FINAL

AIR INSTALLATIONS COMPATIBLE USE ZONES STUDY

MARCH AIR RESERVE BASE

RIVERSIDE, CALIFORNIA

AIR FORCE RESERVE COMMAND

2018

DEPARTMENT OF THE AIR FORCE
AIR FORCE RESERVE COMMAND

28 November 2017

MEMORANDUM FOR AREA GOVERNMENTS

FROM: 452 AMW/CC
2145 Graeber St Ste 117 (Bldg 470)
March ARB CA 92518-1667

SUBJECT: Air Installations Compatible Use Zones (AICUZ) Study

1. This AICUZ Study for March Air Reserve Base (ARB) is an update of the AICUZ study dated 2005. This update was initiated because of the beddown of new aircraft, operational changes and the introduction of new flight tracks. It is a reevaluation of aircraft noise and accident potential related to Air Force flying operations and is designed to aid in the development of local planning mechanisms which will protect the public safety and health, as well as preserve the operational capabilities of March ARB.

2. The AICUZ study contains a summary description of the affected area around the base. It outlines the location of runway clear zones, aircraft accident potential zones and noise contours and provides recommendations for development compatible with military flight operations. It is our desire that local governments incorporate these recommendations into community plans, zoning ordinances, subdivision regulations, building codes and other related documents.

3. This update provides noise contours based upon the Community Noise Equivalent Level (CNEL) metric and utilizes a planning noise contour. Long-range planning by local land use authorities involves strategies to influence present and future uses of land. Due to the long-range nature of planning, the Air Force provides planning contours–noise contours based on reasonable projections of future missions and operations. AICUZ studies using planning contours provide a description of the long-term (5-10 year) aircraft noise environment for projected aircraft operations that is more consistent with the planning horizon used by State, tribal, regional and local planning bodies.

4. We greatly value the positive relationship March ARB has experienced with its neighbors over the years. As a partner in the process, we have attempted to minimize noise disturbances through such actions as minimizing night flying, avoiding flights over heavily populated areas, reducing night maintenance activities and enforcing requested quiet hours. We solicit your cooperation in implementing the recommendations and guidelines presented in this AICUZ study update.

MATTHEW J. BURGER, Colonel, USAF
Commander, 452d Air Mobility Wing

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CONTENTS

CONTENTS (CONTINUED)

LIST OF APPENDICES

LIST OF FIGURES

LIST OF TABLES

ACRONYMS

°F	degrees Fahrenheit
144 FW	144th Fighter Wing
160 ATKS	160th Attack Squadron
163 ATKW	163rd Attack Wing
194 FS	194th Fighter Squadron
196 ATKS	196th Attack Squadron
336 ARS	336th Air Refueling Squadron
452 AMW	452nd Air Mobility Wing
729 AS	729th Airlift Squadron
912 ARS	912th Air Refueling Squadron
ACC	Air Combat Command
AEDT	Aviation Environmental Design Tool
AETC	Air Education and Training Command
AFB	Air Force Base
AFH	Air Force Handbook
AFI	Air Force Instruction
AFM	Airfield Manager
AFPD	Air Force Policy Directive
AFRC	U.S. Air Force Reserve Command
AGL	above ground level
AGR	Active Guard Reserve
AICUZ	Air Installations Compatible Use Zones
ALUC	Airport Land Use Commission
ALUCP	Airport Land Use Compatibility Plan
AM	Airfield Manager
AMC	Air Mobility Command
AMW	Air Mobility Wing
ANG	Air National Guard
AOM	Airfield Operations Manager
AORB	Aircraft Operations Resource Book
AOZ	Airport Overlay Zones
APZ	Accident Potential Zones
ARB	Air Reserve Base
ART	Air Reserve Technician
ARW	Air Refueling Wing
ATC	Air Traffic Control
ATM	Air Traffic Manager
BASH	Bird Animal Strike Hazard
BRAC	Base Realignment and Closure
CBP RAU	U.S. Customs and Border Protection Riverside Aviation Unit
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CNEL	Community Noise Equivalent Level
CP	Command Post
CY	Calendar Year

ACRONYMS (CONTINUED)

CZ	Clear Zones
dB	decibel
dBP	peak sound level
dBA	A-weighted decibels
DNL	Day/Night Average Sound Level
DoD	Department of Defense
DoDI	Department of Defense Instruction
DOT	Department of Transportation
DSG	Traditional Guard
DST	Daylight Savings Time
EA	Environmental Assessment
EMI	Electromagnetic Interference
EPA	Environmental Protection Agency
EIS	Environmental Impact Statement
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulation
FHA	Federal Housing Administration
FICAN	Federal Interagency Committee on Aviation Noise
FICUN	Federal Interagency Committee on Urban Noise
FMC	Federal Management Circular
FOL	Forward Operating Location
ft	foot/feet
FY	Fiscal Year
GC	Government Code
GCA	Ground Control Approach
GCI	Ground Control Intercept
GSA	General Services Administration
HUD	Department of Housing and Urban Development
HAFZ	Hazards to Aircraft Flight Zones
HAZMAT	Hazardous Materials
Hz	Hertz
IFR	Instrument Flight Rules
ILS	Instrument Landing System
INM	Integrated Noise Model
IFR	Instrument Flight Rules
JCS	Joint Chiefs of Staff
JLUS	Joint Land Use Study
JNGB	Joint National Guard Base
JPA	Joint Powers Authority
Lmax	Maximum Sound Level
MAJCOM	Major Command
MSL	mean sea level
NAF	Non-appropriated Fund
NDB	Non-directional Beacon
NEPA	National Environmental Policy Act

ACRONYMS (CONTINUED)

NGB	National Guard Bureau
NLR	Noise Level Reduction
NM	Nautical Miles
NOTAM	Notice to Airmen
NVG	Night Vision Goggles
OEA	Office of Economic Adjustment
OPR	Office of Planning and Research
ORE/ORI	Operational Readiness Exercise/Operational Readiness Inspection
PAO	Public Affairs Officer
PM	Project Manager
RAPCON	Radar Approach Control System
SB	Senate Bill
SEL	Sound Exposure Level
SFO	simulated flame out
SLUCM	Standard Land Use Coding Manual
TACAN	Tactical Air Navigation
TR	Traditional Reservist
USAF	United States Air Force
UFC	United Facilities Criteria
USEPA	U.S. Environmental Protection Agency
VA	Veterans Administration
VFR	Visual Flight Rules
VHF	Very High Frequency
VORTAC	VHF Omnidirectional Range/Tactical Aircraft Control

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SECTION 1
INTRODUCTION

This study is an update of the March Air Reserve Base (ARB) Air Installations Compatible Use Zones (AICUZ) Study. The update presents and documents the changes to the AICUZ since the release of the last study in 2005. It reaffirms Air Force policy of promoting public health, safety, and general welfare in areas surrounding base while seeking development compatible with the defense flying mission. This study presents changes in flight operations since the last study, and provides current noise contours and recommendations for achieving development compatible with the defense flying mission.

1.1 AICUZ PROGRAM

Military airfields attract development – people who work on base want to live nearby while others want to provide services to base employees and residents. When incompatible development occurs near an installation or training area, affected parties within the community may seek relief through political channels that could restrict, degrade or eliminate capabilities necessary to perform the defense mission. In the early 1970s, the Department of Defense (DoD) established the AICUZ program. The goal of the program is to protect the health, safety, and welfare of those living and working near air installations while sustaining the Air Force's operational mission. The Air Force accomplishes this goal by promoting proactive, collaborative planning for compatible development to sustain mission and community objectives.

The AICUZ Program recommends that noise levels, Clear Zones (CZs), Accident Potential Zones (APZs), and flight clearance requirements associated with military airfield operations be incorporated into local community planning programs in order to maintain the airfield's operational requirements while minimizing the impact to residents in the surrounding community. Cooperation between military airfield planners and community-based counterparts serves to increase public awareness of the importance of air installations and the need to address mission requirements and associated noise and risk factors in the public planning process. As the communities that surround airfields grow and develop, the United States Department of the Air Force has the responsibility to communicate and collaborate

with local government on land use planning, zoning, and similar matters that could affect the installation's operations or missions. Likewise, the Air Force has a responsibility to understand and communicate potential impacts that new and changing missions may have on the local community.

1.2 SCOPE AND AUTHORITY

1.2.1 Scope

This AICUZ study uses projected air operations. CZs, APZs, and noise zones associated with the March ARB runways are provided to the local communities along with recommendations for compatible land use near the base for incorporation into comprehensive plans, zoning ordinances, subdivision regulations, building codes, and other related documents.

1.2.2 Authority

Authority for the Air Force AICUZ program is lies in two documents:

- AFI 32-7063, Air Installations Compatible Use Zones Program implements Department of Defense Instruction (DoDI) 4165.57 Air Installations Compatible Use Zones and applies to all Air Force installations with active runways located in the United States and its territories. This instruction provides guidance to installation AICUZ Program Managers (PMs) with a framework that complies with Air Force Policy Directive (AFPD) 32-70.
- AF Handbook (AFH) 32-7084, AICUZ Program Manager's Guide provides installation AICUZ Program Managers (PM) specific guidance concerning the organizational tasks and procedures necessary to implement the AICUZ program. It is written in a "how to" format and aligns with AFI 32-70 Environmental Quality.

1.3 PREVIOUS AICUZ AND RELATED STUDIES

The following five studies are relevant to this document:

- *1998 March Air Reserve Base AICUZ Study* (March ARB 1998) is the initial compatible land use study completed for March ARB.

- *2005 March Air Reserve Base AICUZ Study* (March 2005) which included the conversion from C-141 Starlifter aircraft to the C-17 Globemaster.
- *Final Environmental Assessment for the Proposed Military Construction and Total Force Integration at March Air Reserve Base, California*. July, 2010 (U.S. Air Force Reserve Command [AFRC] 2010). This document assessed the addition of the 912th Air Refueling Squadron (912 ARS) to the 452 AMW as an "Active Associate" to utilize existing KC-135 aircraft and a 60 percent (%) increase in KC-135 operations.
- *Final Environmental Impact Statement F-15 Aircraft Conversion for the 144th Fighter Wing, California Air National Guard, Fresno-Yosemite International Airport, California*. March, 2013 (California ANG 2015). This action replaced the California Air National Guard (ANG) 144th Fighter Wing (144 FW) F-16 aircraft with F-15 aircraft which included their Alert Mission at March ARB.
- *Environmental Assessment for the California Air National Guard 163rd Attack Wing MQ-9 Beddown at March Air Reserve Base, California*. March, 2017 (California ANG 2017). While 163rd Attack Wing (163 ATKW) pilots are based at March ARB, the launch and recovery element takes place at Southern California Logistics Airport. This document assesses the beddown and launch and recovery element of the MQ-9 at March ARB.

1.4 CHANGES REQUIRING AN AICUZ UPDATE

Based on the reasons listed below, this 2018 AICUZ Study is a needed update to the 2005 AICUZ Study and provides flight track, CZs, APZs, and noise zones information that reflects the most accurate picture of the aircraft activities associated with the base, as projected for 2018.

1.4.1 Operational Changes

The DoD aircraft fleet mix and training requirements may change over time. Resulting flight operations changes can affect the CNEL contours. The primary operational changes since the 2005 AICUZ Update are:

- The 144th Detachment Fighter Wing (144 FW) transition from F-16 to F-15 aircraft;
- Addition of the MQ-9 Reaper of the California Air National Guard 163rd Attack Wing (163 ATKW);
- Addition of the KC-135 Total Force Integration and associated flying hours.

The 2018 planning contours reflect the anticipated noise environment at March ARB.

1.4.2 Update of AICUZ Instruction

The March ARB AICUZ uses the most recent Air Force Instruction (AFI), which uses "annual average day." The primary reason for the change to average annual day is to be consistent with the land use recommendations guidelines.

1.4.3 Noise Model Development

To develop the noise contours that were presented in the 2005 March ARB AICUZ Study, military aircraft operations were modeled utilizing the DoD noise model NOISEMAP 6.5, and civilian operations were modeled utilizing the Federal Aviation Administration's Integrated Noise Model (INM). For the 2018 March ARB AICUZ Study, NOISEMAP 7.3 is used to model military aircraft operations, which include impedance (e.g., soft ground, hard ground, etc.) and elevation inputs that were not available in 2005. The FAA has replaced INM with the Aviation Environmental Design Tool (AEDT) 2c as the noise model for use at civilian airfields. Civilian operations at March ARB associated with March Joint Powers Authority (JPA) are now modeled using the FAA's new noise model AEDT. Noise level grids have been developed by both noise models for relevant aircraft operations, and these grids have been combined utilizing a plotting software program, NMPLOT 4.969; the result develops 2018 noise contours.

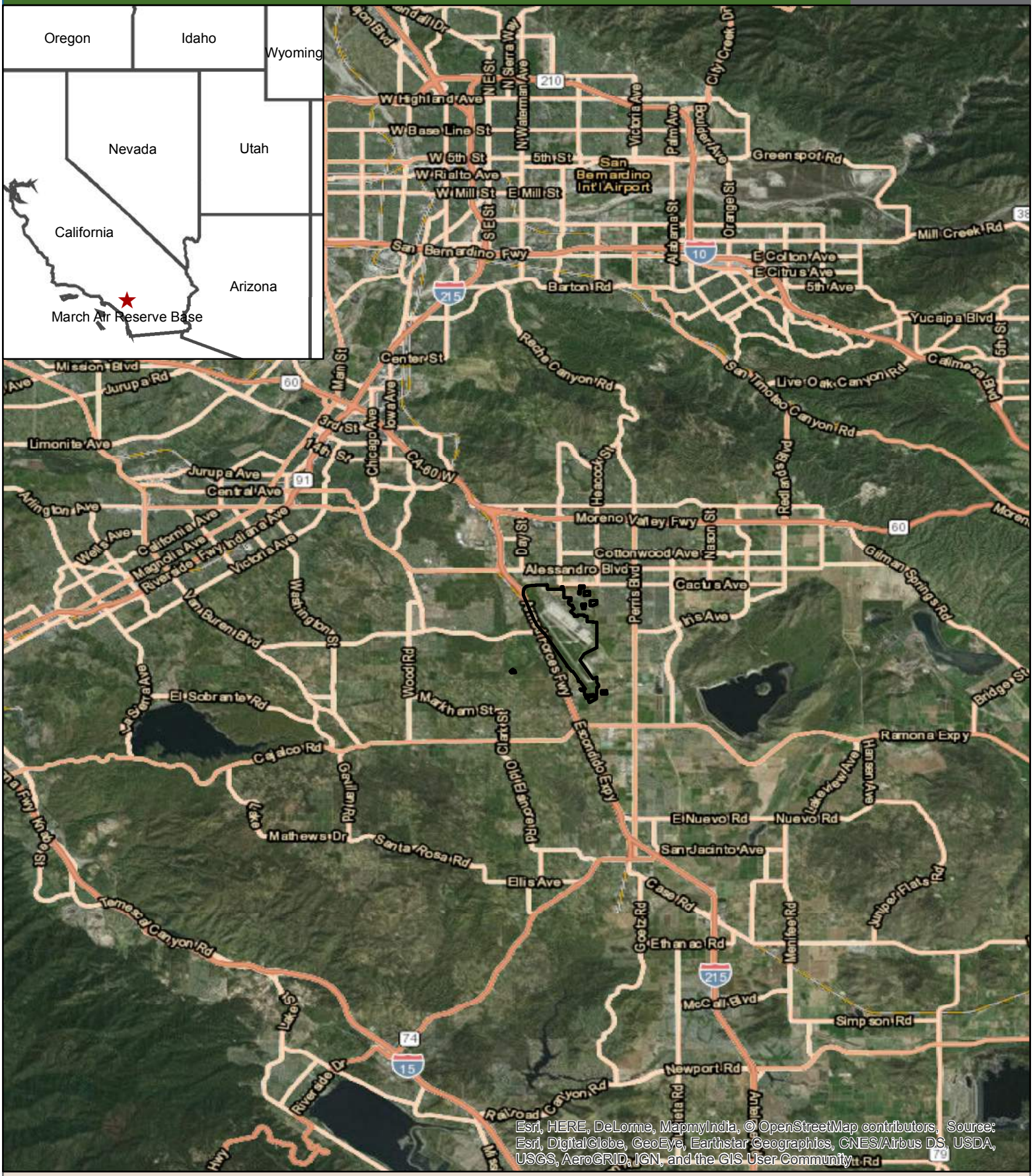
SECTION 2
MARCH ARB, CALIFORNIA

2.1 LOCATION

March ARB is in western Riverside County, California, approximately 70 miles east of Los Angeles (Figure 2-1). The base, which is composed of an airfield and associated support facilities, occupies approximately 2,300 acres of contiguous property and seven (7) geographically separate parcels. The March JPA planning area surrounds March ARB. In addition, the cities of Riverside, Moreno Valley, and Perris are adjacent to, or in close proximity to the base. March ARB has two active runways: Runway 14/32 is 13,302 feet in length and contains 1,000-foot overruns at both ends, while Runway 12/30 (3,061 feet in length) has 200-foot overruns at both ends.

2.2 HISTORY

The story of March Field began at a time when the United States was rushing to build up its military forces in anticipation of an entry into World War I. In early 1917, Congressional appropriations totaling approximately $640,000,000 attempted to back the plans of General George O. Squier, the Army's chief signal officer, to "put the Yankee punch into the war by building an army in the air." At the same time, the War Department announced its intentions to build several new military installations. Efforts by Mr. Frank Miller, then owner of the Mission Inn in Riverside, Hiram Johnson, and other notable Californians, succeeded in gaining War Department approval to construct an airfield at Alessandro Field located near Riverside, an airstrip used by aviators from Rockwell Field on cross-country flights from San Diego.



Legend

March Air Reserve Base

N

0 6 Miles

1 inch = 4.07 miles

Shortly thereafter, the Army established a new airfield. Sergeant Charles E. Garlick, who had landed at Alessandro Field in a "Jenny" in November 1917, was selected to lead the advance contingent of four men to the new base from Rockwell Field. On February 26, 1918, Garlick and his crew and a group of muleskinners from nearby Colton, known to be experts in clearing land as well as for their colorful syntax, began the task of excavating the building foundations at Alessandro. On March 20, 1918, Alessandro Flying Training Field became March Field, named in honor of Second Lieutenant Peyton C. March, Jr., son of the Army Chief of Staff, who had been killed in a flying accident in Texas the previous month. By late April 1918, enough progress had been made in the construction of the new field to allow the arrival of the first troops. The commander of the 818th Aero Squadron detachment, Captain William Carruthers, took over as the field's first commander and for a time operated out of an office in the Mission Inn. On May 15 when the first JN-4D "Jenny" took off, March Field seemed to have come into its own as a training installation. The signing of the armistice on November 11, 1918, did not halt training at March Field initially, but by 1921, the decision had been made to phase down all activities at the new base in accordance with sharply reduced military budgets. In April 1923, March Field closed its doors with one sergeant left in charge.

