	3.5	2.5	4.1
	AV-8B	(all scenarios)	7.8	0.1	3.3	0.8	0.1
	F-14	(all scenarios)	2.2	0.2	0.2	0.1	0.7
	A-6	(all scenarios)	6.8	0.3	0.5	0.5	4.4
	S-3	(all scenarios)	1.0	0.3	3.7	0.2	0.8
	TA-4J	(all scenarios)	1.6	0.1	1.0	0.2	2.1
	F-16	(all scenarios)	2.6	0.0	0.0	0.1	0.3
	Other	(all scenarios)	5.0	0.2	1.4	0.4	1.7
	C-17	(Proposed Action Only)	54.7	0.9	3.4	3.1	15.7
Total for All MTRs			**183.0**	**5.6**	**37.8**	**14.7**	**67.1**

Table 5 - Emissions by MTR Route - Baseline - Current/No Action

(sum of Table 4 Emissions EXCLUDING Proposed Action C-17 emissions) Section 3 of EA

Route	Notes	NOx (ton/yr)	HC (ton/yr)	CO (ton/yr)	SO2 (ton/yr)	PM10 (ton/yr)
IR-214		0.99	0.04	0.04	0.07	0.41
IR-217		15.09	0.42	1.62	1.03	4.57
VR-289		46.66	1.71	13.53	4.07	15.78
VR-296		55.15	2.38	18.28	5.81	29.63
VR-1217		0.04	0.00	0.00	0.00	0.00
VR-1257		10.43	0.18	0.86	0.63	1.03
VR-1265		0.00	0.00	0.00	0.00	0.00
Total for All Routes		**128.4**	**4.7**	**34.3**	**11.6**	**51.4**
	checksums	128.4	4.7	34.3	11.6	51.4

Table 6 - Emissions by MTR Route - Proposed Action

Section 4 of EA

(sum of Table 4 Emissions, including Proposed Action C-17 emissions but EXCLUDING C-141 emissions)

Route	Notes	NOx (ton/yr)	HC (ton/yr)	CO (ton/yr)	SO2 (ton/yr)	PM10 (ton/yr)
IR-214		5.9	0.1	0.2	0.3	1.3
IR-217		30.9	0.6	2.2	1.7	7.5
VR-289		32.8	1.0	8.2	2.4	6.7
VR-296		13.6	0.4	3.1	1.0	3.0
VR-1217		3.5	0.1	0.3	0.2	1.2
VR-1257		24.1	0.4	1.9	1.5	5.8
VR-1265		12.7	0.2	1.0	0.8	4.4
Total for All Routes		123.6	2.9	17.0	8.0	30.0
	checksums	123.6	2.9	17.0	8.0	30.0

Table 7 - Impact of Proposed Action (Delta)

Section 4 of EA

(Table 6 Proposed Action Emissions minus Table 5 Baseline Emissions)

Route	Notes	NOx (ton/yr)	HC (ton/yr)	CO (ton/yr)	SO2 (ton/yr)	PM10 (ton/yr)
IR-214		4.9	0.1	0.2	0.2	0.9
IR-217		15.8	0.2	0.6	0.7	3.0
VR-289		-13.8	-0.7	-5.3	-1.7	-9.1
VR-296		-41.5	-2.0	-15.2	-4.8	-26.6
VR-1217		3.5	0.1	0.3	0.2	1.2
VR-1257		13.7	0.3	1.1	0.9	4.7
VR-1265		12.7	0.2	1.0	0.8	4.4
Total for All Routes		**-4.8**	**-1.8**	**-17.3**	**-3.6**	**-21.5**
	checksums	-4.8	-1.8	-17.3	-3.6	-21.5

The tables above compare the baseline (current) condition to the fully-implemented Proposed Action in 2006. In order to look at the impacts during each of the interim years, it will be assumed that the activity levels on the MTRs will be proportional to the number of stationed aircraft. That is, at the point when half of the C-141s have been retired, C-141 activity on all the MTRs is assumed to be half of current levels.

C-141 Drawdown/C-17 Ramp-Up

Qtr/FY	Qtr/CY	C-141	C-17	Total
2/03	1/03	16	0	16
3/03	2/03	16	0	16
4/03	3/03	16	0	16
1/04	4/03	12	0	12
2/04	1/04	12	0	12
3/04	2/04	10	0	10
4/04	3/04	8	0	8
1/05	4/04	8	0	8
2/05	1/05	8	0	8
3/05	2/05	4	1	5
4/05	3/05	0	5	5
1/06	4/05	0	8	8

Ref: Table 2-1 of the January 2003 DOPA for the March ARB C-17 Beddown

Multipliers for Intermediate Calendar Years to Adjust the Sorties by Scaling to Fleet on Base

	2003	2004	2005	2006	2007
C-141	0.9375	0.5938	0.1875	0.0000	0.0000
C-17	0.0000	0.0000	0.4375	1.0000	1.0000

The multipliers above are used to 'scale' the contributions by C-141s and C-17s to the MTR emissions from the tables above, in order to generate intermediate year emissions estimates.

Table 8 - Emissions by Region

Baseline - Existing Air Traffic - by MTR

Emissions from air traffic on each MTR are allocated to each air basin or Air Quality Control Region (AQCR) based on the percent of the MTR's route length above the respective region.

Totals of this table will match the totals by Route presented in Table 5.

ton/yr = (total tpy for this MTR/pollutant from Table 5) * (percent of this MTR over this AQCR)

AQMD	Overflying MTR	Percent	NOx (ton/yr)	HC (ton/yr)	CO (ton/yr)	SO2 (ton/yr)	PM10 (ton/yr)
South Coast Air Basin							
SOCAB	VR-1265	3%	0.0	0.0	0.0	0.0	0.0
	VR-1257	3%	0.3	0.0	0.0	0.0	0.0
	VR-1217	1%	0.0	0.0	0.0	0.0	0.0
Total For SOCAB			0.3	0.0	0.0	0.0	0.0

Mojave Desert Air Basin							
MDAB	IR-214	30%	0.3	0.0	0.0	0.0	0.1
	IR-217	80%	12.1	0.3	1.3	0.8	3.7
	VR-289	62%	28.9	1.1	8.4	2.5	9.8
	VR-296	62%	34.2	1.5	11.3	3.6	18.4
	VR-1217	99%	0.0	0.0	0.0	0.0	0.0
	VR-1257	29%	3.0	0.1	0.3	0.2	0.3
	VR-1265	87%	0.0	0.0	0.0	0.0	0.0
Total For MDAB			78.6	2.9	21.3	7.2	32.2

Salton Sea Air Basin							
SSAB	IR-217	18%	2.7	0.1	0.3	0.2	0.8
	VR-289	37%	17.3	0.6	5.0	1.5	5.8
	VR-296	20%	11.0	0.5	3.7	1.2	5.9
	VR-1257	14%	1.5	0.0	0.1	0.1	0.1
	VR-1265	3%	0.0	0.0	0.0	0.0	0.0
Total For SSAB			32.5	1.2	9.1	2.9	12.7

South Central Coast Air Basin							
SCCAB	VR-1257	14%	1.5	0.0	0.1	0.1	0.1
	VR-1265	7%	0.0	0.0	0.0	0.0	0.0
Total For SCCAB			1.5	0.0	0.1	0.1	0.1

San Diego Air Basin							
SDAB	IR-217	1%	0.2	0.0	0.0	0.0	0.0
	VR-289	1%	0.5	0.0	0.1	0.0	0.2
	VR-1257	14%	1.5	0.0	0.1	0.1	0.1
Total For SDAB			2.1	0.0	0.3	0.1	0.3

Table 8 - Emissions by Region - Baseline - Continued

Overflying MTR			NOx (ton/yr)	HC (ton/yr)	CO (ton/yr)	SO2 (ton/yr)	PM10 (ton/yr)
San Joaquin Valley Air Basin							
SJVAB	VR-1257	9%	0.9	0.0	0.1	0.1	0.1
Total For SJVAB			0.9	0.0	0.1	0.1	0.1
North Central Coast Air Basin							
NCCAB	VR-1257	17%	1.8	0.0	0.1	0.1	0.2
Total For NCCAB			1.8	0.0	0.1	0.1	0.2
Las Vegas Intrastate AQCR							
LV AQCR	IR-217	1%	0.2	0.0	0.0	0.0	0.0
Total For LV AQCR			0.2	0.0	0.0	0.0	0.0
Mojave-Yuma AQCR							
M-Y AQCR	IR-214	44%	0.4	0.0	0.0	0.0	0.2
	VR-296	18%	9.9	0.4	3.3	1.0	5.3
Total For M-Y AQCR			10.4	0.4	3.3	1.1	5.5
Northern Arizona AQCR							
N AZ AQCR	IR-214	26%	0.3	0.0	0.0	0.0	0.1
Total For N AZ AQCR			0.3	0.0	0.0	0.0	0.1

	NOx	HC	CO	SO2	PM10
Checksum - Total of Table 8	128.36	4.72	34.35	11.61	51.42
Total of Table 5	128.36	4.72	34.35	11.61	51.42

Table 9 - Emissions by Region

Impact of Proposed Action (Delta) - by MTR

Net changes to emissions from traffic on each route are allocated to the underlying area based on the percent of the route length above each area.

Totals of this table will match the total net changes by Route presented in Table 7.

ton/yr = (total tpy for this MTR/pollutant from Table 7) * (percent of this MTR over this area)

	Overflying MTR	Percent	NOx (ton/yr)	HC (ton/yr)	CO (ton/yr)	SO2 (ton/yr)	PM10 (ton/yr)
South Coast Air Basin							
SOCAB	VR-1265	3%	0.4	0.0	0.0	0.0	0.1
	VR-1257	3%	0.4	0.0	0.0	0.0	0.1
	VR-1217	1%	0.0	0.0	0.0	0.0	0.0
Total For SOCAB			0.8	0.0	0.1	0.1	0.3

Mojave Desert Air Basin							
MDAB	IR-214	30%	1.5	0.0	0.1	0.1	0.3
	IR-217	80%	12.7	0.2	0.5	0.6	2.4
	VR-289	62%	-8.6	-0.4	-3.3	-1.0	-5.6
	VR-296	62%	-25.7	-1.2	-9.4	-3.0	-16.5
	VR-1217	99%	3.5	0.1	0.3	0.2	1.2
	VR-1257	29%	4.0	0.1	0.3	0.3	1.4
	VR-1265	87%	11.0	0.2	0.9	0.7	3.8
Total For MDAB			-1.7	-1.1	-10.7	-2.2	-13.1

Salton Sea Air Basin							
SSAB	IR-217	18%	2.9	0.0	0.1	0.1	0.5
	VR-289	37%	-5.1	-0.3	-2.0	-0.6	-3.4
	VR-296	20%	-8.3	-0.4	-3.0	-1.0	-5.3
	VR-1257	14%	1.9	0.0	0.1	0.1	0.7
	VR-1265	3%	0.4	0.0	0.0	0.0	0.1
Total For SSAB			-8.3	-0.6	-4.7	-1.3	-7.4

South Central Coast Air Basin							
SCCAB	VR-1257	14%	1.9	0.0	0.1	0.1	0.7
	VR-1265	7%	0.9	0.0	0.1	0.1	0.3
Total For SCCAB			2.8	0.1	0.2	0.2	1.0

AQCR	MTR	Percent	(ton/yr)	(ton/yr)	(ton/yr)	(ton/yr)	(ton/yr)
San Diego Air Basin							
SDAB	IR-217	1%	0.2	0.0	0.0	0.0	0.0
	VR-289	1%	-0.1	0.0	-0.1	0.0	-0.1
	VR-1257	14%	1.9	0.0	0.1	0.1	0.7
Total For SDAB			1.9	0.0	0.1	0.1	0.6

Table 9 - Emissions by Air Quality Control Region (AQCR) - Delta - Continued

Overflying			NOx	HC	CO	SO2	PM10
San Joaquin Valley Air Basin							
SJVAB	VR-1257	9%	1.2	0.0	0.1	0.1	0.4
Total For SJVAB			1.2	0.0	0.1	0.1	0.4
North Central Coast Air Basin							
NCCAB	VR-1257	17%	2.3	0.0	0.2	0.1	0.8
Total For NCCAB			2.3	0.0	0.2	0.1	0.8
Las Vegas Intrastate AQCR							
LV AQCR	IR-217	1%	0.2	0.0	0.0	0.0	0.0
Total For LV AQCR			0.2	0.0	0.0	0.0	0.0
Mohave-Yuma AQCR							
M-Y AQCR	IR-214	44%	2.2	0.0	0.1	0.1	0.4
	VR-296	18%	-7.5	-0.4	-2.7	-0.9	-4.8
Total For M-Y AQCR			-5.3	-0.3	-2.6	-0.8	-4.4
Northern Arizona AQCR							
N AZ AQCR	IR-214	26%	1.3	0.0	0.0	0.1	0.2
Total For N AZ AQCR			1.3	0.0	0.0	0.1	0.2

	NOx	HC	CO	SO2	PM10
Checksum - Total of Table 9	-4.77	-1.83	-17.34	-3.61	-21.47
Total of Table 7	-4.77	-1.83	-17.34	-3.61	-21.47

Conclusion: The Proposed Action will result in a net reduction of all pollutants emitted on MTR routes. This is because, as shown in Table 2, the C-17 training exercises are planned to use approximately 1/4 as much time flying on MTRs as the current C-141 training sorties.