In July 1926, Congress created the Army Air Corps and approved the Army's five-year plan which called for an expansion in pilot training and the activation of tactical units. Accordingly, funds were appropriated for the reopening of March Field in March of 1927. Colonel William C. Gardenhire, assigned to direct the refurbishment of the base, had just directed his crews to replace underpinnings of many of the previous buildings when he received word that future construction would be in Spanish Mission architectural design.

March Field 1929

As March Field began to take on the appearance of a permanent military installation, the basic mission of the base changed. When Randolph Field began to function as a training site in 1931, March Field became an operational base. Before the end of the year, the 7th Bomb Group, commanded by Major Carl A. Spaatz, brought its Condor B-2

and Keystone B-4 bombers to the picturesque field. The activation of the 17th Pursuit Group and several subordinate units, along with the arrival of the 1st Bombardment Wing, initiated a period where March Field became associated with the Air Corps' heaviest aircraft as well as an assortment of fighters. In the decade before World War II, March Field took on much of its current appearance.

The attack on Pearl Harbor in December of 1941 quickly brought March Field back into the business of training aircrews. Throughout the war, many soon-to-be-famous bombardment groups performed their final training at March before embarking for duty in the Pacific. During this period, the base doubled in area and at the zenith of the war effort March supported approximately 75,000 troops. At the same time, the government procured a similar-sized tract west of the San Diego highway that bordered the base and established Camp Hahn as an anti-aircraft artillery training facility. It supported 85,000 troops at the height of its activity.

After the war, March reverted to its operational role and became a Tactical Air Command base. The main unit, the famed 1st Fighter Wing, brought the first jet aircraft, the F-80, to the base. In 1949, March became a part of the relatively new Strategic Air Command. Headquarters Fifteenth Air Force along with the 33rd Communications Squadron moved to March from Colorado Springs in the same year. Also in 1949, the 22nd Bombardment Wing moved from Smoky Hill AFB, Kansas to March. Thereafter, these three units remained as dominant features of base activities.

Boeing B-47 Stratojets assigned to March AFB's 12th Air Division

From 1949 to 1953, the B-29 Super fortresses dominated the flightline at March AFB. For four months, July to October, the 22nd saw action over Korea, and in this brief period contributed to the elimination of all strategic enemy targets. Involvement in the Korean Conflict had no sooner ended when the wing converted from the huge propeller-driven B-29s to the sleek B-47 jet bombers and their supporting tankers, the KC-97s. The KC-97s belonged to the 17th and 22nd Air Refueling Squadrons and represented an amazing jump in technology. This had been demonstrated earlier when General Archie Old, the Fifteenth Air Force

KC-97 Stratotanker at March AFB

commander, had led a flight of three B-52s in a non-stop around-the-world flight termed "Power Flight" in just 45 hours and 19 minutes. In 1960, the first Reserve unit was assigned to March, flying C-119s. The end of the 1960s saw March AFB preparing to exchange its B-47s and KC-97s for updated bombers and tankers. Increasing international tensions in Europe and elsewhere by September 16, 1963, brought March its first B-52B bomber, "The City of Riverside." Soon 15 more of the giant bombers appeared on the flightline along with new KC-135 jet "Stratotankers." March's first KC-135, "The Mission Bell," arrived on October 4, 1963.

During this period, both tankers and bombers stood alert at March AFB as part of America's nuclear deterrent force. The might of the bombers and tankers, however, was soon to be used in quite another scenario. During the conflict in Southeast Asia, the 22nd Bombardment Wing deployed its planes several times and March crews learned well the meaning behind such names as Young Tiger, Rolling Thunder, Arc Light and Linebacker II. In these troubled years, the base served as a logistical springboard for supplies and equipment en route to the Pacific. Near the end of the conflict, March operated as one of the reception centers for returning prisoners of war.

Following the end of hostilities in Southeast Asia, the 22nd returned to its duties as an integral part of the Strategic Air Command. For the next eighteen years until 1982, March AFB effectively supported America's defensive posture. The 22nd Bombardment Wing, so long a key ingredient in March's long history, became an air refueling wing operating the new KC-10 tanker. The new tankers, able to accomplish considerably more than the KC-135s, promised a new tomorrow for the Strategic Air Command. Within months after the first KC-10 arrived at the base on August 11, 1982, crews quickly realized the ability of the new aircraft to carry cargo and passengers as well as impressive fuel loads over long distances. Air refueling for March AFB had entered a new age. The California Air National Guard (ANG) also arrived in 1982, bringing with them the F-4Cs.

Beginning in the early 1980s, the KC-10 was the vehicle that carried March into a new technological epoch. The large KC-10s with their versatility and dependability again gave the base a featured part in America's efforts to retain a strong and flexible military air arm. The utter importance of the KC-10s in conventional operations became particularly apparent during DESERT SHIELD and DESERT STORM where their outstanding service contributed measurably to the success of American forces in the defense of Saudi Arabia and the liberation of Kuwait.

In 1993, March was selected for realignment. In August 1993, the 445th Military Airlift Wing transferred to March from Norton Air Force Base (AFB), California. On January 3, 1994, the 22nd Air Refueling Wing was transferred to McConnell AFB, Kansas, and the 722nd Air Refueling Wing stood up at March AFB. As part of the Air Force's realignment and transition, March's two Reserve units, the 445th Military Airlift Wing and the 452nd Air Refueling Wing were deactivated and their personnel and equipment joined under the 452 AMW on April 1, 1994. On April 1, 1996, March AFB officially became March ARB.

In 2005, the wing retired the C-141B Stratolifter fleet and a year later began receiving the first of eight C-17 Globemaster aircraft.

2.3 MISSION

The primary mission of the U.S. Air Force Reserve Command (AFRC) 452 AMW is to provide airlift support for the USAF and to train in tactical airlift and airdrop of personnel and supplies in combat, air refueling, and aeromedical evacuation. The 452 AMW is the host organization responsible for all operational functions at March ARB supporting the Air Mobility Command (AMC), Air Combat Command (ACC), and Pacific Air Forces, and is the AFRC's largest wing. Currently, both KC-135 and C-17 aircraft are assigned to March ARB and used for training missions of the 452 AMW. In addition to the AFRC, March ARB is home to the California ANG's 163 ATKW, which operates the MQ-9 Reaper. Another California ANG unit, the 144th Fighter Wing (144 FW) out of Fresno-Yosemite International Airport, operates an F-16 aircraft (soon to be transitioned to F-15 aircraft) alert mission out of March ARB. Additional tenants at March ARB,

include the U.S. Customs and Border Patrol Riverside Aviation Unit (CBP RAU), an Aero Club, and civilian operations through March JPA.

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 law enforcement, fire department, fuel storage area, airfield management, and service for transient aircraft.

In addition to the military entities at March ARB, airport facilities are used by civilian aircraft and organizations. A joint use agreement was created on May 7, 1997, between the DoD and the March JPA to establish March Air Field as a joint use airport. A joint use airport is defined by the USAF as one where the facilities are owned and operated by the USAF and are made available for use by civil aviation. Consequently, the joint use agreement permits the establishment and operation of commercial aviation, except for pilot training activities, where civilian and military entities share essential aviation facilities (March JPA 2005).

2.4 HOST AND TENANT UNITS

The based operating unit and host wing is the 452 AMW of the AFRC. Tenant flying units include 912th Air Refueling Squadron (912 ARS), an active associate squadron, the California Air National Guard's 144 FW and 163 ATKW, the CBP RAU, Aero Club, and March JPA.

2.4.1.1 452 AMW

The 452 AMW is host to more than 16 tenant organizations located at March ARB. The wing consists of the 452nd Operations Group, 452nd Maintenance Group, 452nd Mission Support Group and 452nd Medical Group. The Operations Group includes the 729th Airlift Squadron (729 AS) which operates the C-17 Globemaster and the 336th Air Refueling Squadron (336 ARS) and 912 ARS which operate the KC-135 Stratotanker.

2.4.1.2 California Air National Guard

The 194th Fighter Squadron (194 FS) of the 144 FW accomplishes an alert mission at March ARB with four F-16 aircraft. Though the 194 FS currently utilize F-16 aircraft for their alert mission, when F-15 aircraft become available the unit will be expected to complete the alert mission operating F-15 aircraft. The 160th and 196th Attack Squadrons (160 ATKS and 196 ATKS) of the 163 ATKW operates the MQ-9 Reaper, both the beddown and launch and recovery element, from March ARB, which would include a chase plane when operating outside Prohibited, Restricted, and Warning Area airspaces.

2.4.1.3 U.S. Customs and Border Protection

CBP RAU operate two-fixed wing PC-12s and one rotary-wing AS-350 from March ARB in fulfilling its role as the nation's only federal law enforcement center tasked to coordinate interdiction operations in the Western Hemisphere.

2.4.1.4 Aero Club

Established in 1954, the Aero Club at March ARB operates General Aviation Aircraft (i.e., fixed- and variable-pitch, turbo propeller, etc.) for use by eligible active or retired military personnel.

2.4.1.5 March JPA

The March JPA oversees general and commercial aviation operations at March ARB under the Joint Use Agreement established on 7 May 1997, and amended on 19 March, 2014.

2.5 AIRFIELD ENVIRONMENT

March ARB occupies approximately 2,300 acres of contiguous property and is surrounded by the March JPA planning area. The main airfield includes two runways (14/32 and 12/30) which handle all of the aircraft operations and is located to the west of the main base (Figure 2-2).

March ARB Map Figure 2-2

Legend

- March Air Reserve Base
- Air and Marine Operations Center (AMOC)

N

0 0.6 Miles

1 inch = 0.45 miles

A runway is typically used in both directions and counted as two separate runways, depending on the direction of the departure. Each direction is labeled as a separate runway and numbered based on its magnetic heading, divided by 10 and rounded to a whole number.

The aircraft apron and hangars are located to the east of both Runway 14/32 and Runway 12/30, and parallel to the later. March ARB contains two active runways: Runway 14/32 is a Class B runway with a length of 13,302 feet and width of approximately 200 feet; Runway 12/30 is a Class A runway with a length of 3,061 feet and width of 100 feet, and is closed to the public. (Figure 2-3). An in-frame engine run up pad with aircraft anchor blocks is located on the parking apron and in front of the air traffic control tower for high-end power aircraft engine maintenance runs. There is a southwest facing blast fence at the southern end of the apron and another blast fence at the mid-way point of the apron facing to the northwest.

2.6 ECONOMIC IMPACT

During Fiscal Year (FY) 2014 March ARB employed over 9,500 personnel, as tabulated in Table 2-1. March ARB included a serving population of over 7,089 military personnel, with 6,378 traditional guardsmen and reserves. Civilian employees totaled 2,436 including 1,479 appropriated and 957 non-appropriated employees (Table 2-1).

Table 2-1. 2014 March ARB Employment

Classification	Total
Active Duty Military	305
Air National Guard (ANG)/ Reserve (ART/AGR)	346
Traditional Guard (DSG) / Reserve (TR)	6,378
Individual Mobilization Augmentees (IMA)	60
Total Military	7,089
Civilian Employees Appropriated	1,479
Civilian Employees Non-appropriated	957
Total Civilian Personnel	2,436
Total Personnel	**9,525**

Source: Filson 2016.

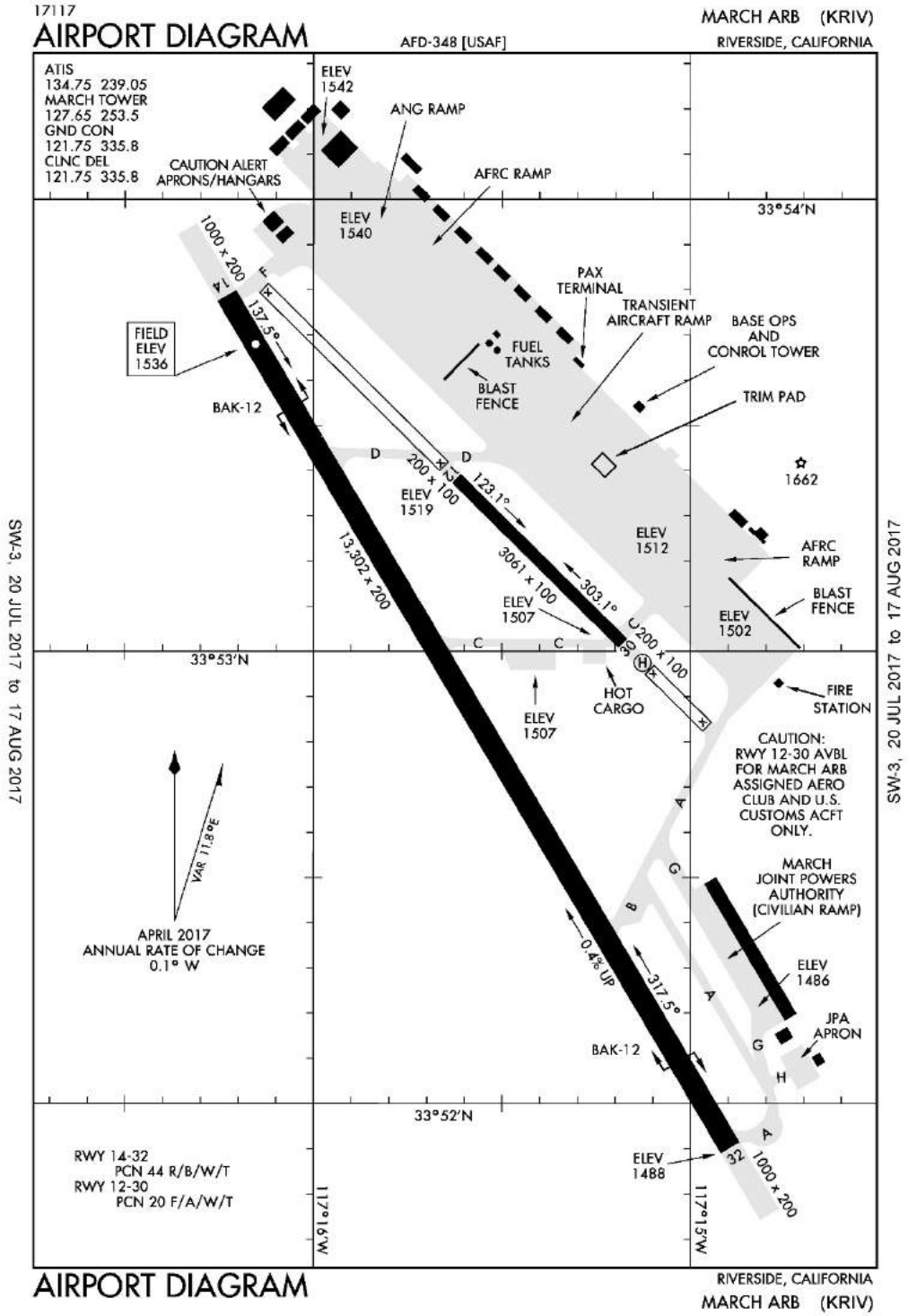


Figure 2-3. March ARB Airfield Diagram

In addition to a payroll over $267 million, total expenditures for goods/services by March ARB exceeded $182 million which results in a total economic direct impact of approximately $450 million from March ARB (Table 2-2).

Table 2-2. 2014 March ARB Direct Economic Impact

Classification	Category	
Appropriated Fund Military Payroll	Active Duty Military	$19,093,768
	Air National Guard (ANG)/ Reserve (ART/AGR)	$30,363,018
	Traditional Guard (DSG)/ Reserve (TR)	$74,084,581
	Individual Mobilization Augmentees (IMA)	$1,620,074
	Subtotal	$125,161,441
Appropriated Fund Civilian Payroll	General Schedule	$92,513,542
	Other	$38,751,309
	Subtotal	$131,264,851
Non-Appropriated Fund, Contract Civilian and Private Business Payroll	Civilian NAF	$4,536,062
	Contract Civilian (not included elsewhere)	$4,582,349
	Other	$1,696,165
	Subtotal	$10,814,576
Expenditures	Contracts and Procurement	$ 28,073,896
	Material, Equipment and Supplies	$127,582,415
	Construction	$26,925,607
	Subtotal	$182,581,918
Total	Total Economic Impact Estimate	$449,822,785

Source: Filson 2016.

SECTION 3
AIRCRAFT OPERATIONS

Aircraft operations are the primary source of noise associated with a military airbase. The level of noise exposure relates to a number of variables, including the aircraft type, engine power setting, altitude flown, direction of the aircraft, flight track, temperature, relative humidity, frequency and time of operation (day/night). This chapter discusses aircraft based at or transient (aircraft that are not permanently assigned, but conduct operations at the base on an occasional basis) to March ARB, the types and number of operations conducted at the airfields, and the runways and flight tracks used to conduct the operations.

Aircraft types that operate at March ARB are presented in Section 3.1. Sections 3.2 and 3.3 present aircraft operations and runway/flight track utilization, respectively. Section 3.4 summarizes flight profiles specific to March ARB.

3.1 AIRCRAFT TYPES

There are two primary classifications (types) of aircraft in operation at March ARB, fixed wing and rotary wing (helicopter). An assortment of these are permanently based at March ARB and are the most commonly observed aircraft to conduct operations from the base. Aircraft that are not permanently assigned, but conduct operations at the base on an occasional basis are referred to as transient. A brief description of base assigned and the most common transient aircraft is provided below.

3.1.1 Based Military Aircraft

Based military aircraft operating out of March ARB include airlift, refueling, remotely piloted, and fighter aircraft. The C-17 and KC-135 aircraft are operated by the 452 AMW, which includes the 729 AS (C-17) and 336 ARS (KC-135). The 912 ARS also operates the 452 AMW's KC-135 aircraft. The 194 FS of the California ANG, a detachment unit of the 144 FW, would operate F-15 aircraft. Also with the California ANG, the 160 ATKS and 196 ATKS operates the remotely piloted aircraft (RPA) MQ-9 Reaper.


C-17 Globemaster

The C-17 Globemaster is a Tactical and Strategic Airlift Aircraft that is powered by four turbofan engines and can operate on a runway as short as 3,500 feet. In addition to its cruise speed of 500 miles per hour (mph) and range of 2,700 miles, the C-17 can also reverse and is capable of completing a three-point turn. Thus, the C-17 is the most flexible cargo aircraft in the airlift force.


KC-135 Stratotanker

The KC-135 Stratotanker provides the core aerial refueling capability for the USAF and has excelled in this role for more than 50 years. It also provides aerial refueling support to the Navy, Marine Corps and allied nation aircraft. The KC-135 is also capable of transporting litter and ambulatory patients using patient support pallets during aeromedical evacuations.


F-15 Eagle

The F-15 Eagle is a twin engine, all-weather, extremely maneuverable, tactical fighter designed to permit the Air Force to gain and maintain air supremacy over the battlefield. This aircraft has a maximum low altitude speed of 900 mph and can achieve a maximum altitude of 65,000 feet.