Table 10 - Emissions by Air Quality Control Region (AQCR)
Impact of Proposed Action (Delta) - All MTRs Combined

This table is simply a condensed summary of Table 9

AQCR	Name	NOx (ton/yr)	HC (ton/yr)	CO (ton/yr)	SO2 (ton/yr)	PM10 (ton/yr)
SOCAB	South Coast Air Basin	0.8	0.0	0.1	0.1	0.3
SSAB	Salton Sea Air Basin	-8.3	-0.6	-4.7	-1.3	-7.4
MDAB	Mojave Desert Air Basin	-1.7	-1.1	-10.7	-2.2	-13.1
SCCAB	South Central Coast Air Basin	2.8	0.1	0.2	0.2	1.0
SDAB	San Diego Air Basin	1.9	0.0	0.1	0.1	0.6
SJVAB	San Joaquin Valley Air Basin	1.2	0.0	0.1	0.1	0.4
NCCAB	North Central Coast Air Basin	2.3	0.0	0.2	0.1	0.8
LV AQCR	Las Vegas Intrastate AQCR	0.2	0.0	0.0	0.0	0.0
M-Y AQCR	Mojave-Yuma AQCR	-5.3	-0.3	-2.6	-0.8	-4.4
N AZ AQCR	Northern Arizona AQCR	1.3	0.0	0.0	0.1	0.2
	TOTAL for All AQCRs	-4.77	-1.83	-17.34	-3.61	-21.47
	Checksums	-4.77	-1.83	-17.34	-3.61	-21.47

Table 11 - 1999 Air Basin and AQCR Point and Area Source Emission Inventories

Source: * US EPA - AIRData NET Tier Report

AQCR	Name	NOx (ton/yr)	HC (ton/yr)	CO (ton/yr)	SO2 (ton/yr)	PM10 (ton/yr)
SOCAB	South Coast Air Basin	505,723	330,114	2,525,710	38,678	158,114
SSAB	Salton Sea Air Basin	32,694	21,257	159,223	1,545	36,218
MDAB	Mojave Desert Air Basin	116,810	66,836	433,169	8,181	65,926
SCCAB	South Central Coast Air Basin	130,764	45,511	324,026	21,532	64,935
SDAB	San Diego Air Basin	116,430	81,719	615,683	5,951	105,429
SJVAB	San Joaquin Valley Air Basin	155,122	103,924	667,765	12,257	217,463
NCCAB	North Central Coast Air Basin	29,067	23,781	162,759	1,652	58,146
LV AQCR	Las Vegas Intrastate AQCR	94,410	53,913	350,402	50,631	67,265
M-Y AQCR	Mojave-Yuma AQCR	24,434	19,526	140,309	1,378	22,528
N AZ AQCR	Northern Arizona AQCR	197,559	69,940	711,437	114,902	119,476

The emissions associated with the Proposed Action in each region are compared to the total regional air emission inventory of that region as a measure of significance of the Proposed Action.

Table 12 - Impact of Baseline MTR Emissions by Region - All MTRs Combined

This table is simply a condensed summary of Table 8

AQCR	Name	NOx (ton/yr)	HC (ton/yr)	CO (ton/yr)	SO2 (ton/yr)	PM10 (ton/yr)
SOCAB	South Coast Air Basin	0.31	0.01	0.03	0.02	0.03
SSAB	Salton Sea Air Basin	32.47	1.21	9.08	2.94	12.73
MDAB	Mojave Desert Air Basin	78.55	2.93	21.29	7.15	32.23
SCCAB	South Central Coast Air Basin	1.46	0.02	0.12	0.09	0.14
SDAB	San Diego Air Basin	2.08	0.05	0.27	0.14	0.35
SJVAB	San Joaquin Valley Air Basin	0.94	0.02	0.08	0.06	0.09
NCCAB	North Central Coast Air Basin	1.77	0.03	0.15	0.11	0.17
LV AQCR	Las Vegas Intrastate AQCR	0.15	0.00	0.02	0.01	0.05
M-Y AQCR	Mojave-Yuma AQCR	10.36	0.44	3.31	1.08	5.52
N AZ AQCR	Northern Arizona AQCR	0.26	0.01	0.01	0.02	0.11
		128.36	4.72	34.35	11.61	51.42

Table 13 - Baseline Emissions - Percents of Total Regional Emissions Inventories

(MTR emissions by Region)/(Regional Inventory)

AQCR	Name	NOx (ton/yr)	HC (ton/yr)	CO (ton/yr)	SO2 (ton/yr)	PM10 (ton/yr)
SOCAB	South Coast Air Basin	0.000%	0.000%	0.000%	0.000%	0.000%
SSAB	Salton Sea Air Basin	0.099%	0.006%	0.006%	0.190%	0.035%
MDAB	Mojave Desert Air Basin	0.067%	0.004%	0.005%	0.087%	0.049%
SCCAB	South Central Coast Air Basin	0.001%	0.000%	0.000%	0.000%	0.000%
SDAB	San Diego Air Basin	0.002%	0.000%	0.000%	0.002%	0.000%
SJVAB	San Joaquin Valley Air Basin	0.001%	0.000%	0.000%	0.000%	0.000%
NCCAB	North Central Coast Air Basin	0.006%	0.000%	0.000%	0.006%	0.000%
LV AQCR	Las Vegas Intrastate AQCR	0.000%	0.000%	0.000%	0.000%	0.000%
M-Y AQCR	Mojave-Yuma AQCR	0.042%	0.002%	0.002%	0.078%	0.024%
N AZ AQCR	Northern Arizona AQCR	0.000%	0.000%	0.000%	0.000%	0.000%

Conclusion: The greatest relative impact of current MTRs is their contribution to the Salton Sea Air Basin Inventory, where they contribute 0.1% of the regional NOx and 0.2% of regional SO2.
The relative contribution of MTRs is greatest in this area because the regional inventory for that region (Imperial County in the southeast corner of California) is relatively small.
These impacts will be REDUCED with the proposed action because a major portion of the C-141 training activities occur in this region. The maximum relative regional contribution to any region under the proposed action will be only 0.01% of any pollutant in any region (see Table 12).

Desert Center Drop Zone

VR-296 is the primary MTR for accessing the Desert Center DZ. IR-214, IR-217, and VR-1265 also pass within 10 NM of the Drop Zone.

The Desert Center Drop Zone is located in eastern Riverside County, in the Mojave Desert Air Basin, in an area of the air basin that is in federal attainment for all criteria air pollutants.

An environmental assessment was done for the Desert Center Drop Zone in August of 1995 (March.07 #11). This assessment reflected a reduction in overall drop zone traffic, coinciding with the addition of a small number of C-17 sorties.

Airdrop Passes Assessed in the 1995 Environmental Assessment

	Maximum Number of Passes					Annual
Aircraft	1 hr	3 hr	8 hr	24 hr	Annual	Sorties
C-141	6	6	6	12	600	150
C-130	0	2	2	4	36	18
C-17	0	2	2	2	12	6

Ref: Table 4-2 "Environmental Assessment of the Desert Center Drop Zone for the 452nd Air Mobility Wing", March Air Force Base, California, August 1995.

Airdrop Passes Assessed for the Current Environmental Assessment

Current

		Maximum Number of Passes					Annual
Unit	Aircraft	1 hr	3 hr	8 hr	24 hr	Annual	Sorties
452 AMW	C-141B	8	16	16	16	512	128
Other	C-141B	4	8	8	8	88	22
Other	C-130	(a)	(a)	2	2	36	18
452 AMW	C-17						
Other	C-17	(a)	(a)	2	2	12	6
						648	174

Proposed

		Maximum Number of Passes					Annual
Unit	Aircraft	1 hr	3 hr	8 hr	24 hr	Annual	Sorties
452 AMW	C-141B						
Other	C-141B						
Other	C-130	(a)	(a)	2	2	36	18
452 AMW	C-17	3	9	9	9	180	60
Other	C-17	1	3	3	3	12	6
						228	84

a) Assumes that the C-130s and C-17s would not use the DZ during a 3-hour period when C-141s are doing back-to-back multi-plane formation airdrops.

Ref: Annual total Sorties and Passes from Table A-6 of the October 2002 DOPA for this Proposed Action. Assumptions regarding pass frequency on next page.

Assumptions for Airdrop Pass Traffic:

The airdrop mission and training for C-17s at March ARB have not been defined. However C-17 airdrop sorties are not expected to be multi-plane formations as was common with the

C-141 airdrop sorties.
The 452 AMW C-141 crews would normally fly a two-aircraft formation airdrop on two consecutive days every two weeks. One day per per month they would fly a three-aircraft formation in place of the two-aircraft formation. Once per calendar quarter they would fly a four to six-aircraft formation in place of the two-aircraft formation. The total was 128 sorties. At an average of 4 airdrop passes per sortie, that worked out to a total of 512 passes per year. The six-aircraft formations may involve non-452 AMW aircraft.
The sortie and pass totals projected in the DOPA indicate that the C-17s would average three passes per sortie.
The short-term maximum passes modeling done for this analysis assumed four-aircraft formations with four airdrop passes in a day for C-141s. For the C-17s, formation drops are not assumed, but the three airdrop passes per sortie are assumed to occur within a single hour.

For the Drop Zone current and projected emissions inventories (tons per year) estimates, the C-141 aircraft formations will be assumed to execute approximately two drop passes per hour, and thus would use two hours of flight time per sortie (beyond normal flying time on the MTR). C-17 aircraft flying individually are assumed to complete their three airdrop passes in about 45 minutes, thus using about 3/4 hour of flying time per sortie (beyond normal flying time on the MTR). *Note that these values are assumptions only. No tabulated data were identified regarding typical durations and frequencies of airdrop passes.*

Altitudes and Speeds Modeled

Table 2-1 of the August 1995 Drop Zone EA indicated that C-141s passed over the drop zone at 130-150 knots, 60-70% power, at no less than 500' AGL.

Table A-7 of the October 2002 e2M Second Site Visit Trip Report indicates that the C-17s may pass over the drop zone as low as 300' AGL (higher for night time air drops). This is the same altitude modeled for the MTRs. The C-17 Run-In Profile indicates that the C-17s would pass over the Drop Zone at 130 to 160 knots at 65% to 75% thrust.

For the MAILS modeling (ground-level pollutant concentrations), the C-141 airdrop passes over the drop zone will be modeled at:

150 knots	70% thrust	500' AGL

The C-17 airdrop passes over the drop zone will be modeled at:

150 knots	70% thrust	300' AGL

MAILS Modeling of Maximum Air Pollutant Impacts At the Desert Center Drop Zone

After a review of the data above, it was determined that MAILs modeling would not be necessary. Total sortie traffic at the intersection of MTR routes (which was modeled) is potentially higher than than maximum expected traffic at the drop zone, and overall drop zone traffic is projected to decrease with the Proposed Action for all averaging periods.

Estimates of Annual Emissions at the Desert Center Drop Zone

Emissions associated with Drop Zone Activities include low-level aircraft flights as well as some passenger car and heavy duty truck traffic to transport personnel and to retrive dropped materials.

Emission Factors For Aircraft Using the Desert Center Drop Zone

Aircraft	# Eng.	Engine	Fuel (Mlb/min)	NOx (lb/Mlb)	HC (lb/Mlb)	CO (lb/Mlb)	SO2 (lb/Mlb)	PM10 (lb/Mlb)
C-130	4	T56-A-15	0.0363	9.69	0.42	1.65	0.96	1.46
C-141	4	TF33-PW-7A	0.1272	8.47	0.39	2.96	0.96	5.29
C-17	4	F117--PW-100	0.1820	30.02	0.21	0.36	0.96	2.31

Ref: AFIERA 2001, Air Emissions Inventory Guidance Document for Mobile Sources at Air Force Installations, July 2001. PM10 values are Total (as opposed to filterable) PM10. "Climbout" emission factors used for drop zone traffic.