MQ-9 Reaper

Commonly referred to as the Reaper, the MQ-9 is powered by a single turbo-propeller and has multiple mission capabilities. It's a medium-altitude, long-endurance RPA that is employed primarily against dynamic execution targets and secondarily as an intelligence collection asset. Given its significant loiter time, wide-range sensors, multi-mode communications suite, and precision weapons -- it provides a unique capability to perform strike, coordination, and reconnaissance against high-value, fleeting, and time-sensitive targets.

3.1.2 Based Government and Aero Club Aircraft


PC-12

This single-engine turbo propeller aircraft operated by the CBP RAU at March ARB, the fixed-wing PC-12 can be operated by one or two pilots and can accommodate up to nine passengers. This aircraft has a cruising speed of 320 mph and a range of 2,120 miles.

The rotary-winged AS-350 is also utilized by the CBP RAU at March ARB. This single-engine helocopter has a cruising speed of 152 mph and a range of 411 miles. A popular helicopter choice for law enforcement based on its versatility and minimal maintenance requirements.


AS-350

Utilized by the March ARB Aero Club, the Cessna 172 is a fixed-pitch single-engine propeller aircraft that seats four. With a cruise speed of 140 mph and a range of 801 miles, the Cessna 172 is arguably the most popular general aviation aircraft in the world.


Cessna 172


Cessna 182

Also operated by the March ARB Aero Club, the Cessna 182 is a variable-pitched propeller aircraft that seats four and has a fixed-landing gear. The Cessna 182 has a cruising speed of 167 miles per hour and range of 1,070 miles.

3.1.3 Transient Aircraft


F-16C/D

The F-16 Fighting Falcon is a compact, multi-role fighter aircraft. It is highly maneuverable and has proven itself in air-to-air combat and air-to-surface attack. It provides a relatively low-cost, high-performance weapon system for the United States and allied nations.


C-130 Hercules

The C-130 Hercules primarily performs the tactical portion of the airlift mission and is capable of operating from rough, dirt strips; further, it's the prime transport for airdropping troops and equipment into hostile areas. With a cruising speed between 350 and 400 mph, depending on aircraft variant, this four engine turbo-propeller aircraft first entered the Air Force service in 1959.


HH-60G Pave Hawk

The primary mission of the HH-60G Pave Hawk helicopter is to conduct day or night personnel recovery operations into hostile environments to recover isolated personnel during war. The HH-60G is also tasked to perform military operations other than war, including civil search and rescue, medical evacuation, disaster response, humanitarian assistance, security cooperation/aviation advisory, NASA space flight support, and rescue command and control.

Table 3-1 lists the various transient aircraft that utilize March ARB. The most frequent are the KC-135 and C-130 which perform Instrument Flight Rules (IFR) and Visual Flight Rules (VFR) closed patterns to Runway 32.

3.2 MAINTENANCE OPERATIONS

Maintenance is an integral part of any flying operation and requires a dedicated team of professionals to ensure that units can meet their flying requirements. Two key tasks in maintaining aircraft are low and high powered engine maintenance runs.

Engine runs may be conducted at any power setting between idle and maximum power and are typically conducted on aircraft parking ramps or just outside of maintenance hangars. All engine run areas are located to the east of Runway 12/30 on the main parking apron. Noise associated with these operations is included in the noise analysis and has been modeled for incorporation into the March ARB noise contours.

Table 3-1. Transient Aircraft

Aircraft Type	Description	Category
B-52H	Eight engines	Bomber
C-17	Four engines	Large Military Transport
C-5	Four engines	
B-737	Mid-size, narrow-body, twin-engine jet airliner	
B-757	Mid-size, narrow-body, twin-engine jet airliner	
DC-9	Mid-size, narrow-body, twin-engine jet airliner	
C-12	Twin-engine turboprop based on Super King Air	Small Military Transport
C-130	Four-engine turboprop	
E-3	Four engines based on B-707	Radar
E-6	Four engines based on B-707-320	Command
F-15	Twin Engine	Fighter
F-16	Single Engine	
KC-10	Based on the DC-10, three engines	Air Refueling Tanker
KC-135	Based on the B-707, four engines	
T-38	Twin Engine	Trainer
UH-1N	Two-blade, twin engine medium lift utility	Helicopter
HH-60	Four-blade, twin engine medium lift utility	
CH-53	Six-blade, twin engine heavy lift transport	
CH-46	Tandem rotor, three-blades per rotor, twin engine medium lift	
AH-1G	Two-blade, twin engine attack	

Source: March ARB 2016b.

Approximately 2.0 percent of all aircraft engine runs at March ARB occur during nighttime (10:00 p.m. to 7:00 a.m.) and are mainly associated with pre-flight checks. The noise associated with pre-flight and engine maintenance engine runs were included in the noise analysis and modeling associated with the noise contours.

3.3 FLIGHT OPERATIONS

Flight activities, including where aircraft fly, how high they fly, how many times they fly over a given area, and the time of day they operate, must be fully evaluated to understand the relationship of flight operations and land use. This chapter discusses typical flight operations for aircraft based at March ARB.

Each time an aircraft crosses over a runway threshold (the beginning or ending of a runway's useable surface) with the intent to either takeoff, practice an approach, or land, it is counts as a single flight operation. For example, a departure counts as a single operation as does an arrival. However, when an aircraft conducts a pattern

(a departure followed by an immediate return) it counts as two operations. This is because the aircraft crosses both the approach and departure ends of the runway during the pattern.

Aircraft operations at March ARB are conducted on a year around basis and in general, experience very little variance in operations from month to month. The following paragraphs and figures highlight typical flight tracks that are followed during normal or increased operations. Each track is designed to maximize flight operations and, when possible, minimize the effects of noise.

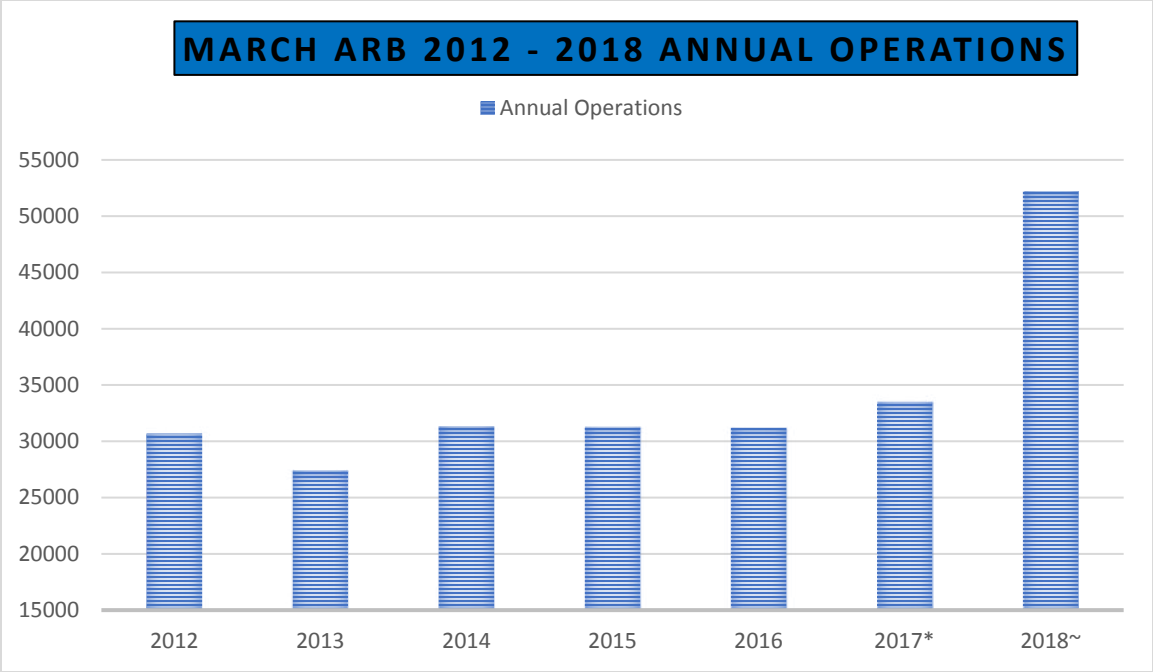
- **Takeoff.** When an aircraft is positioned on the runway, the engine power is set to facilitate movement and eventual flight.
- **Departure.** For the purpose of air traffic sequencing, separation, noise abatement, compliance with avoidance areas and overall safety of flight, aircraft follow specific ground tracks and altitude restrictions as they depart the airfield's immediate airspace.
- **Straight-In Arrival.** An aircraft is aligned with the runway extended centerline and begins a gradual descent for landing. This type of approach enables an aircraft to maintain a smooth, stable and steady approach and requires no additional maneuvering.
    - **Overhead Break Arrival.** An expeditious arrival using VFR. The aircraft arrives over the airfield on the runway centerline at a specified point and altitude and then performs a 180 degree "break turn" away from the runway to enter the landing pattern. Once established, the landing gear and flaps are lowered and the pilot performs a second 180-degree descending turn toward runway centerline to land.
    - **Pattern Work.** Pattern work refers to traffic pattern training where the pilot performs takeoffs and landings in quick succession by taking off, flying the pattern, and then landing. Traffic pattern training is demanding and utilizes all the basic flying maneuvers a pilot learns: takeoffs, climbs, turns, climbing turns, descents, descending turns, and straight and level landings.
    - **Low Approach.** A low approach is an approach to a runway that does not result in a landing, but rather a descent towards the runway (usually below 500 feet above ground level [AGL]) followed by a climb-out away from the airfield. Low approaches are accomplished for a number of reasons. One such reason is to practice avoiding potential ground obstructions (i.e., vehicles, debris, stray animals, etc.).
    - **Touch and Go.** A touch-and-go landing pattern is a training maneuver that involves landing on a runway and taking off again without coming

to a full stop. Usually the pilot then circles the airport in a defined pattern known as a circuit and repeats the maneuver.

- **Box/Arrival Pattern.** Ground Control Approach (GCA) is a radar or "talk down" approach directed from the ground by an air traffic controller (ATC). ATC personnel provide pilots with verbal course and glide slope information, allowing them to make an instrument approach during inclement weather. A Box/Arrival Pattern is normally flown to practice GCA approaches. The Box/Arrival Pattern utilizes a "box-shaped" flight pattern with four 90-degree turns done at a set altitude, used to practice a variety of approach procedures at an airfield.
- **Radar Approach.** An instrument approach is provided with active assistance from ATC during poor weather conditions. ATC personnel direct the aircraft toward the runway centerline. Once established on the centerline, pilots use aircraft instruments to maintain runway alignment and adherence to altitude restrictions until the pilot is able to acquire visual sight with the runway environment. Pilots often practice this type of approach to maintain proficiency.
- **Simulated Flame-Out (SFO).** This is a visual flight maneuver used to simulate a landing recovery from a complete loss of engine thrust. To execute the maneuver, a pilot must establish the aircraft on a specified flight profile (altitude, airspeed, position over the airfield) which would allow the aircraft to glide safely across the runway threshold in a position to land. If properly executed, the maneuver should not require the use of additional engine power until after the maneuver is complete.

3.4 ANNUAL AIRCRAFT OPERATIONS

Figure 3-1 describes all aircraft operations that occurred at March ARB over a 5-year period, including based and transient aircraft. As described below, total annual operations account for each departure and arrival, including those conducted as part of a pattern operation.



2012-2016 transient, CBP RAU, Aero Club, and March JPA operations are consistent annually
*estimation, includes 2016 ATC counts in addition to 163 ATKW proposed operations
~Includes all projected based, transient, CBP RAU, Aero Club, and March JPA operations
Sources: March ARB 2016a, 2016b; March JPA 2016

Figure 3-1. Summary of Flight Operations at March ARB from 2012 to 2018

This study focuses on aircraft activity that is anticipated to occur during Calendar Year (CY) 2018 (CY18), taking into account existing based aircraft operations and allocated March JPA aircraft operations. March ARB is expected to conduct approximately 52,172 annual aircraft operations during 2018 as shown in Figure 3-1. The CY18 scenario accounts for full operational capability of the 163 ATKS MQ-9 Reaper operations and the transition of the 144 FS operations from F-16 aircraft to F-15 aircraft. Approximately 72 percent of the flight operations at March ARB are closed patterns in this scenario. Under the March ARB and March JPA Joint Use Agreement, March JPA is allocated up to 21,000 annual operations (only arrivals and departures); this allocation is also included in development of the study.

Consistent with Air Force policy, aircraft operations are modeled on an average annual day basis, thus the annual operations in Table 3-2 are divided by 365 resulting in approximately 143 average daily flight operations as detailed in Table 3-3.

Table 3-2. Annual Projected Aircraft Flight Operations for 2018

Category	Squadron	Aircraft	Engine*	Arrivals				Departures				Closed Patterns				Total			
				Day 0700-1900	Evening 1900-2200	Night 2200-0700	Total	Day 0700-1900	Evening 1900-2200	Night 2200-0700	Total	Day 0700-1900	Evening 1900-2200	Night 2200-0700	Total	Day 0700-1900	Evening 1900-2200	Night 2200-0700	Total
Based	729 AS	C-17		596	130	3	729	708	21	0	729	8,734	3,886	0	12,620	10,036	4,038	4	**14,078**
	144 FS	F-15E	F-15E (X-220)	374	21	21	416	374	42	0	416	364	20	0	384	1,112	83	21	**1,216**
	336/912 ARS	KC-135R		433	112	148	693	478	210	5	693	3,761	442	221	4,424	4,672	764	374	**5,810**
	163 ATKS	MQ-9	T34	568	0	0	568	568	0	0	568	1,136	0	0	1,136	2,272	0	0	**2,272**
	CBP RAU	PC12	T34	155	17	0	172	153	19	0	172	258	0	0	258	566	36	0	**602**
		AS350		78	8	0	86	76	10	0	86	128	0	0	128	282	18	0	**300**
	Aero Club	Cessna 172	GASEPF	761	27	0	788	770	18	0	788	1,418	0	0	1,418	2,949	45	0	**2,994**
		Cessna 182	GASEPV	262	0	0	262	262	0	0	262	472	0	0	472	996	0	0	**996**
Transient				664	0	4	668	668	0	0	668	1,568	0	0	1,568	2,900	0	4	**2,904**
March JPA				5,376	3,019	2,105	10,500	4,976	4,044	1,480	10,500	0	0	0	0	10,352	7,063	3,585	**21,000**
Total				**9,267**	**3,334**	**2,281**	**14,882**	**9,033**	**4,364**	**1,485**	**14,882**	**17,839**	**4,348**	**221**	**22,408**	**36,137**	**12,047**	**3,988**	**52,172**

Sources: CBP RAU 2016; March ARB 2016a, 2016b; March ARB Aero Club 2016; March JPA 2016.

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Table 3-3. Annual Average Daily Aircraft Flight Operations Projected for 2018

Category	Squadron / Unit / Group	Aircraft	Average Daily Arrival and Departure Operations	Average Daily Closed Operations	Total Average Daily Operations
Based	729 AS	C-17	3.99	34.58	38.57
	144 FS	F-15	2.28	1.05	3.33
	336/912 ARS	KC-135	3.80	12.12	15.92
	163 ATKS	MQ-9	3.11	3.11	6.22
	CBP RAU	PC-12/AS-350	1.41	1.06	2.47
	Aero Club	Cessna 172/182	5.75	5.18	10.93
Transient			3.67	4.26	7.93
March JPA			57.54	0	57.54
Total			**81.55**	**61.36**	**142.91**

Sources: CBP RAU 2016; March ARB 2016a, 2016b; March ARB Aero Club 2016; March JPA 2016.

3.5 RUNWAY AND FLIGHT TRACK UTILIZATION

3.5.1 Runway Utilization

The frequency with which aircraft utilize a runway involves a variety of factors including, but not limited to:

- the airfield environment (layout, lights, runway length, etc.),
- direction of prevailing winds,
- location of natural terrain features (rivers, lakes, mountains, and other features),
- wildlife activity,
- number of aircraft in the pattern, and/or
- the preference of a runway for the purpose of safety and noise abatement.

Airfield Management, control tower personnel and the Supervisor of Flying establish the runway in use. Pattern procedures are adjusted accordingly to maximize air traffic flow efficiency.

Table 3-4 summarizes daytime and nighttime runway utilization by operation type and aircraft type. Runway 32 is used most frequently by all aircraft with approximately 95 percent of all operations, while the remaining 5 percent occur on Runway 14. Runway 12/30 is used exclusively by the March ARB Aero Club and CBP RAU rotary-wing aircraft.

Table 3-4. March ARB Runway Utilization

Operation	Runway	Based							Transients		March JPA	
		729 AS	336/912 ARS	144 FS	163 ATKS	CBP RAU		Aero Club	Aircraft	Helicopter	Aircraft	Helicopter
		C-17	KC-135R	F-15	MQ-9	AS350	PC-12	C-172/-182				
Arrival	14	5%	20%	2%	8%				5%		6%	
	32	95%	80%	98%	92%		90%	5%	95%		94%	
	12					5%	1%			50%		4%
	30					95%	9%	95%		50%		96%
Departure	14	11%	80%	99%	10%				30%		6%	
	32	89%	20%	1%	90%		90%	3%	70%	50%	94%	
	12					5%	1%	5%		50%		4%
	30					95%	9%	92%				96%
Closed Pattern	14				10%							
	32	100%	100%	100%	90%		91%	2%	100%			
	12					5%	1%			50%		
	30					95%	8%	98%		50%		

Sources: CBP RAU 2016; March ARB 2016a, 2016b; March Aero Club 2016, March JPA 2016.

3.5.2 Flight Tracks

Each runway has designated flight tracks which provide for the safety, consistency, and control of an airfield. Flight tracks depict where aircraft fly in relation to an airfield. They are designed for departures, arrivals and for pattern work procedures, and are designated for each runway to facilitate operational safety, noise abatement, aircrew consistency, and the efficient flow of air traffic within the tower's controlled airspace. Aircraft flight tracks are not set highways in the sky. While we show flight tracks as a line on the map, they are actually bands. Aircraft de-confliction, configuration, pilot technique, takeoff weight, and wind all affect the actual path taken on any given flight.

Flight tracks specific to March ARB result from several considerations, including:

- departure tracks routed to avoid noise-sensitive areas as much as possible;
- criteria governing the speed, rate of climb, and turning radius for each type of aircraft in the given airspace;
- efforts to control and schedule missions to keep noise levels low, especially at night; and
- coordination with the FAA to minimize conflict with civil aircraft operations.

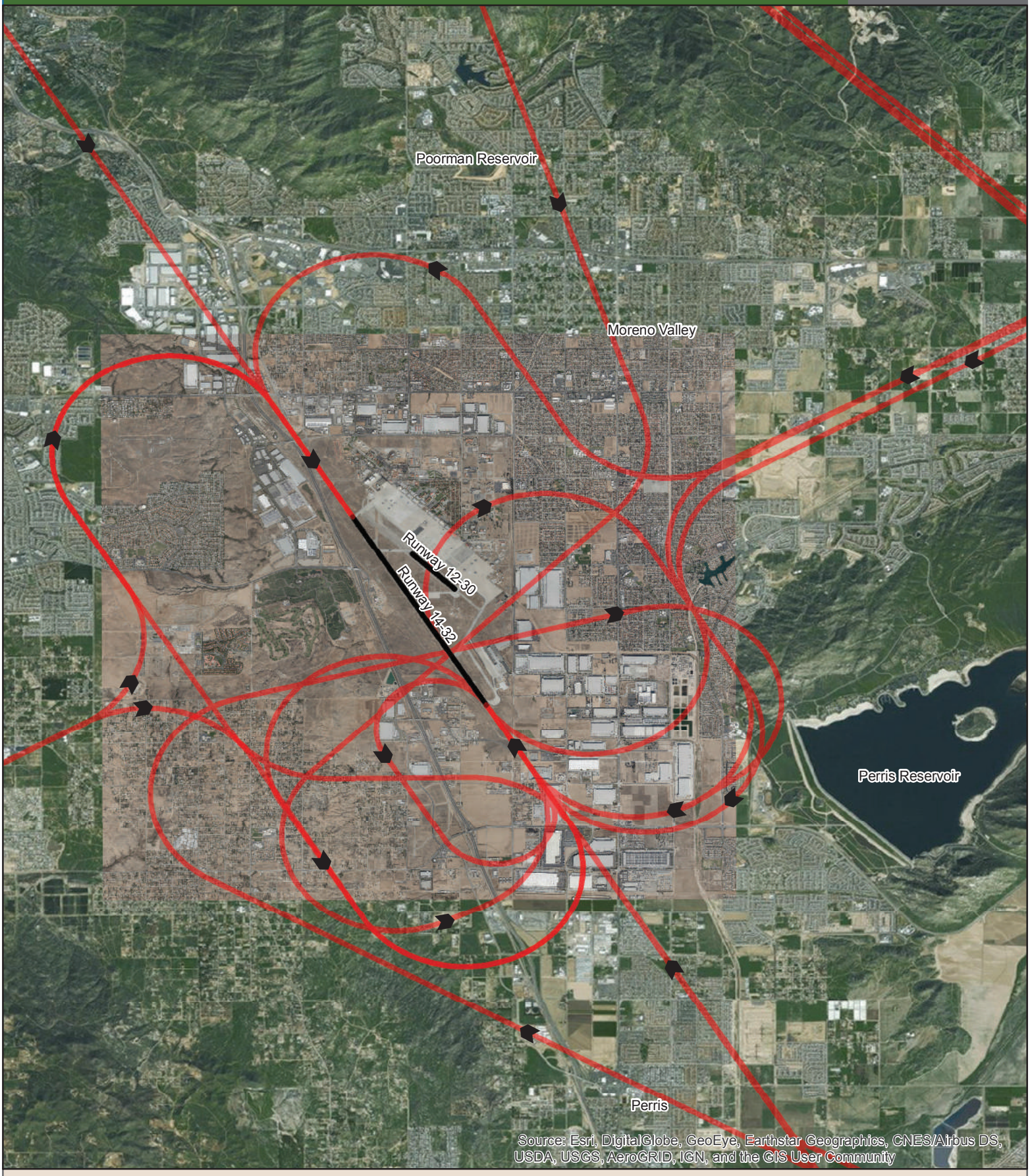
Aircraft operating at March ARB utilize the following flight tracks:

- departures in both north and south directions;
- arrivals from both north and south directions;
- Runway 14/32 radar and visual closed patterns to the west and east of the airfield; and,
- Runway 12/30 visual closed patterns to the east of the airfield.

The typical flight tracks for Runway 14/32 and Runway 12/30 are depicted in Figures 3-2 through 3-7, starting with arrivals, then departures and closed patterns. These flight tracks were used for March ARB aircraft noise modeling.

March ARB Runway 14/32 Arrivals

Figure 3-2



Legend

Runway

Arrival Flight Tracks

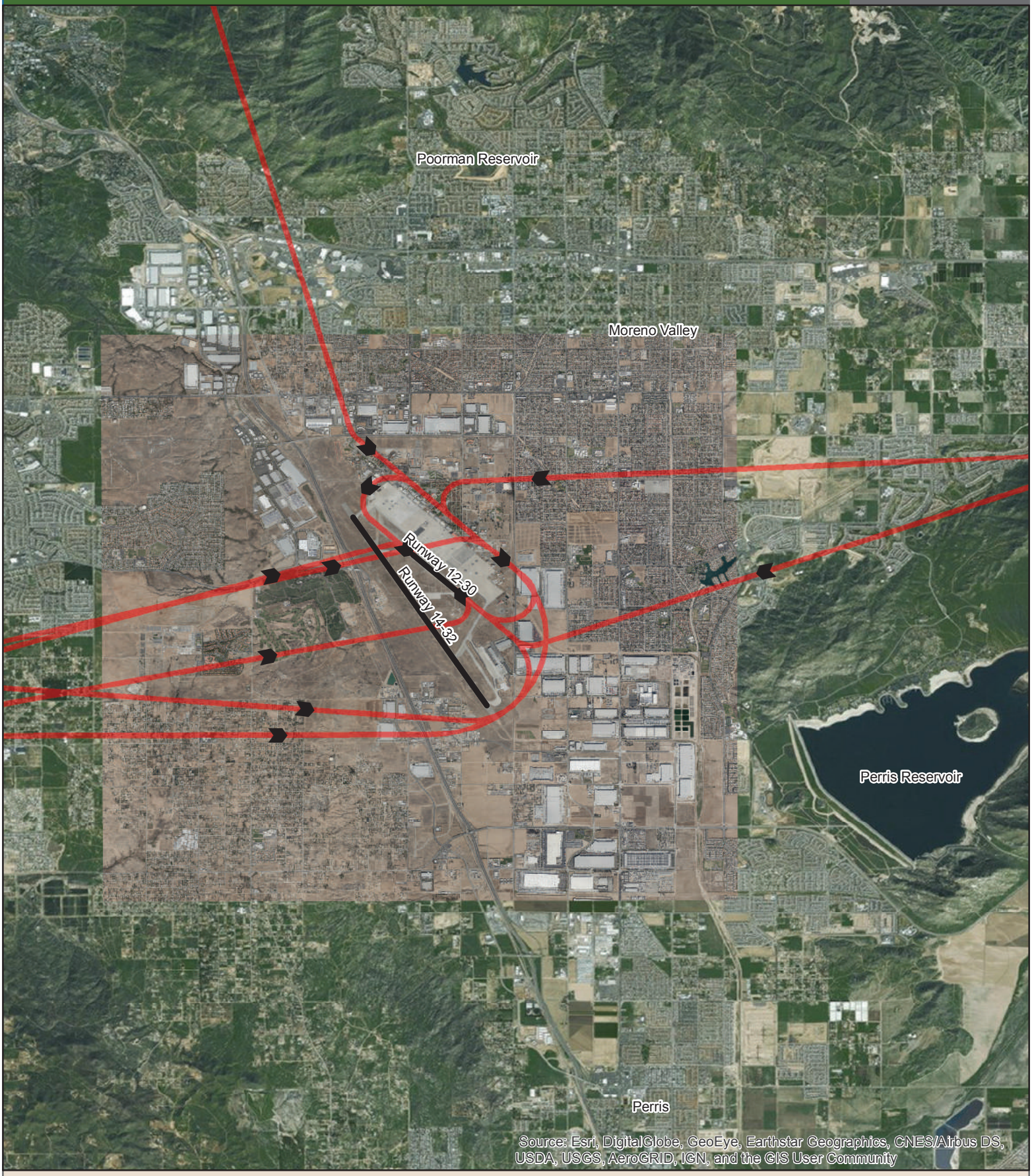
N

0 2.1 Miles

1 inch = 1.46 miles

March ARB Runway 12/30 Arrivals

Figure 3-3



Legend

Runway

Arrival Flight Tracks

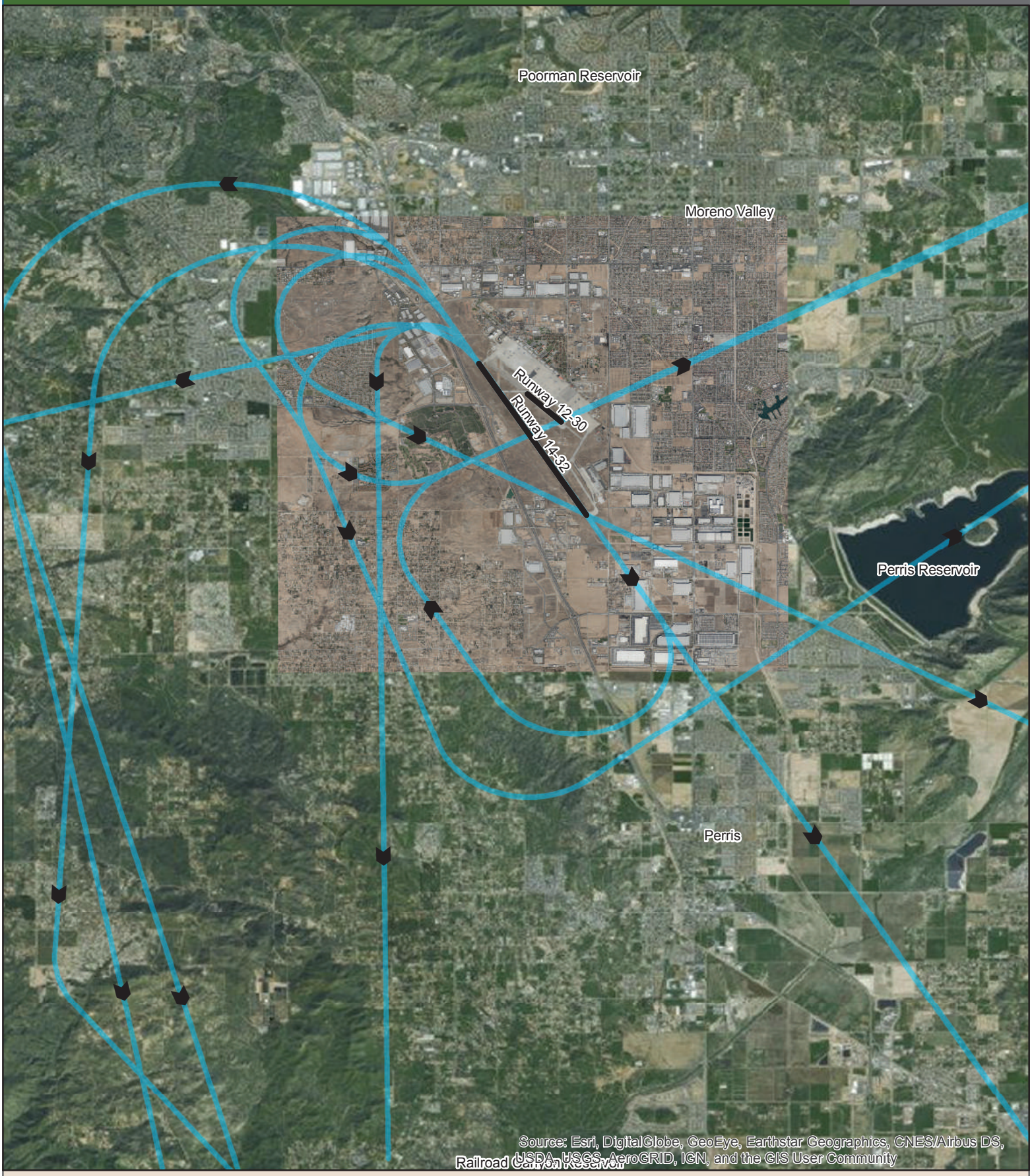
N

0 2.1 Miles

1 inch = 1.46 miles

March ARB Runway 14/32 Departures

Figure 3-4



Legend

Runway — Departure FlightTracks

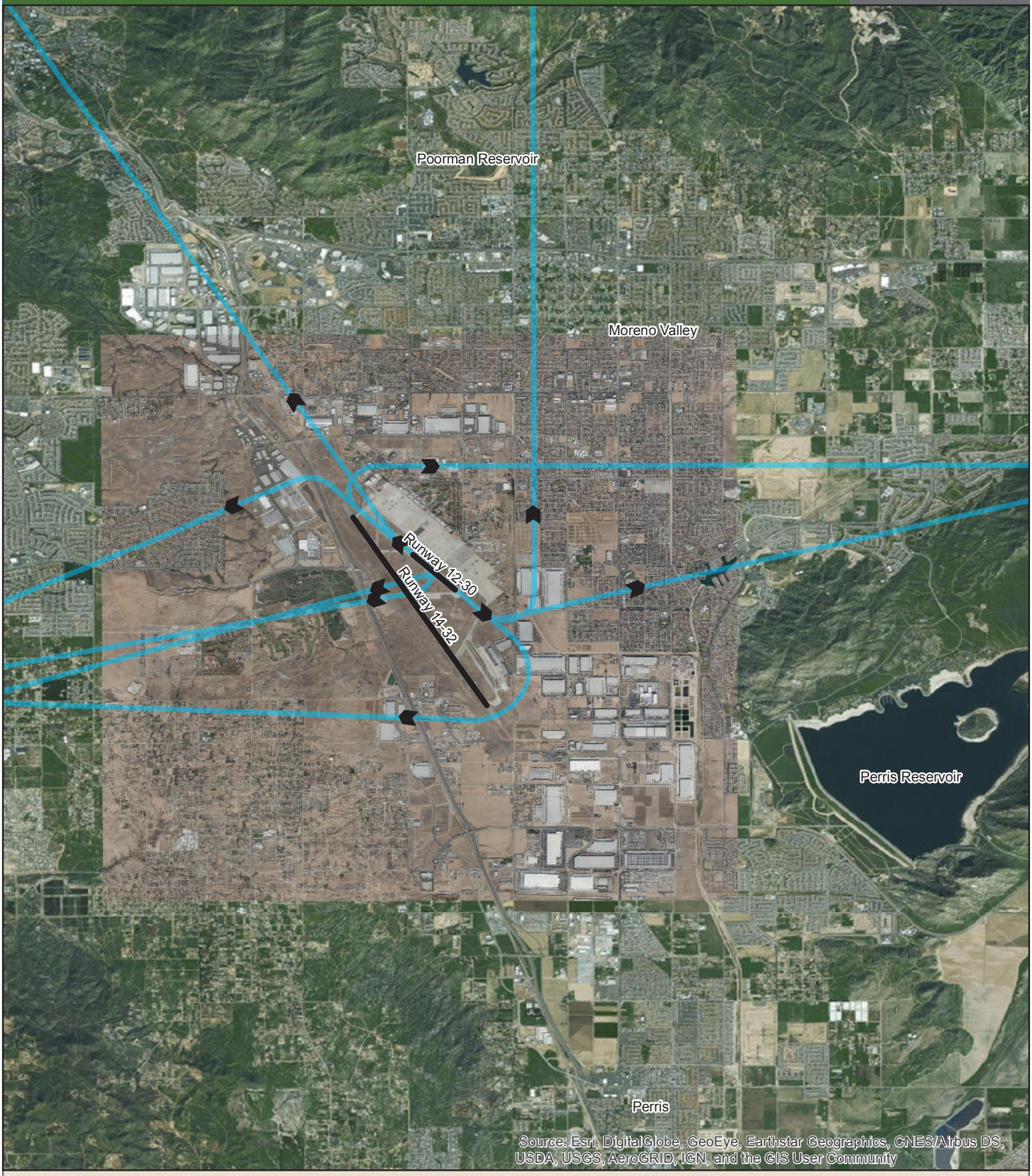
N

0 — 2.7 Miles

1 inch = 1.82 miles

March ARB Runway 12/30 Departures

Figure 3-5



Legend

Runway

Departure FlightTracks

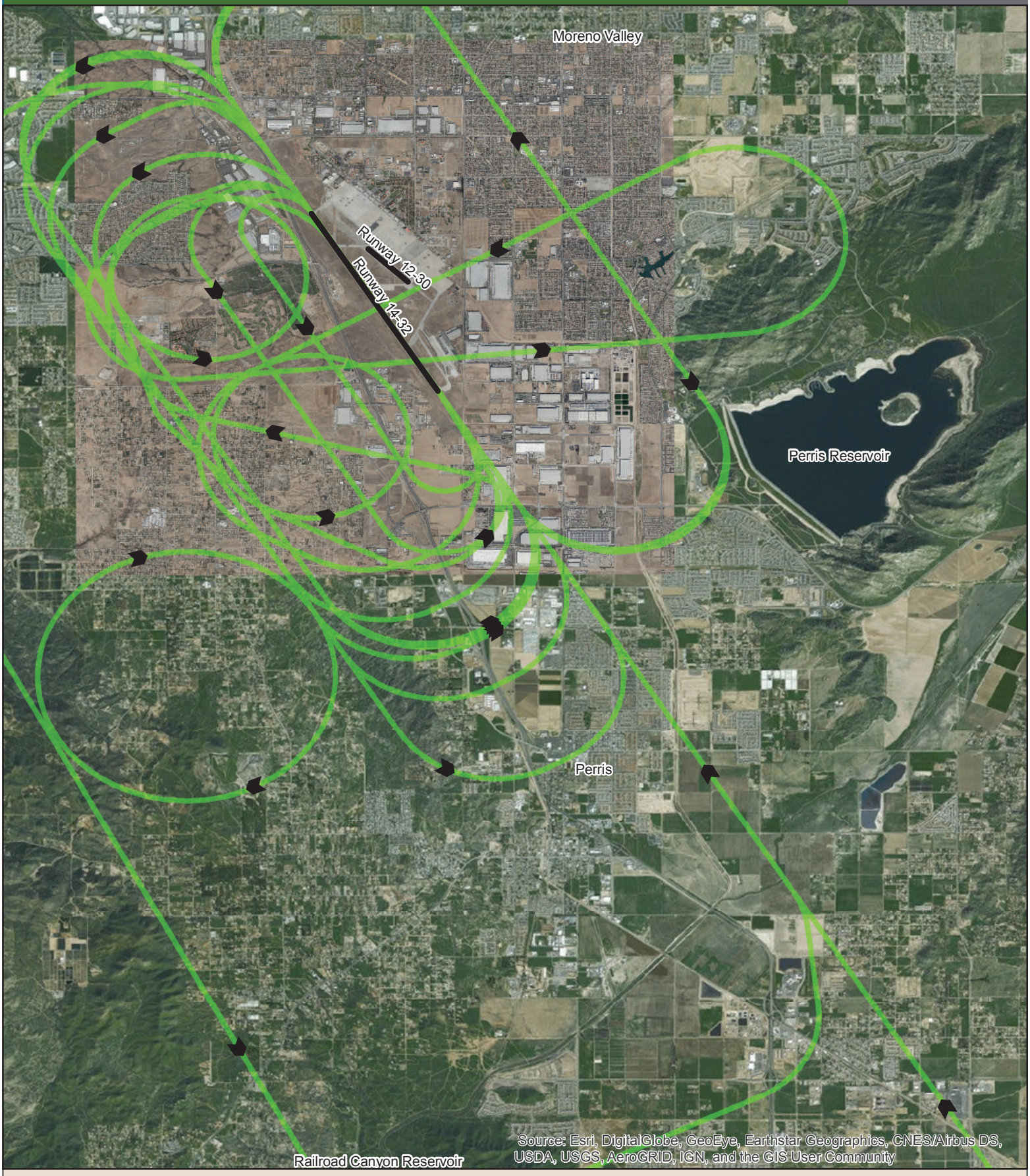
N

0 2.1 Miles

1 inch = 1.46 miles

March ARB Runway 14/32 Closed Patterns

Figure 3-6



Legend

Runway

Closed Pattern Flight Tracks

N

0 2.25 Miles

1 inch = 1.55 miles

March ARB Runway 12/30 Closed Patterns

Figure 3-7

Legend

Runway

Closed Pattern Flight Tracks

N

0 0.45 Miles

1 inch = 0.34 miles

3.6 NOISE ABATEMENT

The Air Force recognizes that noise from military operations may cause concern for people living near military installations.