Current Aircraft Operations Emission Estimates for at the Desert Center Drop Zone

Aircraft	Annual Passes	Minutes/ Pass	NOx (lb/yr)	HC (lb/yr)	CO (lb/yr)	SO2 (lb/yr)	PM10 (lb/yr)
C-130	36	15	190	8	32	19	29
C-141	600	30	19,392	893	6,777	2,198	12,111
C-17	12	15	983	7	12	31	76
Totals	648	60	20,565	908	6,821	2,248	12,216

Proposed Aircraft Operations Emission Estimates for at the Desert Center Drop Zone

Aircraft	Annual Passes	Minutes/ Pass	NOx (lb/yr)	HC (lb/yr)	CO (lb/yr)	SO2 (lb/yr)	PM10 (lb/yr)
C-130	36	15	190	8	32	19	29
C-141	0	30	0	0	0	0	0
C-17	192	15	15,734	110	189	503	1,211
Totals	228	60	15,924	118	221	522	1,239

Emission Estimates for Motor Vehicle Traffic Associated with the Desert Center Drop Zone

The volume and type of motor vehicle traffic would depend on the type of air drop mission. The drop zone support team consists of one to six people (depending on type of drop) using a 4-wheel-drive forklift and a flat bed truck to retrieve the dropped materials.

Air drops conducted at Desert Center include:

- Personnel airdrops (PERS) involve dropping 2 to 15 people from altitudes ranging from 800 to 1,500 feet AGL. These have historically accounted for less than 10% of all airdrops.
- Heavy equipment airdrops (HE) involve dropping single or multiple palletized platforms weighing from 1,000 to 5,000 lbs, from altitudes ranging from 500 to 1,250 ft AGL.
- Container delivery System (CDS) airdrops involve dropping single or multiple A-22 type paletized containers weighing 1,000 to 2,200 lbs from altitudes ranging from 500 to 800 ft AGL.
- Standard airdrop training bundles (SATB) which are 15-lb sand bags dropped from 400 to 1,000 ft AGL.
- Door bundle (DB) airdrops are single A-7A or A-21 containers

Assumptions used for Motor Vehicle Emissions Estimates

The air emissions contribution from motor vehicles is a relatively tiny fraction of the overall air emissions associated with the drop zone. These emissions will be estimated using the following simple assumptions:

- Each air drop sortie requires, on average, two hours of forklift operation.
- Each air drop sortie requires, on average, one passenger vehicle trip and one diesel truck trip from March ARB to Desert Center Drop Zone and back. (approximately 300 miles round trip)

Emission Factors For Motor Vehicles Associated with the Desert Center Drop Zone

Vehicle		NOx	HC	CO	SO2	PM10
Heavy Duty Diesel Truck	grams/mi	8.2	2	11.5	0.512	7.73
Heavy Passenger Vehicle	grams/mi	1.2	0.9	12.9	0.098	2.58
4-WD Forklift	grams/hr	415	50	175	60	36

Reference for truck and passenger vehicle emssion factors: U.S. EPA MOBILE5 model emission factors for vehicles built in the 1990s, operated at low altitudes, as tabulated in Tables 4-2 through 4-53, Reference for forklift emission factors: EPA emission factors for an off-road forklift with an average 50 HP load on a 100-150 HP diesel engine, as tabulated in Table 7-6 of the following reference: "Air Emissions Inventory Guidance Document for Mobile Sources and Air Force Installations" Air Force Institute for Environmental Safety and Occupational Health Risk Analysis (AFIERA), July 2001.

Current Motor Vehicle Operations Emission Estimates for the Desert Center Drop Zone

Vehicle	Annual Sorties	NOx (lb/yr)	HC (lb/yr)	CO (lb/yr)	SO2 (lb/yr)	PM10 (lb/yr)
HD Diesel Truck	174	944	230	1,323	59	890
HD Passenger Vehicle	174	138	104	1,485	11	297
4-WD Forklift	174	318	38	134	46	28
Totals		1,400	372	2,942	116	1,214

Proposed Motor Vehicle Operations Emission Estimates for the Desert Center Drop Zone

Vehicle	Annual Sorties	NOx (lb/yr)	HC (lb/yr)	CO (lb/yr)	SO2 (lb/yr)	PM10 (lb/yr)
HD Diesel Truck	84	456	111	639	28	429
HD Passenger Vehicle	84	67	50	717	5	143
4-WD Forklift	84	154	18	65	22	13
Totals		676	179	1,420	56	586

Passenger vehicle and truck emissions are split between the Mojave Desert Air Basin and the South Coast Air Basin. However, their contribution is so small that it will not be addressed in other tables.

Total Current Emissions Associated with the Desert Center Drop Zone

Vehicle	NOx (lb/yr)	HC (lb/yr)	CO (lb/yr)	SO2 (lb/yr)	PM10 (lb/yr)
Aircraft	20,565	908	6,821	2,248	12,216
Motor Vehicles	1,400	372	2,942	116	1,214
Totals	21,965	1,280	9,763	2,364	13,430

Total Proposed Emissions Associated with the Desert Center Drop Zone

Vehicle	NOx (lb/yr)	HC (lb/yr)	CO (lb/yr)	SO2 (lb/yr)	PM10 (lb/yr)
Aircraft	15,924	118	221	522	1,239
Motor Vehicles	676	179	1,420	56	586
Totals	16,600	298	1,641	578	1,825

	NOx	HC	CO	SO2	PM10
Net Change in Emissions (ton/yr)	**-2.7**	**-0.5**	**-4.1**	**-0.9**	**-5.8**

Tables for Section 4 of the EA
Regional Significance Determinations for the Military Training Routes (MTRs) by Air Basin or Air Quality Control Region

NOTE: Because the proposed action emissions are three orders of magnitude (or more) below significance in each region, (when compared to 1999 actual emissions) this analysis was not carried out on a SIP target year (e.g., 2005, 2007, 2009) basis, as these results will not be materially impacted by the planned growth/reduction in non-attainment area emissions over this 5-year period.

Also note that this analysis uses as geographic boundrys for the affected "Regions" the Air Quality Control Regions (AQCRs) defined in 40 CFR81 for Arizona and Nevada, but uses the California Air Basins, as defined by the California Air Resources Board, in California. The boundries of the federal AQCRs generally coincide with the boundries of the California Air Basins, but the Air Basins subdivide the AQCRs (e.g. the Salton Sea and the Mojave Desert Air Basins combined make up the federal Southeast Desert Intrastate AQCR). There are 15 California Air Basins but only 11 federal AQCRs in California. The Air Basin boundries more closely coincide with the boundries of the attainment areas and the varying degrees of nonattainment areas within California. This is consistant with the way that 40 CFR81 describes these air quality regions. Because of the way that the AQCRs and air basins are defined, the regions treated as non-attainment for this analysis will approximately (though not precisely) correspond to the specific geographic areas defined by EPA to be in attainment or in specific degrees of non-attainment the ambient air quality standards.

In order to simplify the tables, Proposed Action emissions from March ARB and the Desert Center Drop Zone were not included in the Mojave Desert and SOCAB air basin analyses below. Because those two aspects of the Proposed Action are both projected to result in net emissions reductions, inclusion of those values would reduce (or or show more net benefit than) the impacts presented here.

The conformity analysis requires only that Proposed Action emissions be compared to de minimis values and regional inventories for non-attainment pollutants. For the environmental assessment, however, these tables included comparisons of Proposed Action emissions of attainment pollutants to the respective regional inventories. This is done as a qualitative measure of the significance of the Proposed Action in those areas.

Table 14a Nitrogen Oxides (NOx)

Name	Ozone* Attainment Status	Total 1999 Regional Inv. (tpy)	NOx De Minimus (tpy)	Proposed Action (delta tpy)	Proposed Action % of Inventory
North Central Coast Air Basin	Maintenance	29,067	100	2.32	0.0080%
South Central Coast Air Basin	Severe**	130,764	25	2.80	0.0021%
South Coast Air Basin	Extreme	505,723	10	0.83	0.0002%
San Diego Air Basin	Serious	116,430	50	1.93	0.0017%
Salton Sea Air Basin	Severe	32,694	25	-8.28	-0.0253%
Mojave Desert Air Basin	Severe	116,810	25	-1.72	-0.0015%
San Joaquin Valley Air Basin	Severe	155,122	25	1.23	0.0008%
Las Vegas Intrastate AQCR	Attainment	94,410	Not Applic.	0.16	0.0002%
Mojave-Yuma AQCR	Attainment	24,434	Not Applic.	-5.32	-0.0218%
Northern Arizona AQCR	Attainment	197,559	Not Applic.	1.27	0.0006%

- footnotes on next page -

*There are no NOx (NO_2) nonattainment areas. The de minimis threshold for NOx emissions is defined by the ozone attainment status.

**Where areas within an air basin or AQCR have different attainment status, the worst-case status was used for this table.

Table 14b Volatile Organic Compounds (VOC)

Name	Ozone* Attainment Status	Total 1999 Regional Inv. (tpy)	VOC De Minimus (tpy)	Proposed Action (delta tpy)	Proposed Action % of AQCR
North Central Coast Air Basin	Maintenance	23,781	100	0.05	0.0002%
South Central Coast Air Basin	Severe**	45,511	25	0.05	0.0001%
South Coast Air Basin	Extreme	330,114	10	0.02	0.0000%
San Diego Air Basin	Serious	81,719	50	0.03	0.0000%
Salton Sea Air Basin	Severe	21,257	25	-0.57	-0.0027%
Mojave Desert Air Basin	Severe	66,836	25	-1.12	-0.0017%
San Joaquin Valley Air Basin	Severe	103,924	25	0.02	0.0000%
Las Vegas Intrastate AQCR	Attainment	53,913	Not Applic.	0.00	0.0000%
Mojave-Yuma AQCR	Attainment	19,526	Not Applic.	-0.33	-0.0017%
Northern Arizona AQCR	Attainment	69,940	Not Applic.	0.02	0.0000%

*There is no VOC ambient air quality standard. The de minimis threshold for VOC emissions is defined by the ozone attainment status.

**Where areas within an air basin or AQCR have different attainment status, the worst-case status was used for this table.

Table 14c Carbon Monoxide (CO)

Name	CO Attainment Status	Total 1999 Regional Inv. (tpy)	CO De Minimus (tpy)	Proposed Action (delta tpy)	Proposed Action % of AQCR
North Central Coast Air Basin	Attainment	162,759	Not Applic.	0.18	0.0001%
South Central Coast Air Basin	Attainment	324,026	Not Applic.	0.22	0.0001%
South Coast Air Basin	Serious	2,525,710	100	0.06	0.0000%
San Diego Air Basin	Attainment	615,683	Not Applic.	0.10	0.0000%
Salton Sea Air Basin	Attainment	159,223	Not Applic.	-4.70	-0.0030%
Mojave Desert Air Basin	Attainment	433,169	Not Applic.	-10.71	-0.0025%
San Joaquin Valley Air Basin	Attainment	667,765	Not Applic.	0.10	0.0000%
Las Vegas Intrastate AQCR	Serious	350,402	100	0.01	0.0000%
Mojave-Yuma AQCR	Attainment	140,309	Not Applic.	-2.65	-0.0019%
Northern Arizona AQCR	Attainment	711,437	Not Applic.	0.05	0.0000%

Table 14d Sulfur Dioxide (SO2)

Name	SO2 Attainment Status	Total 1999 Regional Inv. (tpy)	SO2 De Minimus (tpy)	Proposed Action (delta tpy)	Proposed Action % of AQCR
North Central Coast Air Basin	Attainment	1,652	Not Applic.	0.15	0.0091%
South Central Coast Air Basin	Attainment	21,532	Not Applic.	0.18	0.0008%
South Coast Air Basin	Attainment	38,678	Not Applic.	0.05	0.0001%
San Diego Air Basin	Attainment	5,951	Not Applic.	0.11	0.0019%
Salton Sea Air Basin	Attainment	1,545	Not Applic.	-1.30	-0.0841%
Mojave Desert Air Basin	Attainment	8,181	Not Applic.	-2.18	-0.0267%
San Joaquin Valley Air Basin	Attainment	12,257	Not Applic.	0.08	0.0006%
Las Vegas Intrastate AQCR	Attainment	50,631	Not Applic.	0.01	0.0000%
Mojave-Yuma AQCR	Attainment	1,378	Not Applic.	-0.77	-0.0559%
Northern Arizona AQCR	Attainment	114,902	Not Applic.	0.06	0.0001%

Table 14e Particulate Matter Less than 10 Microns (PM10)

Name	PM10 Attainment Status	Total 1999 Regional Inv. (tpy)	PM10 De Minimus (tpy)	Proposed Action (delta tpy)	Proposed Action % of AQCR
North Central Coast Air Basin	Attainment	58,146	Not Applic.	0.81	0.0014%
South Central Coast Air Basin	Attainment	64,935	Not Applic.	0.97	0.0015%
South Coast Air Basin	Serious	158,114	70	0.29	0.0002%
San Diego Air Basin	Attainment	105,429	Not Applic.	0.60	0.0006%
Salton Sea Air Basin	Serious*	36,218	70	-7.36	-0.0203%
Mojave Desert Air Basin	Moderate	65,926	100	-13.08	-0.0198%
San Joaquin Valley Air Basin	Serious	217,463	70	0.43	0.0002%
Las Vegas Intrastate AQCR	Serious	67,265	70	0.03	0.0000%
Mojave-Yuma AQCR	Moderate	22,528	100	-4.39	-0.0195%
Northern Arizona AQCR	Attainment	119,476	Not Applic.	0.24	0.0002%

*Where areas within an air basin or AQCR have different attainment status, the worst-case status was used for this table.

References for Table 14 Data:
AQCR 1999 Inventory data are taken from Table 11.
Proposed Action delta emissions for each AQCR are taken from Table 10.
Regional attainment status is from: http://www.epa.gov/oar/oaqps/greenbk/ and
http://www.epa.gov/region09/air/maps/maps_top.html
De minimis thresholds are taken from: 40 CFR 93.153(b)(2)

Conclusion:

For all criteria pollutants in all overflown Air Basins and Air Quality Control Regions, the changes in emissions associated with the Proposed Action are all below the applicable de-minimus thresholds, and are less than 0.01% of the regional inventory for each pollutant (3 orders of magnitude below regional significance).

MAILS Dispersion Modeling of MTR Sorties

Class I Areas Potentially affected.
One of the MTRs to be used by the C-17s, VR-1257 crosses over the Ventura Wilderness in Monterey County.
Six of the seven MTRs, VR-1257, VR-289, VR-296, VR-1265, IR-217, and IR-214 all 'skirt the edge of Joshua Tree National Park. in one or more places. VR-1257, VR-289, VR-296, and, IR-217 intersect or nearly intersect near the southeast corner of Joshua Tree National Park. Therefore, as a worst-case scenario, combined impacts from those four routes have have been modeled using the MAILS dispersion model as though maximum aircraft traffic on all four routes actually passed over the Class I area at the same geographic point. That modeled impact will far exceed the impact that would be modeled for the single MTR that actually does cross over a Class I area.
A map showing the locations of the California Class I areas is available at http://www.epa.gov/region09/air/maps/ca_clss1.html
There are no Class I areas in Arizona or Nevada that are near (within 100 km of) the proposed MTRs. Maps of the Class I areas in Arizona and Nevada are available at http://www.epa.gov/region09/air/maps/az_clss1.html and http://www.epa.gov/region09/air/maps/nv_clss1.html, respectively.

Class II Areas Potentially affected.
The maximum air quality impacts from the MTRs will be at the route intersection modeled for Class I impacts, and at the Desert Center Drop zone. Because sortie-operations at the Drop Zone may include formation flying and up to three airdrop passes per sortie-operation, the short term traffic frequency will be greater at the Drop Zone than at the intersection of these MTRs. Therefore, the impacts at the Drop Zone will be modeled with the MAILs model to determine the maximum impacts at any Class II area.

Maximum MTR Traffic Frequencies Used for MAILS Dispersion Modeling

	Current Annual MTR Activity									Total	Proposed	Total
	C-141C (AFRC)	F/A-18C/D (Marine)	AV-8B (Marine)	F-14A/D (Navy)	A-6E (Navy)	S-3B (Navy)	TA-4/T-45 (Navy)	F-16 (AF)	Other	(Current)	C-17 (AFRC)	Proposed
MTRs												
IR-214	0	0	0	0	13	0	0	14	0	27	26	53
IR-217	**0**	**134**	**0**	**0**	**67**	**0**	**69**	**67**	**0**	**337**	**79**	**416**
VR-289	**220**	**467**	**389**	**127**	**89**	**71**	**44**	**0**	**110**	**1517**	**27**	**1324**
VR-296	**432**	**117**	**97**	**32**	**22**	**18**	**11**	**0**	**27**	**756**	**27**	**351**
VR-1217	0	0	0	0	0	0	0	3	0	3	79	82
VR-1257	**0**	**104**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**104**	**79**	**183**
VR-1265	0	0	0	0	0	0	0	0	0	0	79	79

Modeled Aircraft Sorties for the intersection of the routes that Border the Joshua Tree National Park (**Bolded** in Table above)

per 24-hr	7	9	5	2	2	1	2	1	2	31	8	32
per 8-hr	7	9	5	2	2	1	2	1	2	31	8	32
per 3-hr	4	5	3	1	1	1	1	1	1	18	5	19
per 1-hr	2	3	2	1	1	1	1	1	1	13	4	15

MAILS Modeling Traffic Frequency Assumptions

A schedule of 250 flying days per year is typical for most aircraft on these routes. Because the specific training schedules for these aircraft are not known and are subject to change, the following general assumptions were used to approximate "Busy Day" traffic:

per 24-hr = annual traffic/100 (rounded up)
per 8-hr = same as 'per 24-hour'
per 3-hr = 1/2 of 24-hour (rounded up)
per 1-hr = 1/4 of 24-hour (rounded up)

The exceptions to these formula assumptions are the C-17s, which will be modeled more conservatively.

Although each individual C-17 will use each MTR only 10 times each year (on average), it has been assumed that as a worst-case all 8 active C-17s may pass the modeled locations in the same 8-hour period, and half of them could pass the modeled location in the same 1-hour period. Therefore, although the Proposed Action will result in a decrease in annual traffic through this area, the modeling assumes the possibility that there could be increased traffic over short periods.

The short-term modeling assumptions are VERY conservative because they assume that the MTRs would be scheduled such that 24 planes (AFRC, Navy, and Marine) would pass by the same geographic point in the same hour.

Current C-141 traffic has been omitted from modeling of the Proposed Action maximum ground level impacts.

According to the MTR descriptions in Table A-5 of the October 2002 e2M "Second Site Visit Trip Report", IR-214 is only to be used on even-numbered days. However, this route does not border the Class I area, so this fact does not impact the MAILs modeling.

MAILS Modeled Altitudes

Class II Areas

Per page 2-21 of the January 2003 DOPA for the C-17 Beddown at March ARB, AFRC policy restricts the C-17 aircraft to fly no lower than 500' AGL unless the route has been environmentally assessed and surveyed for 300' AGL operations. According to Table 2-13 of the August 1995 MTR EA (MARB, 1995), the Navy and Marine aircraft using these routes are restricted to flying no less than 300' AGL with the exception of the TA-4 trainer, which is restricted to flying no less than 500' AGL. MAILS modeling done for this analysis assumes 300' AGL traffic for all aircraft using these routes.

Class I Areas

Air Force Instruction AFI 11-206 prohibits Air Force aircraft from flying:

> "Lower than 2,000 (turbojet) or 1,200 feet (turboprop) over National Park Areas, U.S. Fish and Wildlife Service (USFWS) areas, and U.S. Forest Service Wilderness and Primative areas as defined on the National Oceanic and Atmospheric Administration (NOAA) sectional aeronautical charts."

Therefore, modeling for the Class I area impacts will be done assuming all aircraft at 2000' AGL.

MARCH ARB MTR MODELED IMPACTS ON CLASS I AREAS

Pollutant CO No. of Aircraft (Types) : 8
Avg. Peri 1-hour Mixing Height : 3000 ft.

Aircraft	Altitude (ft)	Airspeed (mph)	Emiss. Rate (lb/hr)	Flight Freq.	1-hour Conc. (micrograms/m**3)
A4	2000	360	20.23	2	0.0282
A6	2000	450	40.46	1	0.0226
AV8	2000	475	63.9	2	0.0676
F14	2000	480	31.38	1	0.0164
F16	2000	450	8.18	1	0.0046
F18	2000	450	135	3	0.226
S3	2000	340	48.9	1	0.0361
C-17	2000	300	15.72	4	0.0526

Total 1-hour conc. = .4541

The total 1-hour conc. is 1.14E-03 % of the PSD
Class I 1-hour increment for CO (40000 micrograms/m**3)

The total 1-hour conc. is 1.14E-03 % of the NAAQS
Class I 1-hour increment for CO (4.00E+04 micrograms/m**3)

Pollutant CO No. of Aircraft (Types) : 8
Avg. Peri 8-hour Mixing Height : 3000 ft.

Aircraft	Altitude (ft)	Airspeed (mph)	Emiss. Rate (lb/hr)	Flight Freq.	8-hour Conc. (micrograms/m**3)
A4	2000	360	20.23	4	0.0023
A6	2000	450	40.46	2	0.0019
AV8	2000	475	63.9	5	0.007
F14	2000	480	31.38	2	0.0014
F16	2000	450	8.18	1	0.0002
F18	2000	450	135	9	0.028
S3	2000	340	48.9	1	0.0015
C-17	2000	300	15.72	8	0.0043

Total 8-hour conc. = .0465

The total 8-hour conc. is 4.65E-04 % of the PSD
Class I 8-hour increment for CO (10000 micrograms/m**3)

The total 8-hour conc. is 4.65E-04 % of the NAAQS
Class I 8-hour increment for CO (1.00E+04 micrograms/m**3)

Pollutant **NO2** No. of Aircraft (Types) : 8
Avg. Peri **Annual** Mixing Height : 3000 ft.

Aircraft	Altitude (ft)	Airspeed (mph)	Emiss. Rate (lb/hr)	Flight Freq.	Annual Conc. (micrograms/m**3)
A4	2000	360	18.8	261	3.91E-05
A6	2000	450	37.6	176	4.22E-05
AV8	2000	475	51.83	486	0.0002
F14	2000	480	246.42	159	0.0002
F16	2000	450	50.08	67	2.14E-05
F18	2000	450	300	822	0.0016
S3	2000	340	17.1	89	1.28E-05
C-17	2000	300	1311.27	212	0.0027

Total annual conc. = .0047

The total annual conc. is .1892 % of the PSD
Class I annual increment for NO2 (2 micrograms/m**3)

The total annual conc. is .0047 % of the NAAQS
Class I annual increment for NO2 (1.00E+02 micrograms/m**3)

Pollutant **PART** No. of Aircraft (Types) : 8
Avg. Peri **24-hour** Mixing Height : 3000 ft.

Aircraft	Altitude (ft)	Airspeed (mph)	Emiss. Rate (lb/hr)	Flight Freq.	24-hour Conc. (micrograms/m**3)
A4	2000	360	4.76	4	0.0001
A6	2000	450	9.52	2	0.0001
AV8	2000	475	14.2	5	0.0004
F14	2000	480	123.43	2	0.0013
F16	2000	450	2.4	1	1.40E-05
F18	2000	450	30	9	0.0016
S3	2000	340	6	1	4.62E-05
C-17	2000	300	100.9	8	0.007

Total 24-hour conc. = .0107

The total 24-hour conc. is .1332 % of the PSD
Class I 24-hour increment for PART(8 micrograms/m**3)

The total 24-hour conc. is .0071 % of the NAAQS
Class I 24-hour increment for PART(1.50E+02 micrograms/m**3)

Pollutant **PART** No. of Aircraft (Types) : 8
Avg. Peri**Annual** Mixing Height : 3000 ft.

Aircraft	Altitude (ft)	Airspeed (mph)	Emiss. Rate (lb/hr)	Flight Freq.	Annual Conc. (micrograms/m**3)
A4	2000	360	4.76	261	9.89E-06
A6	2000	450	9.52	176	1.07E-05
AV8	2000	475	14.2	486	4.17E-05
F14	2000	480	123.43	159	0.0001
F16	2000	450	2.4	67	1.02E-06
F18	2000	450	30	822	0.0002
S3	2000	340	6	89	4.50E-06
C-17	2000	300	100.9	212	0.0002

Total annual conc. = .0005

The total annual conc. is .0137 % of the PSD
Class I annual increment for PART(4 micrograms/m**3)

The total annual conc. is .0011 % of the NAAQS
Class I annual increment for PART(5.00E+01 micrograms/m**3)

Pollutant **SO2** No. of Aircraft (Types) : 8
Avg. Peri**3-hour** Mixing Height : 3000 ft.

Aircraft	Altitude (ft)	Airspeed (mph)	Emiss. Rate (lb/hr)	Flight Freq.	3-hour Conc. (micrograms/m**3)
A4	2000	360	2.38	2	0.0006
A6	2000	450	4.76	1	0.0004
AV8	2000	475	7.1	3	0.0019
F14	2000	480	14.8	1	0.0013
F16	2000	450	5.11	1	0.0005
F18	2000	450	15	5	0.007
S3	2000	340	3	1	0.0004
C-17	2000	300	43.68	5	0.0305

Total 3-hour conc. = .0425

The total 3-hour conc. is .1698 % of the PSD
Class I 3-hour increment for SO2 (25 micrograms/m**3)

The total 3-hour conc. is .0033 % of the NAAQS
Class I 3-hour increment for SO2 (1.30E+03 micrograms/m**3)

Pollutant **SO2** No. of Aircraft (Types) : 8
Avg. Peri(**24-hour** Mixing Height : 3000 ft.