For this reason, the Air Force has established a Noise Program aimed at reducing and controlling the emission of noise and vibrations associated with the use of military aircraft, weapon systems and munitions while maintaining operational requirements. The result is the implementation of various strategies, techniques and procedures, documented under the March ARB Noise Abatement Program, that are aimed at protecting persons and structures from the harmful effects of noise and vibrations.

March ARB Noise Abatement Program includes quiet hours that coincide with the published operating hours and other times by Notice to Airmen (NOTAM). The Airfield Manager (AM) and staff are responsible for distribution of approved quiet hours, coordinating and submitting NOTAMs implementing quiet hours, and restricting prior permission required for applicable quiet hour times. All units operating on the airfield are required to comply with quiet hour restrictions. Emergencies as well as 144 FW and CBP RAU alert operations take precedence over any quiet hour restrictions. The AM and ATC will enforce quiet hours as directed and implement restrictions no later than five minutes prior to quiet hours.

Organizations requesting quiet hours must specify the type of operational restrictions, which fall under the "No", "Limit", or "Permitted" operational parameter and include: aircraft towing; aircraft engine runs, aircraft auxiliary power runs, aircraft taxi; vehicle and personnel movement; and runway operations.

During quiet hours, transient aircraft not permanently based at March ARB are not authorized to conduct pattern work between the hours of 9 p.m. and 11 p.m.; however, full stop (i.e. aircraft proceed to parking apron after landing) landings are authorized. Radar Approach Control (RAPCON) must utilize 5,000 feet MSL pattern altitude within confines of delegated airspace between the hours of 10 p.m. and 11 p.m. The tower must hold tanker or receiver aircraft awaiting wingman departure at 3,500 feet MSL or higher over the airfield.

Base leadership reviews flight operations and their potential impact on surrounding communities. This requirement facilitates the planning, designation and establishment of flight tracks over sparsely populated areas and/or waterways as often as practicable as possible to balance operational safety and reduce noise exposure levels in surrounding communities.

3.7 NOISE COMPLAINTS

At times, military operations may draw noise complaints. The Air Force evaluates all noise complaints to ensure future operations, where possible, do not generate unacceptable noise. Concerned citizens are encouraged to contact the March ARB Public Affairs Office with any noise complaints at (951)-655-4137 or via email at 452amw.paworkflow@us.af.mil.

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SECTION 4
AIRCRAFT NOISE

Terrain features, weather phenomena, man-made structures and daily life activity contribute to noise exposure.

How a base manages aircraft noise can play a key role in shaping an installation's relationship with the adjacent communities. Aircraft noise management is ideally a key factor in local land use planning.

While the level of noise produced by aircraft may have a direct effect on communities in close proximity to military air installations, other factors also influence the noise impact. An airfield's layout (its buildings, parking ramps and runways, etc.), type of aircraft, natural terrain features, weather phenomena, and daily activities all influence the levels of noise that the community experiences.

Because noise from aircraft may affect areas around the installation, the Air Force has defined noise zones using the guidance provided in the AICUZ instruction (AFI 32-7063).

4.1 WHAT IS SOUND/NOISE

Sound consists of vibrations in the air. A multitude of sources can generate these vibrations, including roadway traffic, barking dogs, radios – or aircraft operations. We call these vibrations compression waves. Just like a pebble dropped into a pond creates ripples, the compression waves – formed of air molecules pressed together – radiate out, decreasing with distance. If these vibrations reach your eardrum, at a certain rate and intensity, you perceive it as sound. When the sound is unwanted, we refer to it as noise. Generally, sound becomes noise to a listener when it interferes with normal activities. Sound has three components: intensity, frequency and duration.

Sound becomes noise when it interferes with normal activities.

- Intensity or loudness is related to sound pressure change. As the vibrations oscillate back and forth, they create a change in pressure on the eardrum. The greater the sound pressure change, the louder it seems.

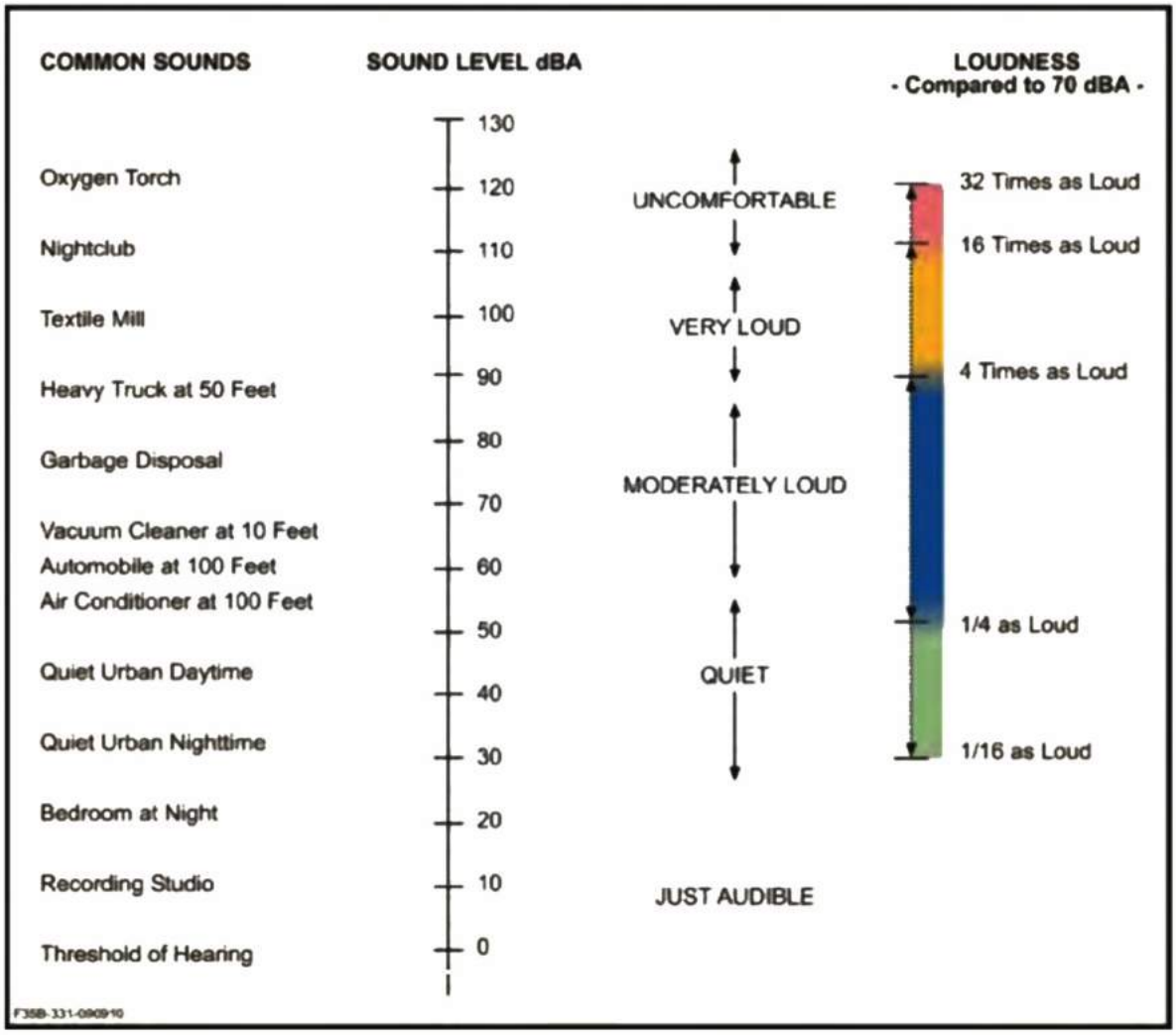
- Frequency determines how we perceive the pitch of the sound. Low-frequency sounds are characterized as rumbles or roars, while high-frequency sounds are typified by sirens or screeches. Sound frequency is measured in terms of cycles per second or hertz (Hz). While the range of human hearing goes from 20 to 20,000 Hz, we hear best in the range of 1,000 to 4,000 Hz. For environmental noise, we use A-weighting, which focuses on this range, to best represent human hearing. While A-weighted decibels may be written as "dBA", if it is the only weighting being discussed, the "A" is generally dropped.
- Duration is the length of time we can detect the sound.

4.2 HOW SOUND IS PERCEIVED

The loudest sounds that can be comfortably heard by the human ear have intensities a trillion times higher than those of sounds barely heard. Because such large numbers become awkward to use, we measure noise in decibels (dB), which uses a logarithmic scale, which doubles the noise energy every three decibels.

Figure 4-1 is a chart of A-weighted sound levels from common sources. 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 120 dB can cause discomfort inside the ear, while sound levels between 130 and 140 dB are felt as pain.

Table 4-1 tabulates the subjective responses with change in (single-event) sound level. While noise energy doubles or halves with every three-decibel change, we do not perceive all that noise energy. It takes a 10 decibel increase or decrease for our ear to perceive a doubling or halving of loudness.



Sources: Harris 1979; Federal Interagency Committee on Aviation Noise (FICAN) 1997.

Figure 4-1. Common A-weighted Sound Levels

Table 4-1. Subjective Response to Changes in Sound Level

Change in Sound Level	Change in Loudness
20 dB	Striking 4-fold Change
10 dB	Dramatic 2-fold or Half as Loud
5 dB	Quite Noticeable
3 dB	Barely Perceptible
1 dB	Requires Close Attention to Notice

4.3 COMMUNITY NOISE EQUIVALENT LEVEL

When we hear an aircraft fly over, the question may be asked, "How loud was that?" While we may often find ourselves concerned over the loudness of a sound, there are other dimensions to the sound event that draw our interest. For instance, does one overflight draw the same interest as two separate overflights – or as twenty? Also, does the 30-second run-up of engines prior to takeoff roll draw the same interest as a 30-minute maintenance run? Additionally, is an overflight more noticeable at two in the afternoon – or two in the morning, when the ambient noise is low and you are trying to sleep?

The length and number of events – the total noise energy – and the time of day play key roles in our perception of noise. To reflect these concerns, the Air Force and the State of California use a metric called the Community Noise Equivalent Level (CNEL).

CNEL, when used as a metric for aircraft noise, represents the accumulation of noise energy from all aircraft noise events in 24-hours. Additionally, for all operations between 10:00 p.m. and 7:00 a.m., a penalty of 10 decibels is added each event to account for the intrusiveness of nighttime operations. CNEL also adds a penalty for evening operations, adding a penalty of five decibels to each event between the hours of 7:00 p.m. and 10:00 p.m. CNEL represents the noise energy present in a daily period. However, because aircraft operations at military airfields fluctuate from day to day, CNEL is typically based upon a year's worth of operations and thus represents the annual average daily aircraft events.

4.4 NOISE CONTOURS

The Air Force prepares noise contours, as needed, to assess the compatibility of aircraft operations. Noise contours connect points of equal value, just as contours on topographic maps connect points of equal elevation. This AICUZ Study exhibits the present-day planning noise contours. The Air Force utilizes NOISEMAP, the DoD standard model for assessing noise exposure from military aircraft operations at air installations. Noise contours, when overlaid on local land use maps, can help to identify areas of incompatible land uses and assist communities in planning for future development around an air installation.

4.4.1 Noise Contour Assumptions

Assumptions included for the March ARB noise zones include:

- The California Air National Guard's 163 ATKW would be fully operational completing two (2) MQ-9 sorties per day, both during weekdays and one (1) weekend per month.

- The California Air National Guard's 144 FW would complete their alert mission at March ARB operating F-15 aircraft.

- March JPA would operate at their maximum annual allocation of 21,000 aircraft operations.

Table 4-2 presents the projected operations for the March ARB 2018 AICUZ noise zones (Figure 4-2).

Table 4-3 tabulates the off-base land acreage and estimated population within the greater than 60 dB CNEL noise zone. The population estimates are based on refined 2010 census block data for average numbers of persons per residence for each of the local municipalities (i.e., city of Moreno Valley, city of Perris, city of Riverside, and Riverside County) (US Census Bureau 2010). Using imagery, residential units within each noise contour were counted and multiplied by the average number of persons per residence within each municipality. The exposure to a minimum of 60 dB CNEL would include approximately 3,989 acres and 4,570 people, the majority of which (98 percent) would be exposed to CNEL between 60 dB and 64 dB. Very little acreage and no people would be exposed to CNEL greater than or equal to 75 dB off-base.

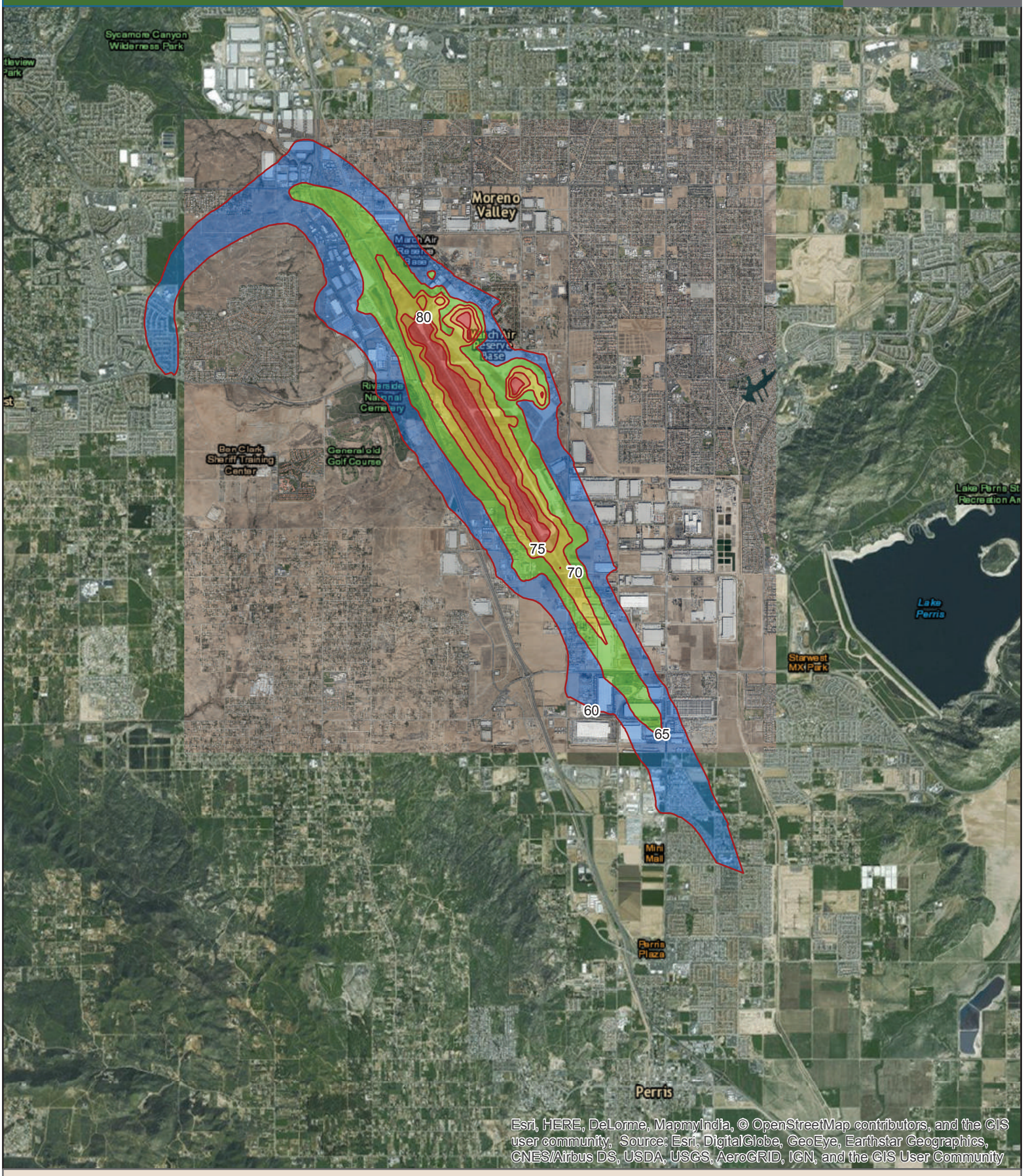
4.4.1.1 City of Moreno Valley

Within the City of Moreno Valley, the 60 dB CNEL noise zone extends to the north of Runway 14/32 and the 65 dB CNEL noise zone passes over a corner of the city's jurisdiction, where the highest noise level anticipated would be 69 dB CNEL.

The city's boundary also covers the south end of Runway 14/32 where the 60 dB, 65 dB, and 70 dB CNEL noise zones all pass through Moreno Valley jurisdiction. The highest noise level within the Moreno Valley would be 74 dB CNEL.