Aircraft	Altitude (ft)	Airspeed (mph)	Emiss. Rate (lb/hr)	Flight Freq.	24-hour Conc. (micrograms/m**3)
A4	2000	360	2.38	4	6.92E-05
A6	2000	450	4.76	2	5.53E-05
AV8	2000	475	7.1	5	0.0002
F14	2000	480	14.8	2	0.0002
F16	2000	450	5.11	1	2.97E-05
F18	2000	450	15	9	0.0008
S3	2000	340	3	1	2.31E-05
C-17	2000	300	43.68	8	0.003

Total 24-hour conc. = .0044

The total 24-hour conc. is .0873 % of the PSD
Class I 24-hour increment for SO2 (5 micrograms/m**3)

The total 24-hour conc. is .0012 % of the NAAQS
Class I 24-hour increment for SO2 (3.65E+02 micrograms/m**3)

Pollutant **SO2** No. of Aircraft (Types) : 8
Avg. Peri(**Annual** Mixing Height : 3000 ft.

Aircraft	Altitude (ft)	Airspeed (mph)	Emiss. Rate (lb/hr)	Flight Freq.	Annual Conc. (micrograms/m**3)
A4	2000	360	2.38	261	4.95E-06
A6	2000	450	4.76	176	5.34E-06
AV8	2000	475	7.1	486	2.08E-05
F14	2000	480	14.8	159	1.41E-05
F16	2000	450	5.11	67	2.18E-06
F18	2000	450	15	822	7.85E-05
S3	2000	340	3	89	2.25E-06
C-17	2000	300	43.68	212	8.85E-05

Total annual conc. = .0002

The total annual conc. is .0108 % of the PSD
Class I annual increment for SO2 (2 micrograms/m**3)

The total annual conc. is .0003 % of the NAAQS
Class I annual increment for SO2 (8.00E+01 micrograms/m**3)

MARCH ARB MTR MODELED IMPACTS ON CLASS II AREAS

Pollutant CO   No. of Aircraft (Types) :   8
Avg. Per: 1-hour Mixing Height   :   3000 ft.

Aircraft	Altitude (ft)	Airspeed (mph)	Emiss. Rate (lb/hr)	Flight Freq.	1-hour Conc. (micrograms/m**3)
A4	300	360	20.23	2	0.297
A6	300	450	40.46	1	0.2376
AV8	300	475	63.9	2	0.711
F14	300	480	31.38	1	0.1728
F16	300	450	8.18	1	0.048
F18	300	450	135	3	2.3783
S3	300	340	48.9	1	0.3801
C-17	300	300	15.72	4	0.5539

Total 1-hour conc. = 4.7786

The total 1-hour conc. is .0119 % of the PSD
Class I 1-hour increment for CO (40000 micrograms/m**3)

The total 1-hour conc. is .0119 % of the NAAQS
Class I 1-hour increment for CO (4.00E+04 micrograms/m**3)

Pollutant CO   No. of Aircraft (Types) :   8
Avg. Per: 8-hour Mixing Height   :   3000 ft.

Aircraft	Altitude (ft)	Airspeed (mph)	Emiss. Rate (lb/hr)	Flight Freq.	8-hour Conc. (micrograms/m**3)
A4	300	360	20.23	4	0.0245
A6	300	450	40.46	2	0.0196
AV8	300	475	63.9	5	0.0733
F14	300	480	31.38	2	0.0143
F16	300	450	8.18	1	0.002
F18	300	450	135	9	0.2943
S3	300	340	48.9	1	0.0157
C-17	300	300	15.72	8	0.0457

Total 8-hour conc. = .4893

The total 8-hour conc. is 4.89E-03 % of the PSD
Class I 8-hour increment for CO (10000 micrograms/m**3)

The total 8-hour conc. is 4.89E-03 % of the NAAQS
Class I 8-hour increment for CO (1.00E+04 micrograms/m**3)

Pollutan NO2 No. of Aircraft (Types) : 8
Avg. Per Annual Mixing Height : 3000 ft.

Aircraft	Altitude (ft)	Airspeed (mph)	Emiss. Rate (lb/hr)	Flight Freq.	Annual Conc. (micrograms/m**3)
A4	300	360	18.8	261	0.0004
A6	300	450	37.6	176	0.0004
AV8	300	475	51.83	486	0.0016
F14	300	480	246.42	159	0.0025
F16	300	450	50.08	67	0.0002
F18	300	450	300	822	0.0165
S3	300	340	17.1	89	0.0001
C-17	300	300	1311.27	212	0.028

Total annual conc. = .0498

The total annual conc. is 1.9904 % of the PSD
Class I annual increment for NO2 (2 micrograms/m**3)

The total annual conc. is .0498 % of the NAAQS
Class I annual increment for NO2 (1.00E+02 micrograms/m**3)

Pollutan PART No. of Aircraft (Types) : 8
Avg. Per 24-hour Mixing Height : 3000 ft.

Aircraft	Altitude (ft)	Airspeed (mph)	Emiss. Rate (lb/hr)	Flight Freq.	24-hour Conc. (micrograms/m**3)
A4	300	360	4.76	4	0.0015
A6	300	450	9.52	2	0.0012
AV8	300	475	14.2	5	0.0041
F14	300	480	123.43	2	0.0142
F16	300	450	2.4	1	0.0001
F18	300	450	30	9	0.0165
S3	300	340	6	1	0.0005
C-17	300	300	100.9	8	0.0741

Total 24-hour conc. = .1121

The total 24-hour conc. is 1.4013 % of the PSD
Class I 24-hour increment for PART(8 micrograms/m**3)

The total 24-hour conc. is .0747 % of the NAAQS
Class I 24-hour increment for PART(1.50E+02 micrograms/m**3)

Pollutant **PART** No. of Aircraft (Types) : 8
Avg. Per: **Annual** Mixing Height : 3000 ft.

Aircraft	Altitude (ft)	Airspeed (mph)	Emiss. Rate (lb/hr)	Flight Freq.	Annual Conc. (micrograms/m**3)
A4	300	360	4.76	261	0.0001
A6	300	450	9.52	176	0.0001
AV8	300	475	14.2	486	0.0004
F14	300	480	123.43	159	0.0012
F16	300	450	2.4	67	1.08E-05
F18	300	450	30	822	0.0017
S3	300	340	6	89	4.74E-05
C-17	300	300	100.9	212	0.0022

Total annual conc. = .0058

The total annual conc. is .1438 % of the PSD
Class I annual increment for PART(4 micrograms/m**3)

The total annual conc. is .0115 % of the NAAQS
Class I annual increment for PART(5.00E+01 micrograms/m**3)

Pollutant SO2 No. of Aircraft (Types) : 8
Avg. Per: **3-hour** Mixing Height : 3000 ft.

Aircraft	Altitude (ft)	Airspeed (mph)	Emiss. Rate (lb/hr)	Flight Freq.	3-hour Conc. (micrograms/m**3)
A4	300	360	2.38	2	0.0058
A6	300	450	4.76	1	0.0047
AV8	300	475	7.1	3	0.0197
F14	300	480	14.8	1	0.0136
F16	300	450	5.11	1	0.005
F18	300	450	15	5	0.0734
S3	300	340	3	1	0.0039
C-17	300	300	43.68	5	0.3206

Total 3-hour conc. = .4467

The total 3-hour conc. is 1.7869 % of the PSD
Class I 3-hour increment for SO2 (25 micrograms/m**3)

The total 3-hour conc. is .0344 % of the NAAQS
Class I 3-hour increment for SO2 (1.30E+03 micrograms/m**3)

Pollutant SO2 No. of Aircraft (Types) : 8
Avg. Per: 24-hour Mixing Height : 3000 ft.

Aircraft	Altitude (ft)	Airspeed (mph)	Emiss. Rate (lb/hr)	Flight Freq.	24-hour Conc. (micrograms/m**3)
A4	300	360	2.38	4	0.0007
A6	300	450	4.76	2	0.0006
AV8	300	475	7.1	5	0.0021
F14	300	480	14.8	2	0.0017
F16	300	450	5.11	1	0.0003
F18	300	450	15	9	0.0083
S3	300	340	3	1	0.0002
C-17	300	300	43.68	8	0.0321

Total 24-hour conc. = .0459

The total 24-hour conc. is .9188 % of the PSD
Class I 24-hour increment for SO2 (5 micrograms/m**3)

The total 24-hour conc. is .0126 % of the NAAQS
Class I 24-hour increment for SO2 (3.65E+02 micrograms/m**3)

Pollutant SO2 No. of Aircraft (Types) : 8
Avg. Per: Annual Mixing Height : 3000 ft.

Aircraft	Altitude (ft)	Airspeed (mph)	Emiss. Rate (lb/hr)	Flight Freq.	Annual Conc. (micrograms/m**3)
A4	300	360	2.38	261	5.21E-05
A6	300	450	4.76	176	5.62E-05
AV8	300	475	7.1	486	0.0002
F14	300	480	14.8	159	0.0001
F16	300	450	5.11	67	2.30E-05
F18	300	450	15	822	0.0008
S3	300	340	3	89	2.37E-05
C-17	300	300	43.68	212	0.0009

Total annual conc. = .0023

The total annual conc. is .1140 % of the PSD
Class I annual increment for SO2 (2 micrograms/m**3)

The total annual conc. is .0028 % of the NAAQS
Class I annual increment for SO2 (8.00E+01 micrograms/m**3)

*** US EPA - AirData NET Tier Report** http://www.epa.gov/air/data/nettier.html
6-Jan-2003 at 12:52:38 PM (USA Eastern time zone)
* NET Air Pollution Sources (1999) in Tons Per Year

				Point and Area Sources Combined						
		AQCR	Basin	CO	NOx	PM10	SO2	VOC	PM	NH3
Alameda Co	CA		SF Bay	298,756	50,647	32,774	4,410	40,279	10,507	2,262
Alpine Co	CA		GreatBasin	948	114	1,314	6	167	297	57
Amador Co	CA		Mtn Counti	32,161	2,991	11,938	119	3,401	4,324	894
Butte Co	CA		Sacrament	72,449	7,233	19,705	382	9,823	7,396	1,674
Calaveras Co	CA		Mtn Counti	30,974	2,034	14,003	101	3,262	4,520	779
Colusa Co	CA		Sacrament	28,344	4,247	11,338	107	3,116	3,886	1,411
Contra Costa Co	CA		SF Bay	193,583	49,361	30,265	14,447	28,595	9,339	3,867
Del Norte Co	CA		North Coas	42,020	3,175	10,522	163	3,798	4,761	567
El Dorado Co	CA			66,525	7,467	31,994	625	9,695	9,013	639
(25% of El Dorado)			Lake Taho	16,631	5,600	23,996	469	7,271	6,760	479
(75% of El Dorado)			Mtn Counti	49,894	1,867	7,999	156	2,424	2,253	160
Fresno Co	CA		San Joaqu	162,856	37,447	48,520	3,750	25,871	12,756	12,417
Glenn Co	CA		Sacrament	25,021	4,144	10,783	177	3,371	3,514	2,320
Humboldt Co	CA		North Coas	109,391	12,370	25,058	561	19,985	9,362	1,866
Imperial Co	CA	SE Dese	Salton Sea	54,002	12,760	18,747	608	7,735	5,082	10,464
Inyo Co	CA		GreatBasin	8,542	1,133	3,746	231	1,697	1,250	491
Kern Co	CA	split in two, San Joa		158,321	64,189	43,479	5,304	39,124	13,651	11,865
(1/2 of Kern Co)			San Joaqu	79,161	32,095	21,740	2,652	19,562	6,826	5,933
(1/2 of Kern Co)			Mojave De	79,161	32,095	21,740	2,652	19,562	6,826	5,933
Kings Co	CA		San Joaqu	35,685	9,618	19,563	370	5,040	5,247	7,003
Lake Co	CA		Sacrament	23,993	2,909	13,704	220	3,626	3,448	267
Lassen Co	CA		NE Plateau	29,048	2,794	11,272	229	4,546	3,595	1,618
Los Angeles Co	CA	split in two, mostly M		1,687,272	357,738	91,722	31,112	223,260	37,450	15,273
(95% of LA County)			South Coa	1,602,908	339,851	87,136	29,556	212,097	35,578	14,509
(5% of LA County)			Mojave De	84,364	17,887	4,586	1,556	11,163	1,873	764
Madera Co	CA		San Joaqu	30,090	6,389	13,996	521	4,771	4,267	3,515
Marin Co	CA		SF Bay	68,076	9,035	9,984	398	8,696	2,604	1,730
Mariposa Co	CA		Mtn Counti	42,547	3,524	10,187	153	2,940	4,653	712
Mendocino Co	CA		North Coas	68,871	7,589	25,336	521	11,642	7,884	1,292
Merced Co	CA		San Joaqu	62,657	10,332	28,885	749	7,937	7,530	12,408
Modoc Co	CA		NE Plateau	9,698	982	5,305	91	2,130	1,459	2,918
Mono Co	CA		GreatBasin	7,871	633	3,520	57	1,419	1,073	434
Monterey Co	CA		N Central C	88,257	18,386	34,224	906	13,041	8,049	4,174
Napa Co	CA		SF Bay	29,806	4,398	10,261	179	3,989	2,659	538
Nevada Co	CA		Mtn Counti	48,480	6,413	24,103	425	6,440	6,703	352
Orange Co	CA	Metro LA	South Coa	653,157	99,043	31,377	5,148	81,906	12,694	6,045
Placer Co	CA			82,275	12,632	31,542	657	11,779	8,826	1,127
(25% of Placer)			Lake Taho	20,569	9,474	23,657	493	8,834	6,620	846
(75% of Placer)			Mtn Counti	61,706	3,158	7,886	164	2,945	2,207	282
Plumas Co	CA		Mtn Counti	28,909	1,849	9,133	173	3,799	3,473	614
Riverside Co	CA	split in three, Metro		315,662	59,801	52,412	2,811	40,565	14,744	9,544
(1/3 of Riverside)			South Coa	105,221	19,934	17,471	937	13,522	4,915	3,181
(1/3 of Riverside)			Salton Sea	105,221	19,934	17,471	937	13,522	4,915	3,181
(1/3 of Riverside)			Mojave De	105,221	19,934	17,471	937	13,522	4,915	3,181
Sacramento Co	CA		Sacrament	224,763	37,966	25,376	1,660	30,907	7,668	5,494
San Benito Co	CA		N Central C	13,699	2,288	9,522	99	1,737	2,262	1,852
San Bernardino Co	CA	split in two, mostly S		328,848	93,790	44,260	6,073	45,178	14,989	11,633
(1/2 of San Bernardino)			South Coa	164,424	46,895	22,130	3,037	22,589	7,495	5,817
(1/2 of San Bernardino)			Mojave De	164,424	46,895	22,130	3,037	22,589	7,495	5,817
San Diego Co	CA		SanDiego	615,683	116,430	105,429	5,951	81,719	29,936	5,256
San Francisco Co	CA		SF Bay	143,746	33,908	15,497	4,118	20,021	4,715	827
San Joaquin Co	CA		San Joaqu	116,715	27,537	27,783	2,140	17,516	8,262	13,745
San Luis Obispo Co	CA		S Central C	66,946	11,539	22,977	4,077	9,820	5,786	3,233
San Mateo Co	CA		SF Bay	149,451	23,423	19,528	1,219	18,665	5,682	803
Santa Barbara Co	CA	Split bet	S Central C	106,463	55,448	17,933	8,695	15,810	6,325	2,886

Santa Clara Co	CA		SF Bay	365,762	61,118	48,565	2,759	43,831	14,622	2,377
Santa Cruz Co	CA		N Central C	60,803	8,393	14,400	647	9,003	3,940	650
Shasta Co	CA		Sacrament	91,998	12,257	29,324	921	12,464	9,504	1,153
Sierra Co	CA		Mtn Counti	6,881	704	2,737	73	659	924	306
Siskiyou Co	CA		NE Plateau	70,541	7,129	19,641	473	7,650	7,877	2,379
Solano Co	CA		SF Bay	74,406	18,447	18,050	7,019	14,139	4,844	2,435
Sonoma Co	CA			112,933	16,139	47,865	765	16,478	11,474	3,579
(1/2 of Sonoma)			North Coas	56,467	8,070	23,933	383	8,239	5,737	1,790
(1/2 of Sonoma)			SF Bay	56,467	8,070	23,933	383	8,239	5,737	1,790
Stanislaus Co	CA		San Joaqu	89,165	16,303	20,826	1,305	12,246	6,842	13,541
Sutter Co	CA		Sacrament	30,112	3,472	11,580	122	4,116	3,672	1,780
Tehama Co	CA		Sacrament	41,766	5,940	16,889	302	4,562	5,387	2,628
Trinity Co	CA		North Coas	15,472	1,044	4,963	52	1,846	1,976	268
Tulare Co	CA		San Joaqu	91,436	15,401	36,150	770	10,981	10,880	19,480
Tuolumne Co	CA		Mtn Counti	83,465	5,399	22,313	351	6,626	9,790	625
Ventura Co	CA	Metro LA	S Central C	150,617	63,777	24,025	8,760	19,881	7,083	1,327
Yolo Co	CA		Sacrament	43,869	9,198	16,238	416	6,478	4,288	1,566
Yuba Co	CA		Sacrament	18,329	2,735	8,815	163	2,597	2,449	657
	Totals			7,710,116	1,523,162	1,371,398	134,642	1,052,375	427,193	221,618

Notes:
Federal AQCRs tend to generally coincide with the California air basins, with a few exceptions:
The Metro LA AQCR includes all of the South Coast Air Basin, but it also includes Ventura County and south Santa Barbara County, which are part of the South Central Coast Air Basin.
The Southeast Desert AQCR includes the Salton Sea and Mojave Desert Air basins (all of southeastern California)
The South Central Coast AQCR is small, including only San Luis Obispo and northern Santa Barbara Counties.
The nonattainment area designations in 40CFR81 generally use AQCRs to describe the attainment status of regions of the United States. However, for California, 40CFR81 uses Air Basins as the frame of reference, rather than the federal AQCRs. Air Basins have been used as the regions of influence for this analysis.

Arizona and Nevada Counties Overflown by MTRs

Mojave Co	AZ		Mojave-Yu	80,302	11,446	9,771	640	9,609	-	900
Yuma Co	AZ		Mojave-Yu	60,007	12,988	12,757	738	9,917	-	2,722
Apache Co	AZ		N Ariz AQC	184,248	50,152	30,860	48,439	14,509	-	783
Coconino Co	AZ		N Ariz AQC	208,333	67,337	30,312	10,801	18,464	-	1,480
Navajo Co	AZ		N Ariz AQC	240,794	63,892	38,802	53,133	27,189	-	1,079
Yavapai Co	AZ		N Ariz AQC	78,062	16,178	19,502	2,529	9,778	-	2,054
Clark Co	NV		Las Vegas	350,402	94,410	67,265	50,631	53,913	-	2,154

1999 Air Emissions Inventories by Air Basin and AQCR
(values are approximated where air basin lines bisect counties)

		Point and Area Sources Combined						
	Air Basin/AQCR	**CO (tpy)**	**NOx (tpy)**	**PM10 (tpy)**	**SO2 (tpy)**	**VOC (tpy)**	**PM (tpy)**	**NH3 (tpy)**
	SF Bay	1,380,053	258,407	208,857	34,932	186,454	60,709	16,629
	GreatBasin	17,361	1,880	8,580	294	3,283	2,620	982
	Mtn Counties	385,017	27,939	110,298	1,716	32,496	38,847	4,724
	Sacramento	600,644	90,101	163,752	4,470	81,060	51,212	18,950
	North Coast	292,221	32,248	89,812	1,680	45,510	29,720	5,783
	Lake Tahoe	37,200	15,074	47,652	962	16,106	13,379	1,325
SJVAB	**San Joaquin**	667,765	155,122	217,463	12,257	103,924	62,610	88,042
SSAB	**Salton Sea**	159,223	32,694	36,218	1,545	21,257	9,997	13,645
MDAB	**Mojave Desert**	433,169	116,810	65,926	8,181	66,836	21,107	15,694
	NE Plateau	109,287	10,905	36,218	793	14,326	12,931	6,915
SOCAB	**South Coast**	2,525,710	505,723	158,114	38,678	330,114	60,681	29,552
NCCAB	**N Central Coast**	162,759	29,067	58,146	1,652	23,781	14,251	6,676
SDAB	**SanDiego**	615,683	116,430	105,429	5,951	81,719	29,936	5,256
SCCAB	**S Central Coast**	324,026	130,764	64,935	21,532	45,511	19,194	7,446
M-Y AQCR	**Mojave-Yuma AQCR**	140,309	24,434	22,528	1,378	19,526	-	3,622
N AZ AQCR	**N Ariz AQCR**	711,437	197,559	119,476	114,902	69,940	-	5,396
LV AQCR	**Las Vegas AQCR**	350,402	94,410	67,265	50,631	53,913	-	2,154

Attachment 3 to Appendix D - Conformity Analysis

March C-17 Airfield Emissions Spreadsheets

This workbook Contains Estimates of Emissions from Military Airfield Activities at March ARB.

Data	General Information supporting multiple calculations: airfield ops counts, etc.
LTOs&TGOs	Emissions from Airfield Ops - LTOs, TGOs, and Run-Ups
Summary	Basewide Emissions Summary Tables
March Budget	Discussion of the March SIP Budget

MTR and Construction Emissions Estimates are in separate workbooks

March ARB - C-17 EA - General Information and Statistics

Overview

Proposed Action is to replace the current fleet of 16 C-141s with 8 new C-17s
Concurrently, the 452 AMW's fleet of KC-135s will be reduced from 10 to 8.

Aircraft Fleet

16 C-141Cs (PW TF33 P-7 engines), assigned to the 452 AMW
10 KC-135R Cargo Planes, assigned to the 452 AMW

Airfield Annual Ops

An "Op" is one takeoff or one landing, or 1/2 of a closed pattern (round trip)

FY	Ops	
92	104,320	from 1997 Joint Use Feasibility Study
94	40,800	from 1997 Joint Use Feasibility Study
95	*78,406*	*? citation not determined, cannot verify this value. 1st quarter data from 1995 indicated activity similar to 1994.*
98	61,396	from 1998 AICUZ, includes 40,396 actual military and military-related, and 21,000 projected JPA
01		
02	70,770	from data provided in 2002 by March ARB, includes 21,000 projected JPA

Reference for total Airfield Ops: 1997 Joint Use Feasibility Study, 1998 March ARB AICUZ Study, and information supplied for the DOPPA.
The 98 and 02 data include the permitted 21,000 Ops per year for Civilian Aircraft by the JPA.
Based aircraft normally fly 5 days/wk, while transient and civilian aircraft fly 7 days/week

Airfield Operation Emissions (LTOs and TGOs)

Discussion of Airfield Operations

Of the stationary and mobile air emissions sources at March ARB, the source category most impacted by the Proposed Action will be airfield operations. Airfield operations include aircraft operated by 452 AMW, California Air Guard, and private aircraft that use the March Airfield through the Joint Powers Authority (JPA) agreement. There are also a limited number of transient military-related aircraft included in annual airfield operations.

Airfield operations include landings and takeoffs (LTOs) , which consist of
"Idle Out" as the aircraft rolls out to the runway and queues for takeoff;
"Takeoff" which is a short burst of full-power acceleration down the runway.
"Climbout" which is the climb from the runway to 3000 ft AGL (the 'mixing height' altitude above which emissions have little or no impact on ground-level air quality;
"Approach" which is the descent from 3000 ft to the runway, and braking;
Idle In" which is the taxi back to the apron or terminal.

Touch-and-Go (TGO) operations are practice landings and takeoffs. These operations are characterized in exactly the same way as LTOs, but with no idle time. Because the airplanes do not slow to a stop, there may also be no "takeoff" thrust required, only "approach" and "climbout".

Discussion of Aerospace Ground Equipment

A related source category that is expected to be moderately impacted by the Proposed Action is aerospace ground equipment (AGE). There are two AGE shops on base, one serving the Reserves aircraft and the other serving the Air Guard aircraft. AGE air emissions contribute approximately 10% of the mobile source emission inventory at March ARB.

The 40% reduction of the number of aircraft in the Air Reserves fleet is expected to result in a corresponding reduction in the number of allocated engines and in the overall activity of Reserves AGE equipment. New AGE equipment required specifically to support the C-17 will consist of several motorized scissors-lift platforms. Overall, the net effect of the Proposed Action on AGE emissions is expected to be a moderate reduction, on the order of 2-3% of the basewide mobile source inventory. This reduction has not been estimated for inclusion in the emissions tables in this analysis.

Assumptions Used in Emissions Estimates

The methodology and times-in-mode (TIM) minutes at each throttle setting used in this analysis are consistant with the values used in the "2000/2001 Air Emissions Inventory (Stationary and Mobile Sources), March Air Reserve Base, Riverside California" prepared by Ecology and Environment Inc. for March Air Reserve Base.
This document used current Air Force guidance for preparation of air emission inventories using all default assumptions with one exception: March AFB estimates for C-141s and KC-135s assume full thrust all the way through climbout. The fuel flows and emission factors used for the "take-off" mode are assigned to the "climbout" mode for these two aircraft.

Aircraft Descriptions and Airfield Activity Data

C-141C

				2001	2006	
16	assigned aircraft		LTO Ops	3,532	0	From the DOPPA
4	engines each		TGO Ops	22,644	0	From the DOPPA
TF33-PW-7A	engine model					

C-17

				2001	2006	
8	assigned aircraft		LTO Ops	0	1440	From the DOPPA
4	engines each		TGO Ops	0	2160	From the DOPPA
F117--PW-100	engine model					

KC-135R 452 AMW and 163 ARW (Guard) 10 ea.