March ARB 2018 AICUZ Noise Contours

Figure 4-2



Legend

March ARB 2018 Noise Contours

Noise Contour Levels (CNEL)

60dB 65dB 70dB 75dB 80dB

N

0 1.95 Miles

1 inch = 1.29 miles

Table 4-2. Annual Aircraft Flight Operations for March ARB 2018 AICUZ Noise Zones

Category			Based								Transient	March JPA	Total
Squadron			729 AS	144 FS	336/912 ARS	163 ATKS	CBP RAU		Aero Club				
Aircraft			C-17	F-15E	KC-135R	MQ-9	PC12	AS350	Cessna 172	Cessna 182			
Engine*			-	F-15E (X-220)	-	T34	T34	-	GASEPF	GASEPV			
Arrivals	Day	0700-1900	596	374	433	568	155	78	761	262	664	5,376	**9,267**
	Evening	1900-2200	130	21	112	0	17	8	27	0	0	3,019	**3,334**
	Night	2200-0700	3	21	148	0	0	0	0	0	4	2,105	**2,281**
	Total		**729**	**416**	**693**	**568**	**172**	**86**	**788**	**262**	**668**	**10,500**	**14,882**
Departures	Day	0700-1900	708	374	478	568	153	76	770	262	668	4,976	**9,033**
	Evening	1900-2200	21	42	210	0	19	10	18	0	0	4,044	**4,364**
	Night	2200-0700	0	0	5	0	0	0	0	0	0	1,480	**1,485**
	Total		**729**	**416**	**693**	**568**	**172**	**86**	**788**	**262**	**668**	**10,500**	**14,882**
Closed Patterns	Day	0700-1900	8,734	364	3,761	1,136	258	128	1,418	472	1,568	0	**17,839**
	Evening	1900-2200	3,886	20	442	0	0	0	0	0	0	0	**4,348**
	Night	2200-0700	0	0	221	0	0	0	0	0	0	0	**221**
	Total		**12,620**	**384**	**4,424**	**1,136**	**258**	**128**	**1,418**	**472**	**1,568**	**0**	**22,408**
Total	Day	0700-1900	10,036	1,112	4,672	2,272	566	282	2,949	996	2,900	10,352	**36,137**
	Evening	1900-2200	4,038	83	764	0	36	18	45	0	0	7,063	**12,047**
	Night	2200-0700	4	21	374	0	0	0	0	0	4	3,585	**3,988**
	Total		**14,078**	**1,216**	**5,810**	**2,272**	**602**	**300**	**2,994**	**996**	**2,904**	**21,000**	**52,172**

Table 4-3. Off-base Land Area and Estimated Population within the Greater Than 60 dB CNEL Noise Zones

CNEL (dB)	Acres	Housing Units	Population
60-64	2,847	1,229	4,483
65-69	1,052	18	75
70-74	90	3	12
75-79	0	0	0
80+	0	0	0
Total	**3,989**	**1,250**	**4,570**

Sources: Amec Foster Wheeler 2017a; U.S. Census Bureau 2010.

4.4.1.2 City of Perris

The City of Perris is situated directly along the southern end of Runway 14/32 where the majority of aircraft arrivals and closed patterns occur, thus Perris has the largest amount of acreage exposed to noise levels above 60 dB CNEL when compared to the neighboring municipalities. The 60 dB, 65 dB, and 70 dB CNEL noise zones all extend inside the city of Perris boundary, with the largest anticipated cumulative noise level being 73 dB CNEL.

4.4.1.3 City of Riverside

Within the City of Riverside, the 60 dB CNEL noise zone extends to the north and west of March ARB following the departure track from Runway 32 that departs to the north and is followed by a 140-degree left turn which heads south. The 65 dB CNEL noise zone extends slightly into the Riverside boundary, where the highest expected noise level would be 66 dB CNEL.

4.4.1.4 Riverside County

The 60 dB CNEL noise zone passes through Riverside County's jurisdiction directly west of the base; additionally, part of the 65 dB CNEL noise zone extends into Riverside County jurisdiction to a lesser extent.

4.4.2 Comparison of 2005 AICUZ and 2018 AICUZ

As depicted in Figure 4-3, there is a large reduction in the noise footprint and exposure when comparing the 2005 AICUZ to the current study. This reduction is due largely to the methodology (determining aircraft operational numbers based on average annual day instead of average busy day); changes in the aircraft noise models, both civilian (INM in 2005 and AEDT in 2018) and military (newer version of NOISEMAP); and modern aircraft engines (quieter than their predecessors).

The area of off-base noise exposure above 60 dB CNEL from aircraft operations at March ARB totals approximately 1,954 acres less when comparing the current study (2018) to the 2005 AICUZ Study (Table 4-4).

Table 4-4. Off-Base Acreage Comparison 2005 AICUZ and 2018 AICUZ

CNEL (dB)	Acres		Difference
	2005	2018	
60-64	3,959	2,847	-1,112
65-69	1,501	1,052	-449
70-74	417	90	-327
75-79	66	0	--66
80+	0	0	0
Total	**5,943**	**3,989**	**-1,954**

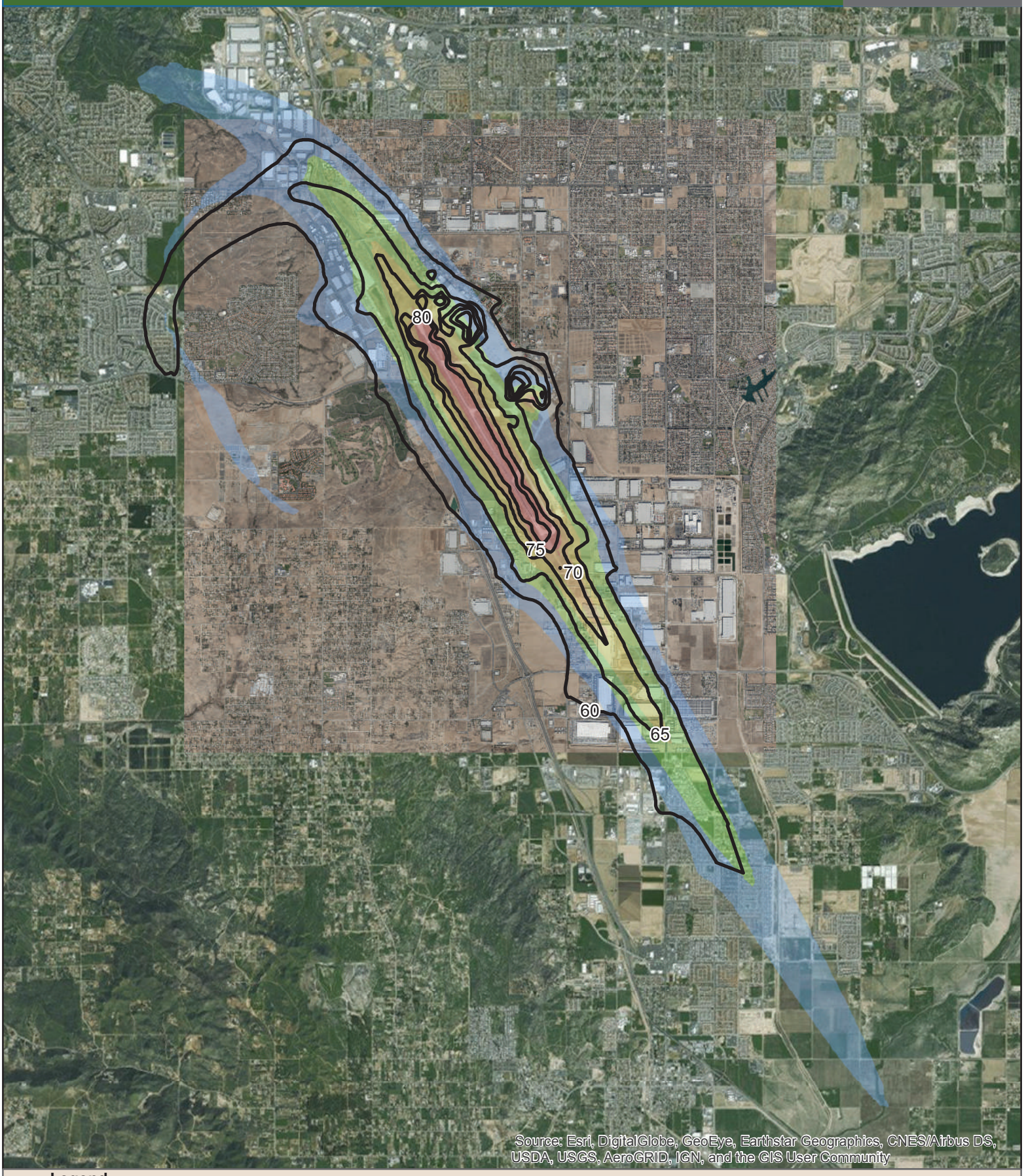
Sources: Amec Foster Wheeler 2017a; U.S. Census Bureau 2010.

4.5 MARCH AIR RESERVE BASE SMALL ARMS RANGE

Outside of the March ARB airfield boundary is a geographically separate parcel with an outdoor small arms firing range facility utilized primarily by the base's security forces. The range contains shooting positions and targets in a northeast to southwest orientation. Both firing positions and targets are under cover; further, the target backstop starts at floor level and meets the roof. The range accommodates the following weapons: M9; M4; and 12 gauge shotgun (March ARB 2017b). Table 4-5 and 4-6 presents peak sound levels (dBP) for the M4 and 12-gauge shotgun, the two loudest of the three weapons, respectively. The range of levels are based on sound propagation between the source and receiver without

March ARB 2005 and 2018 AICUZ Noise Contours

Figure 4-3



Legend

March ARB 2018 Noise Contours

2018 Noise Contour levels (CNEL) 60dB, 65dB, 70dB, 75dB, 80dB

2005 Noise Contour Levels (CNEL)

60dB 65dB 70dB 75dB 80dB

N

0 1.95 Miles

1 inch = 1.29 miles

Table 4-5. Predicted Peak Sound Level for M4 Rifle (dBP)

Distance (feet)	Azimuth		
	0	90	180
164	135-150	112-127	102-117
328	113-128	106-121	95-110
656	106-121	99-114	89-104
1,312	93-108	86-101	78-93
2,624	85-100	77-92	69-84
5,249	75-90	67-82	59-74

Sources: Hede and Bullen 1982, O'Loughlin et. al. 1986.

Table 4-6. Predicted Peak Sound Level for 12 Gauge Shotgun (dBP)

Distance (feet)	Azimuth (Degrees)		
	0	90	180
164	119-134	107-122	107-122
328	112-127	100-115	101-116
656	105-120	93-108	95-110
1,312	94-109	83-98	85-100
2,624	85-100	74-89	77-92
5,249	76-91	65-80	68-83

Sources: Hede and Bullen 1982, O'Loughlin et. al. 1986.

any barriers. The lower level numbers are expected when the receiver is upwind of the source and higher numbers when the receiver is downwind of the source (Hede and Bullen 1982; O'Loughlin et. al. 1986).

The nearest residences to the March ARB outdoor range is approximately 1,970 feet from the firing positions and the line of sight from the residences to the firing positions is blocked by both an earthen berm and target backstop.

Similar range configurations with covered firing positions and targets, wall enclosures, and target backstops result in a noise level of 87 dBP between 1,475 and 1,970 feet from the firing positions (Warrenton Training Center 2005). Based on the weapons, configuration of the range, and distance to the nearest residence, it is anticipated that residences would experience a noise level of approximately 87 dBP or less.

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SECTION 5
COMMUNITY AND AIRCRAFT SAFETY

As development increases near an airfield, more people may be exposed to the potential risks from nearby aircraft operations. Airfield safety is a shared responsibility between the Air Force and surrounding communities, each playing a vital role in its success.. Cooperation between the Air Force and the community results in strategic and effective land use planning and development. As such, the Air Force has established a flight safety program and has designated areas of accident potential around its air installations to assist in preserving the health, safety, and welfare of residents living near the airfield. This AICUZ Study provides the information needed, in part, to reach this shared safety goal.

Identifying safety issues assists the community in developing land uses compatible with airfield operations. As part of the AICUZ program, the Air Force defines areas of accident potential, imaginary surfaces, and hazards to flight.

Section 5.1 discusses clear zones and accident potential zones. Section 5.2 presents the imaginary surfaces and Section 5.3 discusses the zones associated with hazards to aircraft flight.

5.1 CLEAR ZONES AND ACCIDENT POTENTIAL ZONES

In the 1970s and 1980s, the military conducted studies of historic accident and operations data throughout the military. The studies showed that most aircraft mishaps occur on or near the runway, diminishing in likelihood with distance from the runway. Based on these studies, the DOD identified Clear Zones and Accident Potential Zones (APZ) as areas where an aircraft accident is most likely to occur if an accident were to take place – these zones are not predictors of accidents. The studies identified three areas that, because of accident potential, should be considered for density and land use restrictions: the Clear Zone (CZ), Accident Potential Zone I (APZ I) and Accident Potential Zone II (APZ II). The CZs and APZs are described in the bullets below and are shown on Figure 5-1.

- **Clear Zone.** At the end of all active Air Force runways is an area known as the Clear Zone. The CZ is a square area beyond the end of the runway and centered on the runway centerline extending outward for 3,000 feet. A Clear Zone is required for all active runways and should remain undeveloped.

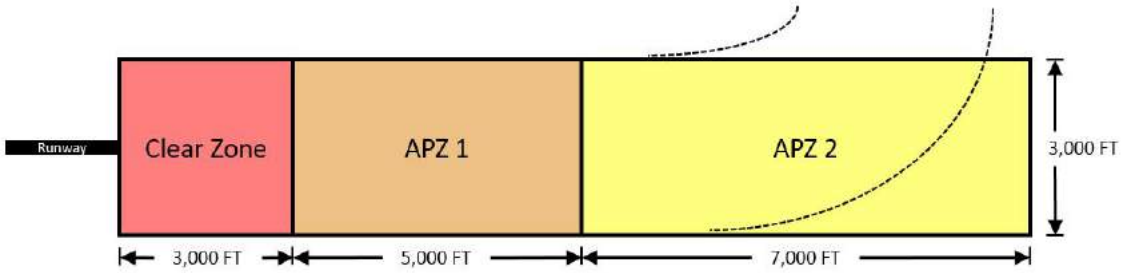


Figure 5-1. Runway CZs and APZs

- **APZ I.** Beyond the CZ is Accident Potential Zone I (APZ I). APZ I is 3,000 feet in width and 5,000 feet in length along the extended runway centerline.
- **APZ II.** Accident Potential Zone II is the rectangular area beyond APZ I. APZ II is 3,000 feet in width by 7,000 feet in length along the extended runway centerline.

While the APZs extend outward from the ends of the runway along the extended runway centerline, base may add a curved APZ where over 80-percent of the operations follow a curved departure.

Within the CZ, most uses are incompatible with military aircraft operations. For this reason, it is the Air Force's policy, where possible, to acquire real property interests in land within the CZ to ensure incompatible development does not occur. Within APZ I and APZ II, a variety of land uses are compatible; however, higher density uses (e.g., schools, apartments, churches, etc.) should be restricted because of the greater safety risk in these areas. Chapter 6 discusses land use and recommendations for addressing incompatibility issues within APZs for each runway.

March ARB has two active runways which carry different class designations based on their size and capability, thus the size of the CZs and APZs associated with each runway differ. Runway 14/32 is a Class B runway and at both ends has CZs that encompass an area 3,000 feet wide by 3,000 feet long. Beyond the CZs are an APZ I that is 3,000 feet wide by 5,000 feet long, and an APZ II that is 3,000 feet wide by 7,000 feet long. Runway 12/30 is a Class A runway and at both ends has CZs that encompass an area 1,000 feet wide by 3,000 feet long, an APZ I that is 1,000 feet wide by 2,500 feet long, and an APZ II that is 1,000 feet wide by 2,500 feet long. Figure 5-2 through 5-5 depicts the CZs and APZs for Runways 14/32 and 12/30 at March ARB.

March ARB Runway Clear Zones and Accident Potential Zones

Figure 5-2

Legend

Runway | APZ I | APZ II | CZ

N

0 1.2 Miles

1 inch = 0.84 miles

March ARB Runway 12 and 14 Clear Zones and Accident Potential Zones

Figure 5-3

Legend

- Runway
- City of Riverside
- City of Moreno Valley
- APZ I
- APZ II
- CZ

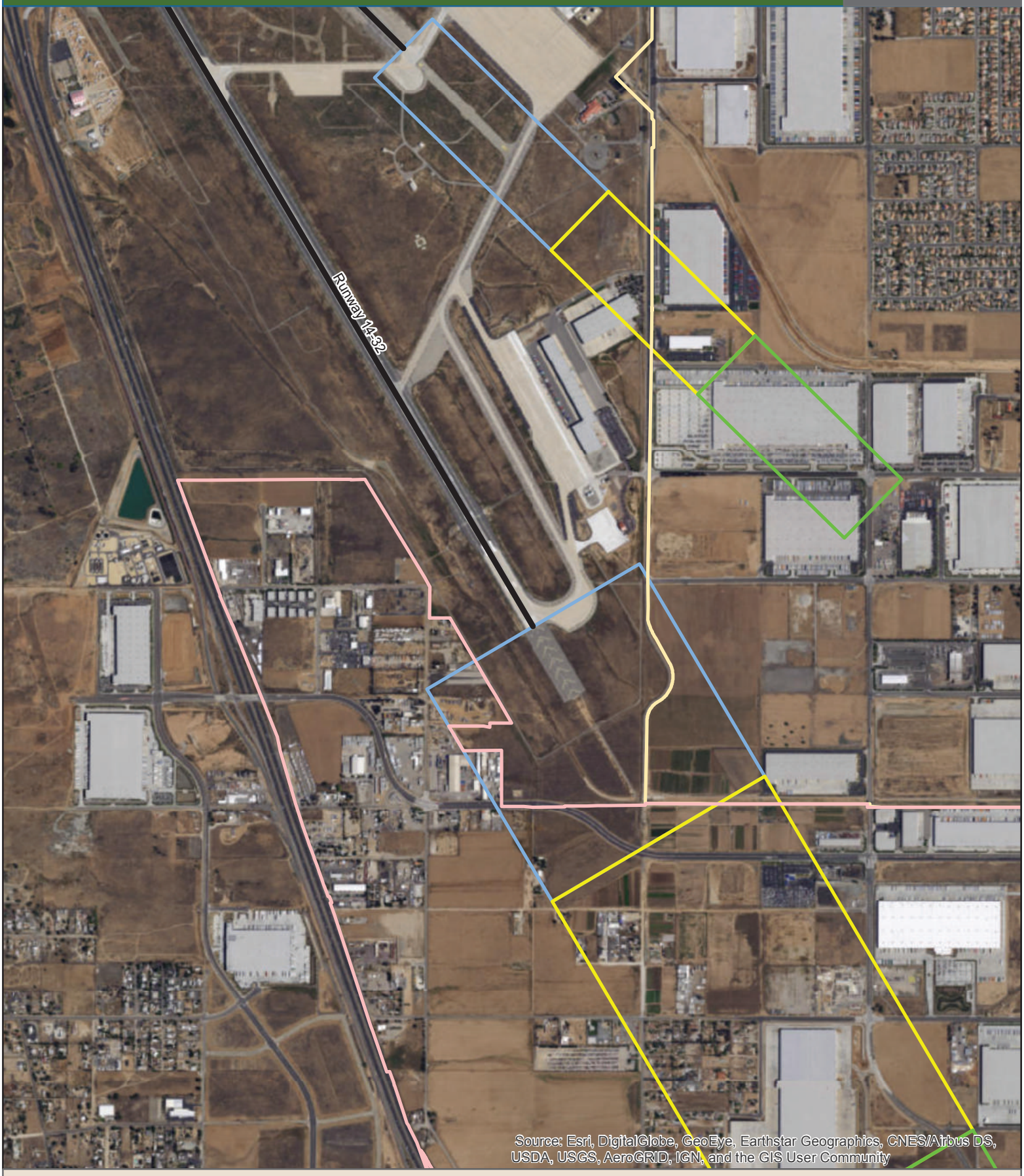
N

0 0.45 Miles

1 inch = 0.36 miles

March ARB Runway 30 Clear Zones and Accident Potential Zones

Figure 5-4



Legend

- Runway
- City of Perris
- City of Moreno Valley
- APZ I
- APZ II
- CZ

N

0 0.3 Miles

1 inch = 0.29 miles

March ARB Runway 32 Clear Zones and Accident Potential Zones

Figure 5-5

Legend

- Runway
- APZ I
- APZ II
- CZ
- City of Perris
- City of Moreno Valley

N

0 0.6 Miles

1 inch = 0.43 miles

Table 5-1 tabulates the off-base land acreage and estimated population within the CZs and APZs**.** While some portions of the CZs and APZs associated with March ARB runways fall within jurisdiction of each local government (i.e., city of Moreno Valley, city of Perris, city of Riverside, and Riverside County), only the cities of Moreno Valley and Perris have residences within the APZs. To the north end of Runway 14/32 within the city of Moreno Valley, approximately 44 residential units are within APZ II. There are 37 and 38 residential units in APZ I and APZ II, respectively, in the city of Perris to the south end of Runway 14/32. To determine the population within the APZs, the identical method to determining populations within noise contour levels was applied.