				2001	2006	
20	assigned aircraft		LTO Ops	1,676	1,509	From the DOPPA
4	engines each		TGO Ops	17,828	16,405	From the DOPPA
F108-CF-100	engine model					

Emission Factors, Time-In-Mode, and Fuel Consumption Rates (per engine)

C-141C

	Fuel (Mlb/min)	LTO TIM (minutes)	TGO (minutes)	NOx (lb/Mlb)	HC (lb/Mlb)	CO (lb/Mlb)	SO2 (lb/Mlb)	PM (lb/Mlb)
Taxi Out	0.01758	9.2		1.5	131.16	136.96	0.96	6.13
Takeoff	0.15180	0.4		11.49	0.25	1.19	0.96	2.93
Climbout	0.15180	1.2	1.2	11.49	0.25	1.19	0.96	2.93
Approach	0.06643	5.1	5.1	6.22	3.62	14.6	0.96	5.46
Taxi In	0.01758	6.7		1.50	131.16	136.96	0.96	6.13

C-17

	Fuel (Mlb/min)	LTO TIM (minutes)	TGO (minutes)	NOx (lb/Mlb)	HC (lb/Mlb)	CO (lb/Mlb)	SO2 (lb/Mlb)	PM (lb/Mlb)
Taxi Out	0.01840	9.2		3.96	2.15	23.86	0.96	10.54
Takeoff	0.23293	0.04	0.04	34.3	0.03	0.4	0.96	2.31
Climbout	0.18198	1.56	1.56	30.02	0.21	0.36	0.96	2.31
Approach	0.07132	5.1	5.1	13.03	0.3	1.25	0.96	5.52
Taxi In	0.01840	6.7		3.96	2.15	23.86	0.96	10.54

TIMs reflect the fact that throttle setting would not be expected to exceed "climbout" setting for over 90% of take-offs from March ARB (ref: Major Golden if AMC, confirmed by Major Harris, 4 AF/DOV) See emission factor references for more detail.

KC-135R

	Fuel (Mlb/min)	LTO TIM (minutes)	TGO (minutes)	NOx (lb/Mlb)	HC (lb/Mlb)	CO (lb/Mlb)	SO2 (lb/Mlb)	PM (lb/Mlb)
Taxi Out	0.01893	32.8		3.94	0.92	27.19	0.96	9.08
Takeoff	0.10763	0.7		15.28	0.03	0.63	0.96	1.59
Climbout	0.10763	1.6	1.6	15.28	0.03	0.63	0.96	1.59
Approach	0.04245	5.2	5.2	6.96	0.04	6.39	0.96	1.55
Taxi In	0.01893	14.9		3.94	0.92	27.19	0.96	9.08

References:

Emission factors & TIM for C-141 from Section 3, AFIERA AEI Guidance for Mobile Sources, July 2001

Emission factors & TIM for C-17 from Section 3, AFIERA AEI Guidance for Mobile Sources, July 2001
TIM for takeoff was adjusted based on intervew with Major Golden of AMC Standardization Evaluation. Major Golden stated that the throttle setting is calculated by the computer, and that conditions demanding a full throttle takeoff would rarely (less than 10% of the time) occur on the March airfield. Normal fuel flow during takeoff will be approximately 30,000 lbs per hour for four engines (0.125 Mlb/min per engine), and approximately 25,000 lbs per hour for climbout (0.104 Mlb/min per engine). Therefore, the TIMs were adjusted to have full throttle only 10% of the time and "climbout" setting for the rest of take-offs.
Major Golden, AMC Standardization Evaluation HQ AMC DOAT 614-229-3659 1/11/02
e2M staff conferred with Major Timothy Harris of 4 AF/DOV who confirmed that these assumptions are also valid (and conservative) for March ARB airfield and for the Palmdale ALZ takeoffs.
Emission factors & TIM for KC-135 from Section 3, AFIERA AEI Guidance for Mobile Sources, July 200
Note: These TIMs assume an average mixing height of 3000 ft., and are the default values for USAF transport aircraft, with the exception of the KC-135 which has a model-specific TIM ref: Table 3-7, Section 3, AFIERA AEI Guidance for Mobile Sources, July 2001
SOx emission factors assume an average sulfur weight of 0.048% (used in 2000/2001 AEI)
Each set of LTO TIMs and TGO TIMs listed in the tables above corresponds to two ops: a complete landing and takeoff or a complete touch-and-go.

Calculations

lbs = (# engines)*(EF lb/Mlb fuel)*(fuel Mlb/min)*(TIM minutes)(total Ops/2) summed over all power settings

2001 Airfield Operation Emissions Estimates

C-141C **2001 Emissions Estimates**

	NOx (lbs)	HC (lbs)	CO (lbs)	SO2 (lbs)	PM (lbs)
LTOs	37,562	268,123	307,469	5,841	30,201
TGOs	190,228	57,608	233,840	22,650	107,950
Totals	227,791	325,731	541,309	28,491	138,151
	113.9	162.9	270.7	14.2	69.1

C-17 **2001 Emissions Estimates**

	NOx (lbs)	HC (lbs)	CO (lbs)	SO2 (lbs)	PM (lbs)
LTOs	0	0	0	0	0
TGOs	0	0	0	0	0
Totals	0	0	0	0	0

KC-135R **2001 Emissions Estimates**

	NOx (lbs)	HC (lbs)	CO (lbs)	SO2 (lbs)	PM (lbs)
LTOs	29,872	2,841	87,601	4,421	29,977
TGOs	148,606	499	54,162	13,451	21,963
Totals	178,478	3,340	141,763	17,872	51,940

Grand Total **2001 Emissions Estimates**

	NOx (lbs)	HC (lbs)	CO (lbs)	SO2 (lbs)	PM (lbs)
LTOs	67,434	270,964	395,070	10,262	60,178
TGOs	338,834	58,107	288,002	36,101	129,913
Totals	406,269	329,071	683,073	46,363	190,091
Total Tons per Year	**203**	**165**	**342**	**23**	**95**

2006 Airfield Operation Emissions Estimates

C-141C **2006 Emissions Estimates**

	NOx (lbs)	HC (lbs)	CO (lbs)	SO2 (lbs)	PM (lbs)
LTOs	0	0	0	0	0
TGOs	0	0	0	0	0
Totals	0	0	0	0	0

C-17 **2006 Emissions Estimates**

	NOx (lbs)	HC (lbs)	CO (lbs)	SO2 (lbs)	PM (lbs)
LTOs	42,451	2,298	21,718	2,625	16,614
TGOs	58,671	730	2,422	2,724	11,599
Totals	101,122	3,028	24,140	5,350	28,213

KC-135R **2006 Emissions Estimates**

	NOx (lbs)	HC (lbs)	CO (lbs)	SO2 (lbs)	PM (lbs)
LTOs	26,895	2,558	78,872	3,981	26,990
TGOs	136,745	459	49,839	12,377	20,210
Totals	163,640	3,017	128,711	16,358	47,200

Grand Total **2006 Emissions Estimates**

	NOx (lbs)	HC (lbs)	CO (lbs)	SO2 (lbs)	PM (lbs)
LTOs	69,346	4,856	100,591	6,606	43,603
TGOs	195,416	1,189	52,261	15,101	31,809
Totals	264,762	6,045	152,851	21,707	75,413
Total Tons per Year	**132**	**3**	**76**	**11**	**38**

Net Change: 2006 - 2001 tpy	-71	-162	-265	-12	-57

Target Year Calculations of LTO/TGO Emissions

The only emissions that are expected to change as a result of the Proposed Action are Airfield Operations, Construction, and MTR emissions. Airfield ops and associate emissions during the years from 2003 to 2006 are are expected to scale proportionally to the number of aircraft based in any year. This should be conservative because it is unlikely that every aircraft will have crew and support ready for a full training schedule the day it arrives.

C-141 Drawdown/C-17 Ramp-Up

Qtr/FY	Qtr/CY	C-141	C-17	Total
2/03	1/03	16	0	16
3/03	2/03	16	0	16
4/03	3/03	16	0	16
1/04	4/03	12	0	12
2/04	1/04	12	0	12
3/04	2/04	10	0	10
4/04	3/04	8	0	8
1/05	4/04	8	0	8
2/05	1/05	8	0	8
3/05	2/05	4	1	5
4/05	3/05	0	5	5
1/06	4/05	0	8	8

Ref: Table 2-1 of the January 2003 DOPA for the March ARB C-17 Beddown

Multipliers for Calendar Years to Adjust the Sorties by Scaling to Fleet on Base

	2003	**2004**	**2005**	**2006**	**2007**	
C-141	0.9375	0.5938	0.1875	0.0000	0.0000	Relative to 2001 Operations
C-17	0.0000	0.0000	0.4375	1.0000	1.0000	Relative to 2006 Operations
KC-135	-	-	-	-	-	See note below.

The multipliers above are used to 'scale' the contributions by C-141s and C-17s to the airfield emissions from the tables above, in order to generate intermediate year emissions estimates.

No schedule for removal of the two KC-135s is projected in the DOPA. Airfield operations are therefore assumed to continue at current levels until the beginning of 2006.

In the tables on the next page, the first (CY2001) and the last (CY2006) tables take their values directly from the totals in the detail tables above. The interim year tables (CY2002 through CY2005) use the scaling factors above to approximate interim year emissions.

Airfield Ops Emissions Estimates for Target Years

CY2001 (from detail tables above)

Model	Year	Total Ops	NOx (tons)	HC (tons)	CO (tons)	SO2 (tons)	PM (tons)	Notes
C-141C	2001	26,176	113.9	162.9	270.7	14.2	69.1	16 aircraft stationed
C-17	2001	0.0	0.0	0.0	0.0	0.0	0.0	0 aircraft stationed
KC-135R	2001	19,504	89.2	1.7	70.9	8.9	26.0	10 aircraft stationed
Total for 2001			**203.1**	**164.5**	**341.5**	**23.2**	**95.0**	
		checksum	203	329,071	683,073	46,363	190,091	

CY2003 (interpolated)

Model	Year	Estimated Ops	NOx (tons)	HC (tons)	CO (tons)	SO2 (tons)	PM (tons)	Notes
C-141C	2001	24,540	106.8	152.7	253.7	13.4	64.8	15 aircraft (avg.)
C-17	2001	0.0	0.0	0.0	0.0	0.0	0.0	0 aircraft stationed
KC-135R	2001	19,504	89.2	1.7	70.9	8.9	26.0	10 aircraft stationed
Total for 2003			**196.0**	**154.4**	**324.6**	**22.3**	**90.7**	
		checksum	203.1	164.5	341.5	23.2	95.0	

CY2004 (interpolated)

Model	Year	Estimated Ops	NOx (tons)	HC (tons)	CO (tons)	SO2 (tons)	PM (tons)	Notes
C-141C	2004	15,542	67.6	96.7	160.7	8.5	41.0	9.5 aircraft (avg)
C-17	2004	0.0	0.0	0.0	0.0	0.0	0.0	0 aircraft stationed
KC-135E	2004	19,504	89.2	1.7	70.9	8.9	26.0	10 aircraft stationed
Total for 2004			**156.9**	**98.4**	**231.6**	**17.4**	**67.0**	

CY2005 (interpolated)

Model	Year	Estimated Ops	NOx (tons)	HC (tons)	CO (tons)	SO2 (tons)	PM (tons)	Notes
C-141C	2005	4,908	21.4	30.5	50.7	2.7	13.0	3 aircraft (avg)
C-17	2005	1,575	22.1	0.7	5.3	1.2	6.2	3.5 aircraft (avg)
KC-135E	2005	19,504	89.2	1.7	70.9	8.9	26.0	10 aircraft stationed
Total for 2005			**132.7**	**32.9**	**126.9**	**12.8**	**45.1**	

CY2006 (from detail tables above)

Model	Year	Total Ops	NOx (tons)	HC (tons)	CO (tons)	SO2 (tons)	PM (tons)	Notes
C-141C	2006	0	0.0	0.0	0.0	0.0	0.0	0 aircraft stationed
C-17	2006	3,600	50.6	1.5	12.1	2.7	14.1	8 aircraft stationed
KC-135E	2006	17,914	81.8	1.5	64.4	8.2	23.6	8 aircraft stationed
Total for 2006			**132.4**	**3.0**	**76.4**	**10.9**	**37.7**	
		checksum	132.4	3.0	76.4	10.9	37.7	

Deltas for Airfield Ops			NOx (tons)	HC (tons)	CO (tons)	SO2 (tons)	PM (tons)
	2001		0.0	0.0	0.0	0.0	0.0
	2003		-7.1	-10.2	-16.9	-0.9	-4.3
	2004		-46.3	-66.2	-110.0	-5.8	-28.1
	2005		-70.4	-131.7	-214.6	-10.4	-50.0
	2006		-70.8	-161.5	-265.1	-12.3	-57.3

Emission Estimate for Internal Combustion Engine

It has been assumed that a small (30kW) diesel generator may be purchased to provide backup power to critical activities in the new C-17 maintenance and inspection hangar.