Table 5-1. Off-Base Land Area and Estimated Population within the Clear Zones and Accident Potential Zones

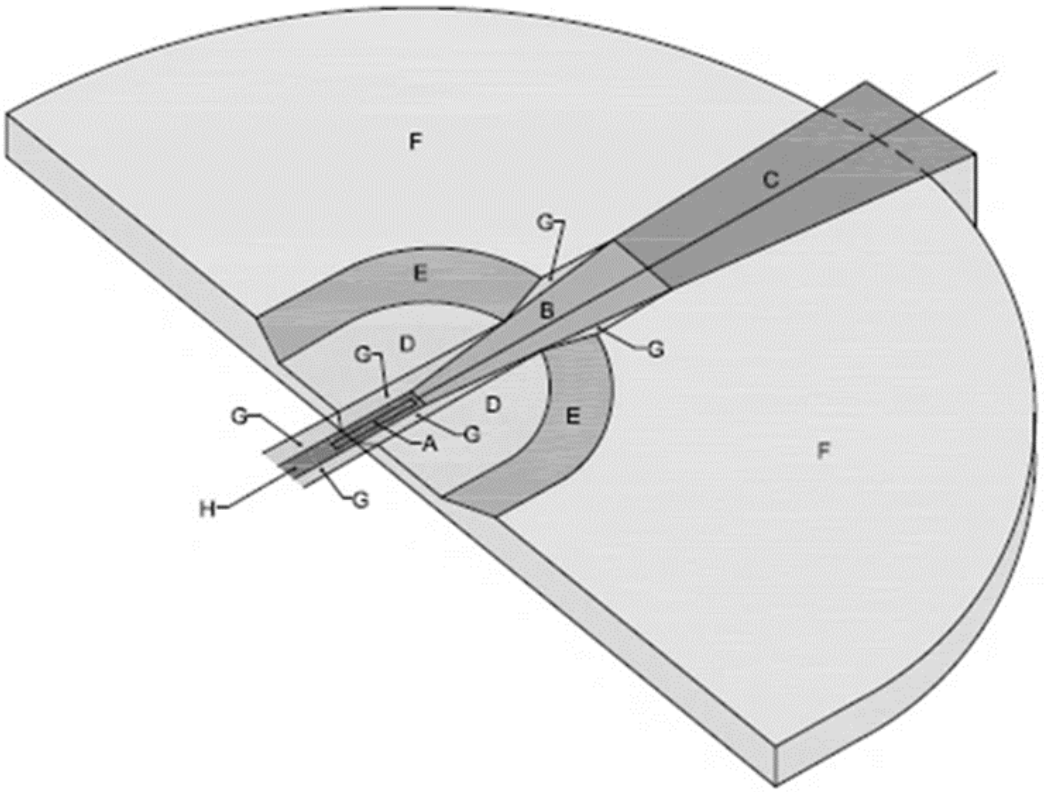
Zone	Acres	Population
CZ	72	0
APZ I	731	154
APZ II	1,034	323
Total	**1,837**	**477**

Source: U.S. Census Bureau 2010

5.2 IMAGINARY SURFACES

The DoD and Federal Aviation Administration (FAA) identify a complex series of imaginary planes and transition surfaces which define the airspace needed to remain free of obstructions around an airfield. Obstruction-free imaginary surfaces ensure safe flight approaches, departures, and pattern operations. Obstructions include natural terrain and man-made features, such as buildings, towers, poles, wind turbines, cell towers, and other vertical obstructions to airspace navigation.

Fixed-wing runways and rotary-wing runways/helipads have different imaginary surfaces. Brief descriptions of the imaginary surfaces for fixed-wing runways are provided on Figure 5-6 and in Table 5-2. Figure 5-7 and Figure 5-8 depict runway airspace imaginary surfaces specific to March ARB, specifically Runway 14/32 and Runway 12/30, respectively. In general, the Air Force does not permit above-ground structures in the primary surface, and height restrictions apply to transitional surfaces and approach and departure surfaces. Height restrictions are more stringent the closer you are to the runway and flight paths.



LEGEND

A Primary Surface
B Approach-Departure Clearance Surface (50:1 Slope Ratio)
C Approach-Departure Clearance Surface (Horizontal)
D Inner Horizontal Surface (45.72m [150'] Elevation)
E Conical Surface (20:1 Slope Ratio)
F Outer Horizontal Surface (152.40m [500'] Elevation
G Transitional Surface (7:1 Slope Ratio)
H Runway

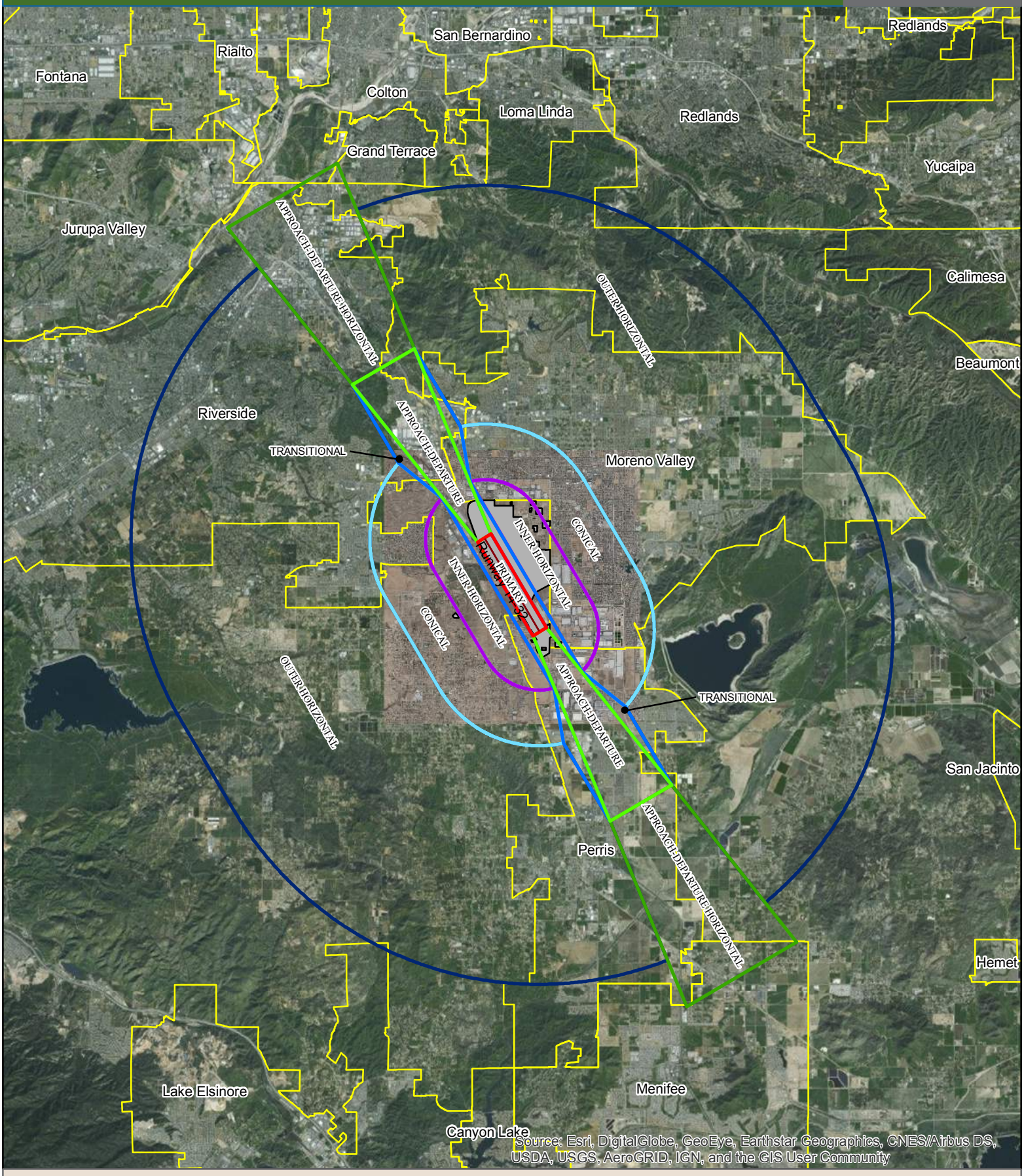
Figure 5-6. Runway Imaginary Surfaces and Transition Planes

Table 5-2. Description of Imaginary Surfaces for Military Airfields

Primary Surface	An imaginary surface symmetrically centered on the runway, extending 200 feet beyond each runway end that defines the limits of the obstruction clearance requirements in the vicinity of the landing area. The width of the primary surface is 2,000 feet, or 1,000 feet on each side of the runway centerline.
Approach-Departure Clearance Surface	This imaginary surface is symmetrically centered on the extended runway centerline, beginning as an inclined plane (glide angle) at the end of the primary surface (200 feet beyond each end of the runway), and extending for 50,000 feet. The slope of the approach-departure clearance surface is 50:1 until it reaches an elevation of 500 feet above the established airfield elevation. It then continues horizontally at this elevation to a point 50,000 feet from the starting point. The width of this surface at the runway end is 2,000 feet, flaring uniformly to a width of 16,000 feet at the end point.
Inner Horizontal Surface	This imaginary surface is an oval plane at a height of 150 feet above the established airfield elevation. The inner boundary intersects with the approach-departure clearance surface and the transitional surface. The outer boundary is formed by scribing arcs with a radius 7,500 feet from the centerline of each runway end and interconnecting these arcs with tangents.
Conical Surface	This is an inclined imaginary surface extending outward and upward from the outer periphery of the inner horizontal surface for a horizontal distance of 7,000 feet to a height of 500 feet above the established airfield elevation. The slope of the conical surface is 20:1. The conical surface connects the inner and outer horizontal surfaces.
Outer Horizontal Surface	This imaginary surface is located 500 feet above the established airfield elevation and extends outward from the outer periphery of the conical surface for a horizontal distance of 30,000 feet.
Transitional Surface	This surface extends outward and upward at right angles to the runway centerline and extended runway centerline at a slope of 7:1. The transitional surface connects the primary and the approach-departure clearance surfaces to the inner horizontal, the conical, and the outer horizontal surfaces.

Runway 14/32 Imaginary Surfaces

Figure 5-7



Legend

- Runway 14-32
- APPROACH-DEPARTURE CLEARANCE SURFACE
- APPROACH-DEPARTURE CLEARANCE SURFACE HORIZONTAL
- CONICAL SURFACE
- INNER HORIZONTAL SURFACE
- OUTER HORIZONTAL SURFACE
- PRIMARY SURFACE
- TRANSITIONAL SURFACE
- Installation Boundry
- City Boundary

N

0 4.5 Miles

1 inch = 2.99 miles

Runway 12/30 Imaginary Surfaces

Figure 5-8

Legend

- Runway
- PRIMARY SURFACE
- APPROACH-DEPARTURE CLEARANCE SURFACE
- TRANSITIONAL SURFACE

N

0 0.6 Miles

1 inch = 0.47 miles

5.3 HAZARDS TO AIRCRAFT FLIGHT ZONES (HAFZ)

Certain land uses and activities can pose potential hazards to flight. To ensure land uses and activities are examined for compatibility, the Air Force has identified a Hazards to Aircraft Flight Zone (HAFZ). The HAFZ is defined as the area within the "Imaginary Surfaces" that are shown in Figures 5-7 and 5-8, Imaginary Surfaces for Runway 14/32 and Runway 12/30 at March ARB, respectively. Unlike Noise and Safety Zones, the HAFZ does not have recommended land use compatibility tables. Instead, it is a consultation zone recommending that project applicants and local planning bodies consult with the Air Force to ensure the project is compatible with Air Force operations. These land uses and activities include:

- **Height:** Tall objects can pose significant hazards to flight operations or interfere with navigational equipment (including radar). City/County agencies involved with approvals of permits for construction should require developers to submit calculations which show that projects meet the height restriction criteria of 14 CFR, Part 77.17, for the specific airfield described in the AICUZ study. City and County agencies may also consider requiring a "Determination of No Hazard" issued by the Federal Aviation Administration for any tall objects within this zone.
- **Visual Interference:** Industrial or agricultural sources of smoke, dust, and steam in the airfield vicinity can obstruct the pilot's vision during takeoff, landing, or other periods of low-altitude flight. Close coordination between the base and the landowner can often mitigate these concerns. For example, irrigating before plowing can greatly reduce dust concerns.
- **Light Emissions:** Bright lights, either direct or reflected, in the airfield vicinity can impair a pilot's vision, especially at night. A sudden flash from a bright light causes a spot or "halo" to remain at the center of the visual field for a few seconds or more, rendering a person virtually blind to all other visual input. This is particularly dangerous for pilots at night when the flash can diminish the eye's adaptation to darkness. The eyes partially recover from this adaptation in a matter of minutes, but full adaptation typically requires 40 to 45 minutes. Specific examples of light emissions that can interfere with the safety of nearby aviation operations include:
    - Lasers that emit in the visible spectrum can be potentially harmful to a pilot's vision during both day and night.
    - The increasing use of energy-efficient LED lights also poses potential conflicts in areas where pilots use Night Vision Goggles (NVGs). NVGs can exaggerate the brightness of these lights, interfering with

pilot vision.
    - The use of red LED lights to mark obstructions can produce an unintended safety consequence because red LED lights are not visible on most NVG models, rendering them invisible to NVG users in the area.

- **Bird Animal Strike Hazard (BASH):** Wildlife represents a significant hazard to flight operations. Birds, in particular, are drawn to different habitat types found in the airfield environment including hedges, grass, brush, forest, water, and even the warm pavement of the runways. Although most bird and animal strikes do not result in crashes, they cause structural and mechanical damage to aircraft as well as loss of flight time. Most collisions occur when the aircraft is at an elevation of less than 1,000 feet. Due to the speed of the aircraft, collisions with wildlife can happen with considerable force.

  To reduce the potential of a BASH, the Air Force recommends that land uses that attract birds not be located near installations with an active air operations mission. These land uses include but not limited to:

    - Waste disposal operations
    - Wastewater treatment facilities
    - Transfer stations
    - Landfills
    - Golf courses
    - Wetlands
    - Storm water ponds
    - Retention basins
    - Dredge disposal sites
    - Fruit trees

  Birds and raptors in search of food or rodents will flock to landfills, increasing the probability of BASH occurrences in the vicinity of these facilities. Design modifications also can be used to reduce the attractiveness of these types of land uses to birds and other wildlife.

- **Radio Frequency/Electromagnetic Interference (RF/EMI):** The American National Standards Institute defines Electromagnetic Interference (EMI) as any electromagnetic disturbance that interrupts, obstructs, or otherwise degrades or limits the effective performance of electronics/electrical

equipment. EMI may be caused by atmospheric phenomena, such as lightning or precipitation static, and by non-telecommunications equipment, such as vehicles and industrial machinery.

New generations of military aircraft are highly dependent on complex electronic systems for navigation and critical flight and mission-related functions. Consequently, communities should use care when siting any activities that create EMI. Many of these sources are low-level emitters of EMI. However, when combined, they have an additive quality.

EMI also affects consumer devices, such as cell phones, FM radios, television reception, and garage door openers. In some cases, the source of interference occurs when consumer electronics use frequencies set aside for military use.

SECTION 6
LAND USE ANALYSIS

The AICUZ area of influence or the "AICUZ footprint" of an airfield is the combination of noise contours, CZ, APZs, and the HAFZ, and is used as the basis for the land use compatibility analysis. The AICUZ footprint defines the minimum recommended area within which land use controls are needed to enhance the health, safety, and welfare of those living or working near a military airfield and to preserve the flying mission. The AICUZ footprint, combined with the guidance and recommendations set forth in the AICUZ study, are the fundamental tools necessary for the planning process. The Air Force recommends local and regional governments adopt the AICUZ noise zones, CZs, APZs and HAFZ into planning studies, regulations, and processes to best guide compatible development around the installation. This study uses the AICUZ footprint (Figures 6-1 and 6-3) for March ARB as the basis for the land use compatibility analysis.

6.1 LAND USE COMPATIBILITY AND GUIDELINES

In an effort to establish long-term compatibility for lands within the vicinity of military air installations, the DoD has created land use compatibility recommendations based on the Federal Highway Administration's Standard Land Use Coding Manual (SLUCM). These guidelines are used by DoD personnel for on-base planning and for engaging with the local community to foster compatible land use development. Table A-1 of Appendix A shows the suggested land use compatibility guidelines within the Clear Zones (CZ) and Accident Potential Zones (APZs). Table A-2 of Appendix A provides land use compatibility recommendations within CNEL noise contours.

6.2 PLANNING AUTHORITIES

This section presents the State of California, Riverside County, and the municipalities that have land use jurisdiction near March ARB, including descriptions of objectives to address existing and future land use specifically influenced by aircraft operations at March ARB. Riverside County exercises control over unincorporated lands to the east and west of March ARB. The City of Perris exercises land use control to the south and south west of the base, the City

of Moreno Valley and City of Riverside exercise land use control to the north and northeast and northwest, respectively of the base. The Riverside Airport Land Use Commission (ALUC) has developed noise and safety compatibility guidelines for all areas surrounding March ARB, which include the municipalities mentioned.