Emissions have been estimated assuming 500 hours per year operation at a 50 HP engine output (25,000 HP-hrs/yr)

Pollutant	Emission Factors lb/HP-hr out	Emissions lb/yr	Emissions tpy
NOx	0.031	775	0.39
CO	0.0067	167	0.08
SOx	0.0021	51	0.03
PM10	0.0022	55	0.03
CO2	1.15	28750	14.38
Aldehyd	0.00046	12	0.01
Exh VOC	0.0025	62	0.03

Reference for diesel engine emission factors: AP-42 Table 3.3-1 dated 10/96

March ARB Emissions - Conformity with the SIP Emissions Budget

1997 AQMP SIP Budget (tpy) (ref: 7 June email from Kathy Hsiao of SCAQMD to Allan Priest of e2M)
March ARB has an approved SIP budget for military aircraft emissions in the SCAQMD 1997 Air Quality Management Plan. The AQMP is the annual budget for CY 2000 to 2020. According to Ms. Hsiao, the 1999 Amendment to the 1997 AQMP did not change this budget.

This table takes KC-135, C-141, and C-17 emissions estimates by year from the "LTOs and TGOs" page of this workbook and combines them with the emissions estimates for the other military aircraft as documented in the 2000/2001 Basewide Air Emissions Inventory for March Air Reserve Base, September 2001. The emissions for the military aircraft not associated with the Proposed Action are assumed to remain constant over the years of interest.

2000/2001 emissions estimates for the non-Proposed Action-related Aircraft

		NOx TPY	VOC TPY	CO TPY	SOx TPY	PM10 TPY
LTOs	Based F-16s	3.7	2.7	10.9	0.4	0.9
TGOs	Based F-16s	0.5	0.1	0.0	0.0	0.1
LTOs	Transients	16.6	11.6	32.2	1.4	5.9
LTOs	Air Carriers	3.3	2.8	6.1	0.2	0.0
LTOs	Small Aircraft	0.2	1.4	77.0	0.0	0.0
	Totals	24.3	18.6	126.2	2.1	6.9

Comparison of Anticipated Military Aircraft Emissions to the SIP Budget

		NOx TPY	VOC TPY	CO TPY	SOx TPY	PM10 TPY	
March ARB SIP Budget - 2000/2020		501.8	203.4	645.4	13.1	15.2	
2001	Military Aircraft Emissions	227.5	183.1	467.7	25.3	101.9	*(matches AEI)*
2003	Military Aircraft Emissions	220.3	172.9	450.8	24.4	97.6	
2004	Military Aircraft Emissions	181.2	117.0	357.8	19.5	73.9	
2005	Military Aircraft Emissions	157.0	51.4	253.1	14.9	52.0	
2006+	Military Aircraft Emissions	156.7	21.6	202.6	12.9	44.6	

Conclusions:

The Proposed Action will result in overall reductions in basewide emissions of all pollutants and will therefore not cause March ARB to exceed it's SIP budgets.

It appears that current operations at March ARB exceed the SOx and PM10 budgets in the 1997 SCAQMP Air Quality Management Plan (and SIP). This issue was discussed in a meeting between AFRC staff and SCQAMD staff on 13 August 2002. Because SOx and PM10 emissions have not increased at March ARB, it appears that there must have been some misunderstanding when these budgets were set by SCAQMD. However, SCAQMD was not able to locate any documentation regarding the basis for the current budgets. Therefore, these budgets will need to be revised to reflect actual current and historical base emissions the next time the District updates the AQMP.

Historical SIP Budget for March ARB

1994 AQMP SIP Budget (tpy) (ref: Table 4-1 in Multi-Use Conformity Determination)

	Baseline 1990	1997	1999	2000	2002	2005	2007	2008	2010
NOx	1010.7	787.3	759.5	743.8	716.4	677.5	658.1	650.3	638.8
VOC	2282.1	2029.6	1990.3	1964.6	1921.9	1866.5	1841	1828.3	1811.3

The 1997 Multiple Use Conformity Determination explained that the 1994 AQMP SIP budget was based on March AFB's 1990 actual emissions, and that the 'ratcheting down' was based on projected reductions in POV emissions due to California mobile source control measures.

Per the 1997 Multi-Use Conformity Determination, these budgets are to include:

Aircraft flying and ground operations
AGE and non-road equipment
GOVs and POVs (direct employees)
Construction Activities

It appears that these VOC budgets were developed to accommodate the storage and handling of JP-4 fuel. At least half of the 2000 tons of VOC budget was apparently JP-4 evaporation.

APPENDIX E

CORRESPONDENCE CONCERNING THE IDENTIFICATION OF THREATENED AND ENDANGERED SPECIES

January 11, 2003

Dahlia Boyarsky
United States Fish and Wildlife Service
6010 Hidden Valley Road
Carlsbad, CA 92009

Subject: March Air Reserve Base C-17 Beddown Environmental Assessment Threatened and Endangered Species Information Request.

Dear Ms. Boyarsky

The Air Force Reserve Command is preparing an Environmental Assessment (EA) for the Beddown of C-17 Aircraft at March Air Reserve Base (ARB), California. The Proposed Action consists of three parts: 1) aircraft changes at March ARB; 2) construction activities at March ARB; and 3) changes of operations at March ARB, within military training airspace, and at aircraft training. Your office has been contacted via letter (dated 3 January 2003) requesting your office's review of the Description of Proposed Actions and Alternatives (DOPAA). The United States Fish and Wildlife Office Arizona Ecological Services Field Office, Carlsbad Ecological Services Field Office, and Nevada Ecological Services Field Office have been contacted regarding this request. Please comment on those counties which fall within your jurisdiction.

In conjunction with your office's review of the DOPAA, we are requesting information regarding the presence of threatened or endangered species that have the potential to be affected by the Proposed Action. Enclosed with this letter is a table which provides a list of counties that are proposed to be overflown by the C-17 aircraft. In order to fully assess the impacts of the Proposed Action on threatened and endangered species, we are requesting a list of species by county that occur within the region of influence covered by your office's jurisdiction. Specific figures which illustrate the locations of these proposed training routes and construction sites were included with the DOPAA. Should you require an additional copy of the DOPAA, it can be forwarded to you electronically by contacting e²M.

March ARB is located on the western side of Riverside County, California, approximately 70 miles east of Los Angeles. The base, which is composed of an airfield and associated support facilities, occupies 2,300 acres of contiguous property. The communities of Riverside, Moreno Valley, and Perris, California surround the base. The military training airspace components proposed for C-17 aircraft utilization overlies portions of Fresno, Imperial, Kern, Kings, Los Angeles, Monterey, Riverside, San Benito, San Bernardino, San Diego, San Luis Obispo, Santa Barbara, and Ventura counties, California; La Paz, Mohave, and Yavapai counties, Arizona; and Clark County, Nevada. The military aircraft training areas proposed for C-17 aircraft utilization include the Air Force Plant No. 42 (Palmdale) and Desert Center Zone, which are located near Palmdale and Desert Center, California, respectively. Air Force Plant No. 42 (Palmdale) is the proposed location for a C-17 Assault Landing Zone.

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Please forward information to my attention at e^2M, Inc., 355 West Lancaster Avenue, Building E, 2nd Floor East, Haverford, PA 19041. Also, please address any questions concerning or comments on the request to my attention. I can be reached at (610) 649-8064 or at bhoppy@e2m.net. Thank you for your assistance.

Sincerely,
engineering-environmental Management, Inc.

Brian K. Hoppy

Brian Hoppy, Vice President
Project Manager

Attachments:
1. List of Counties Effected by Flight Routes

March ARB
Counties Effected by Flight Routes

Flight Route	Arizona	California	Nevada
IR-214	LePaz Mohave Yavapai	Riverside	
IR-217		Imperial Riverside San Bernardino San Diego	Clark
VR-289		Imperial Riverside San Bernardino San Diego	
VR-296	LePaz	Imperial Riverside San Bernardino San Diego	
VR-1217		San Bernardino	
VR-1257		Fresno Imperial Kern Kings Los Angeles Monterey Riverside San Benito San Bernardino San Diego San Luis Obispo Santa Barbara	
VR-1265		Imperial Kern Los Angeles Riverside San Bernardino Ventura	

January 11, 2003

Steve Spangle
United States Fish and Wildlife Service
2321 W. Royal Palm Road, Suite 103
Phoenix, AZ 85021

Subject: March Air Reserve Base C-17 Beddown Environmental Assessment Threatened and Endangered Species Information Request.

Dear Mr. Spangle

The Air Force Reserve Command is preparing an Environmental Assessment (EA) for the Beddown of C-17 Aircraft at March Air Reserve Base (ARB), California. The Proposed Action consists of three parts: 1) aircraft changes at March ARB; 2) construction activities at March ARB; and 3) changes of operations at March ARB, within military training airspace, and at aircraft training. Your office has been contacted via letter (dated 3 January 2003) requesting your office's review of the Description of Proposed Actions and Alternatives (DOPAA). The United States Fish and Wildlife Office Arizona Ecological Services Field Office, Carlsbad Ecological Services Field Office, and Nevada Ecological Services Field Office have been contacted regarding this request. Please comment on those counties which fall within your jurisdiction.

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engineering-environmental Management, Inc.

January 11, 2003

Mr. Lyle Lewis
Nevada Ecological Services Field Office
United States Fish and Wildlife Office
1340 Financial Boulevard, Suite 234
Reno, Nevada 89502-7147

Subject: March Air Reserve Base C-17 Beddown Environmental Assessment Threatened and Endangered Species Information Request.

Dear Mr. Lewis

The Air Force Reserve Command is preparing an Environmental Assessment (EA) for the Beddown of C-17 Aircraft at March Air Reserve Base (ARB), California. The Proposed Action consists of three parts: 1) aircraft changes at March ARB; 2) construction activities at March ARB; and 3) changes of operations at March ARB, within military training airspace, and at aircraft training. Your office has been contacted via letter (dated 3 January 2003) requesting your office's review of the Description of Proposed Actions and Alternatives (DOPAA). The United States Fish and Wildlife Office Arizona Ecological Services Field Office, Carlsbad Ecological Services Field Office, and Nevada Ecological Services Field Office have been contacted regarding this request. Please comment on those counties which fall within your jurisdiction.

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IMC	Instrument Meteorological Conditions
IR	Instrument Route
JPA	Joint Powers Authority
KIAS	knots indicated airspeed
KV	kilovolts
LBP	Lead-based paint
L_{dn}	Day-Night Average Sound Level measured in A-Weighted decibels
L_{dnmr}	Monthly Day-Night Average Sound Level
LOX	liquid oxygen
LTO	landing and takeoff
MAILS	Multiple Aircraft Instantaneous Line Source
mg/m^3	milligrams per cubic meter
mgd	million gallons per day
mi	statute mile
MOA	Military Operations Area
mogas	motor gasoline
mph	miles per hour
MSDS	Material Safety Data Sheet
MSL	Mean Sea Level
MSW	Municipal solid waste
MTR	Military Training Route
MW	million watts
MWH	million watts per hour
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NM	nautical mile
NO_2	Nitrogen Dioxide
NOAA	National Oceanic and Atmospheric Administration
NOAD	North American Air Defense
NO_X	Nitrogen Oxides
NPDES	National Pollution Discharge Elimination System
NPL	National Priority List
NRHP	National Register of Historic Places
NSR	New Source Review
NVDOW	Nevada Division of Wildlife
O_3	Ozone
OSHA	Occupational Safety and Health Administration
PAA	Primary Assigned Aircraft
Pb	Lead
PCB	Polychlorinated biphenyl
PCE	tetrachloroethene
PM_{10}	particulate matter less than 10 microns in diameter
$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
POLs	Petroleum, Oils, and Lubricants
POTW	Publicly owned treatment works
POV	Privately-owned Vehicle
ppm	parts per million
PSD	Prevention of Significant Deterioration
RF	radio frequency
ROG	Reactive organic gas
ROI	Region of Influence
RRRP	Resource, Recovery, and Recycling Program
SAAQS	State Ambient Air Quality Standards
SATAF	Site Activation Task Force
SCAQMD	South Coast Air Quality Management District
SEL	Sound Exposure Level
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SKR	Stephens' Kangaroo Rat
SO_2	Sulphur Dioxide
SOP	Special Operating Procedure
SO_x	Sulphur Oxides
TCE	trichloroethene
TDS	Total dissolved solids
TGO	touch-and-go
tpy	tons per year
TSP	total suspended particulates
U.S.C.	U.S. Code
UBC	Universal Building Code
USACE	U.S. Army Corps of Engineers
USAF	U.S. Air Force
USDA-WS	U.S. Department of Agriculture – Wildlife Services
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
VFR	Visual Flight Rules
VMC	Visual Meteorological Conditions
VMT	Vehicle miles traveled
VOC	volatile organic compound
VR	Visual Route
WMWD	Western Municipal Water District
$\mu g/m^3$	micrograms per cubic meter