6.2.1 State of California

Published in 2009 and updated on 8 June 2017, the State of California Governor's Office of Planning and Research (OPR) Community and Military Compatibility Planning branch assists cities and counties in addressing military compatibility issues when developing, updating or significantly amending their general plans. These guidelines are the result of the passage of Senate Bill 1468 and Senate Bill 1462, which outline the responsibilities of cities and counties regarding the military in the planning and land use decision-making process. SB 1462 and SB 1468 identify specific measures that need to be taken by local jurisdictions. The State recommends that cities and counties near military facilities consider such facilities to be part of the community and, therefore, there is a need to address these facilities and local land use impacts within the general plan

Codified in the California Government Code (GC) at sections 65302 and 65560, Senate Bill (SB) 1468 was authored by Senator Pete Knight and signed into law by Governor Gray Davis on September 26, 2002. SB 1468 outlines how cities and counties must consider the impact of development on military readiness activities when preparing or updating their general plan. The intention of the law is to encourage cooperation between military installations and local communities to reduce land use conflicts between civilian development and military readiness activities. SB 1468 identifies specific requirements about when and where local governments must incorporate military readiness activities into the general plan. SB 1468 also required OPR to prepare and publish the California Advisory Handbook for Community and Military Compatibility Planning (OPR Handbook) for local officials, planners and developers to include information about how to reduce land use conflicts between the effects of civilian development and military readiness.

SB 1462 amended GC sections 65352, 65404, 65940, and 65944, and was signed by Governor Arnold Schwarzenegger on September 29, 2004. It requires cities and counties to notify the military of certain local planning proposals and development permit applications. The intent of SB 1462 is to create a local notification process which informs the military of certain local land use proposals in an effort to prevent land use conflicts between local communities and military installations and their training activities. The bill requires local governments to: (a) revise their development permit application forms, and (b) notify branches of the military when proposed general plan actions and amendments, and development projects might have an impact on military facilities and operations.

AB1108 amended the California Environmental Quality Act (CEQA) to ensure military agencies are provided notice of proposed projects within two miles of installations or under training routes or Special Use Airspace.

6.2.2 Riverside County Airport Land Use Commission

The Riverside County Airport Land Use Commission (ALUC) has been assigned the lead responsibility for airport land use compatibility planning around each public-use and military airport in Riverside County. Established in accordance with the California State Aeronautic Act (Public Utilities Code Section 21670 *et seq.*), the Riverside County ALUC is required to prepare an Airport Land Use Compatibility Plan (ALUCP) for each airport. With regard to military airports, Section 21675(b) states that ALUCs must prepare a compatibility plan and that such plans "shall be consistent with the safety and noise standards in the Air Installations Compatible Use Zones plan prepared for that military airport" (Riverside County ALUC 2014).

In 2014, the *March ARB/Inland Port Authority (IPA) ALUCP* was completed. This ALUCP is primarily based on the *2005 March ARB AICUZ Study*, however the noise contours presented within the 2005 AICUZ were supplemented by more recent contours prepared for both March ARB and March JPA (Riverside County ALUC 2014).

6.2.3 City of Moreno Valley

In 2016, the City of Moreno Valley revised the *2006 Moreno Valley General Plan* which addresses proposed development on land surrounding March ARB. Based on the compatible uses identified within the *2005 AICUZ*, the Moreno Valley General Plan discourages new residential development where noise due to aircraft overflights exceeds 65 CNEL. In addition, noise attenuation is required where necessary to achieve acceptable interior noise levels. The acceptable interior noise is not greater than 45 CNEL for residences and schools and 50 CNEL for libraries, hospitals, places of worship and office uses (Moreno Valley 2006). The City of Moreno Valley is currently updating their General Plan to conform to the *2014 March ARB/IPA ALUCP*.

6.2.4 City of Perris

In 2016, the City of Perris adopted an Airport Overlay Zones (AOZ) (Zoning Code Chapter 19.51) to comply with the *2014 March ARB/IP ALUCP* boundaries and policies. Presented within the City of Perris Land Use Element, an AOZ ensures that the policies in the *March ARB/IP ALUCP* are adhered to when new development projects are brought before the City of Perris (City of Perris 2016).

The purpose and intent of the AOZ is to:

- Implement the City's General Plan policies to ensure that all land uses within the AOZ are consistent with the State Aeronautics Act, state law, Federal Aviation Administration regulations, and guidance of the California Airport Land Use Planning Handbook;
- Ensure that land uses and development within the AOZ are compatible with the March ARB/IPA ALUCP;
- Prohibit the establishment of new incompatible land uses and further expansion of existing incompatible land uses to avoid or minimize exposure of persons to potential hazards associated with aircraft operations;
- Prohibit development, uses, or any installations or activities that could represent a hazard to aircraft operations; and

- Recognize the unique constraints and considerations that apply to properties potentially affected by aircraft operations by establishing policies and review criteria for land use, development, and properties within the AOZ.

6.2.5 City of Riverside

The Land Use and Urban Design Element of the Riverside General Plan 2025 describes present and planned land uses and their relationship to Riverside's vision and goals. In addition to constituting an action plan for implementation of Riverside's vision, this element complies with all requirements for General Plan Elements set forth in California Law. This also includes two objectives directly addressing March ARB (City of Riverside 2013):

- Objective 22 - Avoid land use/transportation decisions that would adversely impact the long-term viability of the March ARB/IPA, Riverside Municipal and Flabob Airports; and
- Mission Grove Objective 69 - Complete buildout of the Mission Grove Specific Plan, encouraging development that can harmoniously co-exist near the March ARB/IPA facility.

The Noise Element of the City's General Plan examines noise sources in the city with a view toward identifying and appraising the potential for noise conflicts and problems, and identifies ways to reduce existing and potential noise impacts. In particular, the Noise Element contains policies and programs to achieve and maintain noise levels compatible with various types of land uses. Although, this element addresses noise which affects the community at large, rather than noise associated with site specific conditions, this element also addresses effective strategies to reduce, eliminate and limit community exposure to loud noise sources. Guidelines put forth by the State of California include requirements for defining projected future noise conditions in the form of noise exposure contours. These contours serve as the basis for developing guidelines for identifying compatible land uses. The following objectives are associated with March ARB/IPA aircraft operations and include:

- Objective 1 - Minimize noise levels from point sources throughout the community and, wherever practicable, mitigate the effects of noise to provide a safe and healthful environment;
- Objective 2 - Minimize the adverse effects of airport-related noise through proper land use planning; and
- Objective 3 - Ensure the viability of March ARB/IPA.

The City of Riverside is currently in the process of updating the Housing Element of their General Plan.

6.3 LAND USE AND ZONING

6.3.1 Existing Land Use and Zoning

Zoning is the legal regulation of property use to protect the health, safety, and welfare of citizens; protect property rights; conserve resources; and avoid incompatible uses. In California, counties and cities enact zoning ordinances to implement respective comprehensive plan objectives. Land use and zoning classifications are generalized to illustrate compatibility across common land use and zoning types.

As mentioned in earlier sections, March ARB is located in the middle of four separate municipalities, three of which share a border with the base. Nearest the base to the south is the city of Perris where land use designations are established by the City of Perris Specific Plan which encourages industrial and commercial land use and no new residential housing. To the east and north of the base, Moreno Valley shares a continuous border with March ARB where industrial and commercial land use is designated and encouraged. Riverside County shares a western border with March ARB where commercial, industrial, open space, and public/quasi-public land use has been designated. The city of Riverside does not border March ARB, however aircraft overflights and associated noise extends into areas of Riverside where commercial land use exists, and into residential areas to a lesser extent relative to noise.

Interstate 215 is a north-south highway and is the primary transportation corridor that runs through Moreno Valley and to the west of March ARB. Interstate 215 links to regional primary and secondary transportation routes within Riverside

County. Land use designation along the interstate is primarily industrial and commercial.

Table 6-1 indicates specific land use designations from each municipality and the associated amount of acreage within each noise zone above 65 dB CNEL and within the CZs and APZs associated with March ARB.

Table 6-1. Municipality Land Use Acreage within High Noise Zones, Clear Zones, and Accident Potential Zones (Acres)

Municipality	Land Use	CNEL (dB)				CZ	APZ I	APZ II
		65-69	70-74	75-79	80+			
City of Moreno Valley	Open Space/Ag	23	5			36	1	
	Commercial						4	11*
	Industrial	34					86	97*
	Residential							
City of Perris	Commercial							2
	PVCC SP	332	76			28	344*	475
	Residential	20	1					7
City of Riverside	Commercial	3						367
	Recreation							4
Riverside County	Commercial	370	4			16	114	30
	Industrial	247	4			17	57	35
	Open Space/Ag							
	Public-Quasi	23					3	
	Undesignated	-	-					

-Ag=Agriculture, PVCC SP=Perris Valley Community Center Specific Plan
* does include residences within commercial or industrial land use
-Does not include all land use designations, only those with acreage within 65+ dB CNEL noise zones, CZs, and APZs
-CZs and APZs includes acreage within these zones for both runways
-Does not include acreage where CZ/APZ of one runway overlaps a CZ/APZ of another runway, in this case the more conservative zone acreage is presented.
Sources: Amec Foster Wheeler 2017; City of Moreno Valley 2006; City of Perris 2016; City of Riverside 2013; Riverside County 2014.

Figure 6-1 shows the existing land uses for the area that surrounds March ARB and identifies those areas exposed to CNEL greater than or equal to 60 dB due to aircraft operations at the base. Figure 6-2 depicts zoning classifications associated with the Riverside County ALUC. Existing land use was determined utilizing GIS provided by the local governments (i.e., cities of Moreno Valley, Perris, Riverside, and Riverside County) with mapping of land use layers.

Figures 6-3 and 6-4 present the CZs and APZs associated with the March ARB runways relative to surrounding land uses, both for the cities and the Riverside County ALUC. Currently, March ARB does not own all property within the CZs or APZs associated with either Runway 14/32 or Runway 12/30. All surrounding municipalities have lands that are within March ARB CZs and APZs and, though zoned for compatibility, existing incompatible land use does exist.

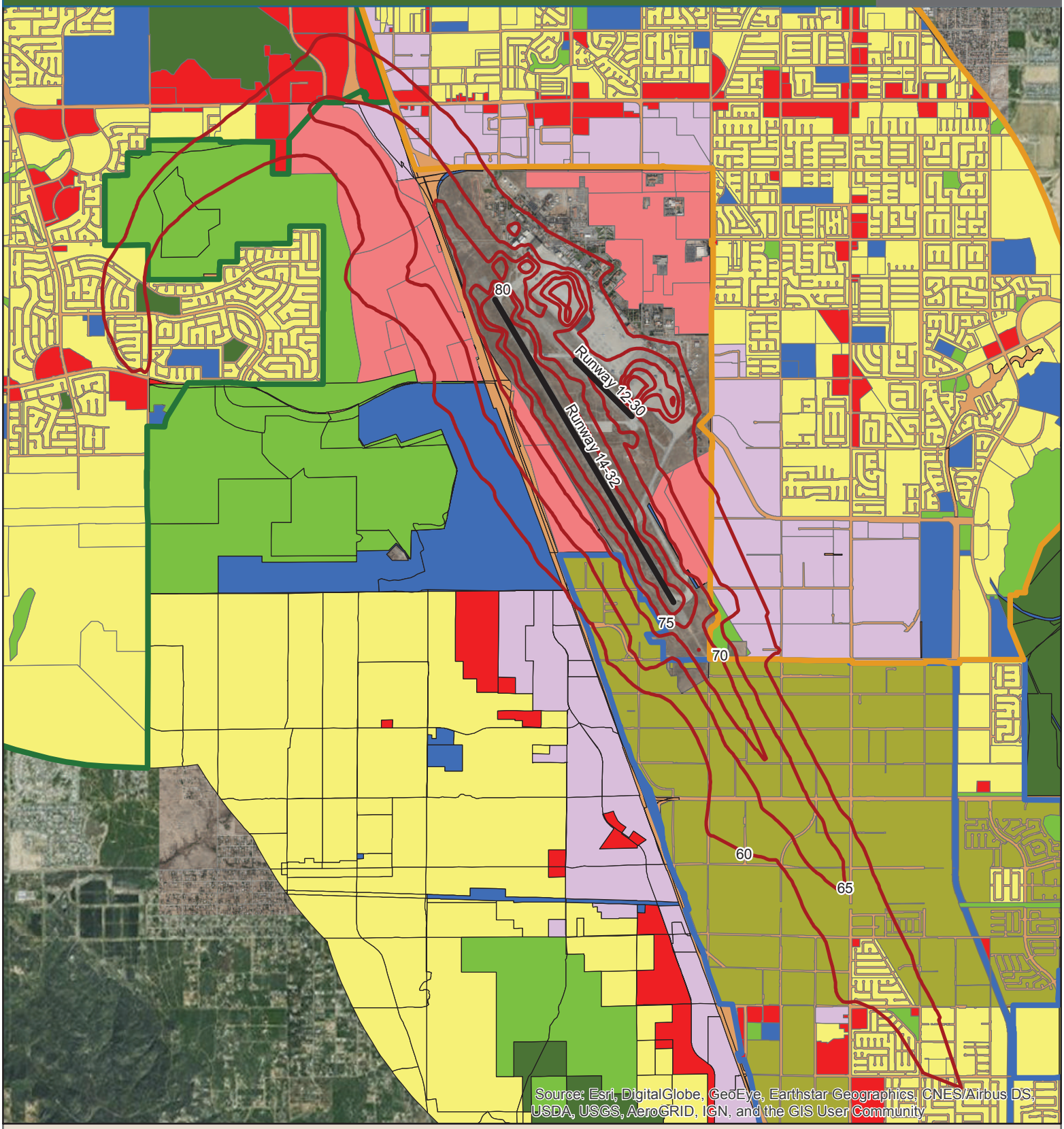
6.3.2 Future Land Use and Zoning

As with existing land use and zoning, future land use has been generalized for comparison. The cities of Moreno Valley, Perris, Riverside and Riverside County (specifically the ALUC) have zoned areas surrounding March ARB to ensure long-term land use compatibility with aircraft operations at the base. While existing incompatible land use does exists, through responsible zoning future land use incompatibility can be maintained at a negligible level.

To the south end of Runway 14/32, the City of Perris has zoned an area within APZ I, APZ II, and the 65+ dB CNEL noise zone as "City of Perris Specific Plan." Within this Specific Plan, commercial and industrial land use would be encouraged with no new residences included. It is important that the City of Perris follow through in encouraging only commercial and industrial land use within this area, with a focus on compatibility with density requirements per the SLUCM.

March ARB 2018 Noise Contours and Surrounding Land Use

Figure 6-1



Legend

- Runway

March ARB 2018 Noise Contours

- Noise Contour Levels(CNEL) 60dB, 65dB, 70dB, 75dB, 80dB
- City of Moreno Valley
- City of RiverSide
- City of Perris

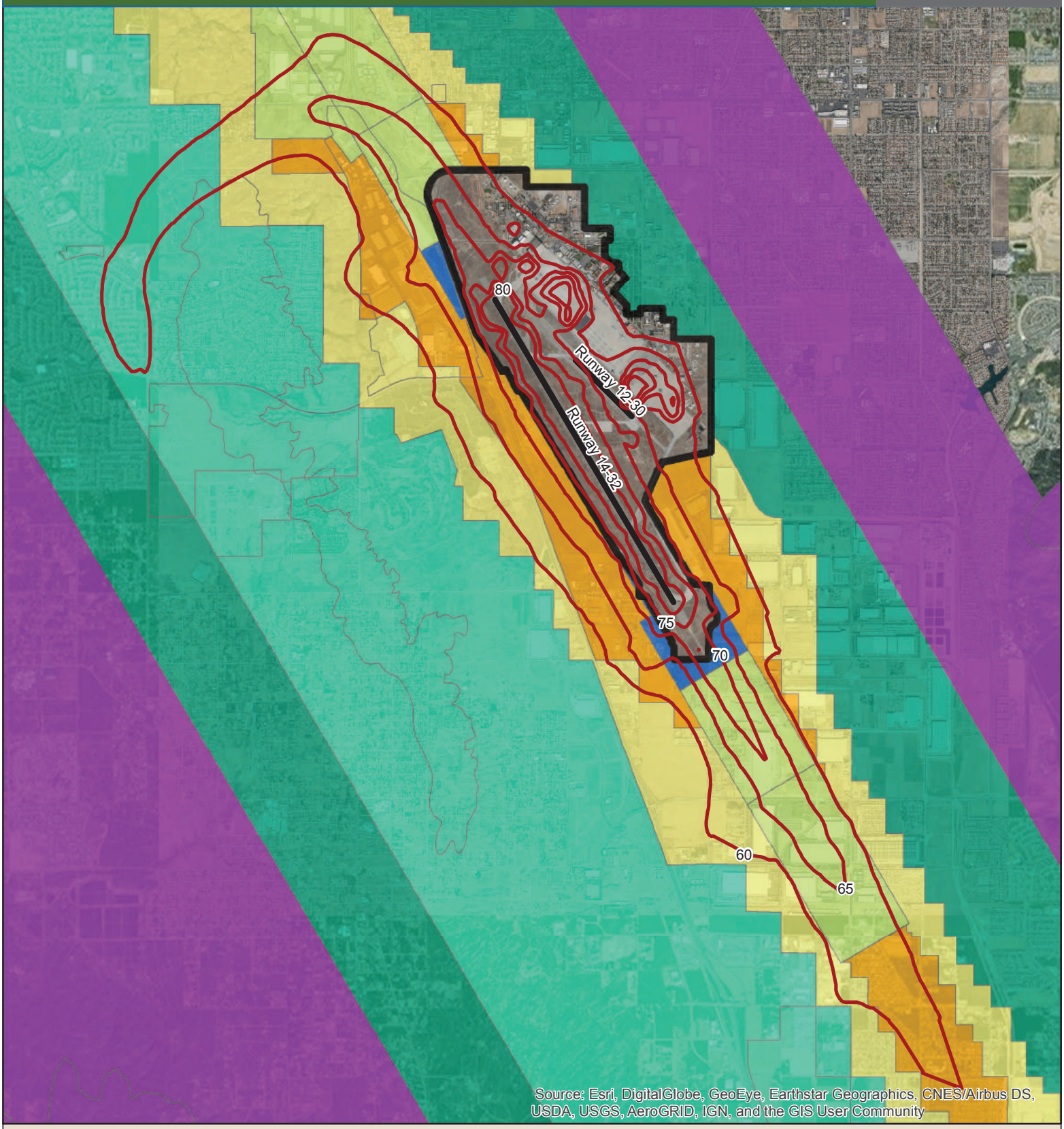
LANDUSE

- Open/Agriculture/Low Density
- Commercial
- Public/Quasi-Public
- Undesignated
- Commercial/Industrial/Mixeduse
- Residential
- Industrial
- Recreation
- City of Perris Specific Plan

N

0 1.35 Miles

1 inch = 0.94 miles



Legend

March ARB 2018 Noise Contours

- Noise Contour Levels (CNEL) 60dB, 65dB, 70dB, 75dB, 80dB
- Runways

ZONES

- Clear Zone
- Inner Approach/Depature Zone
- High Noise Zone
- Primary Approach/Departure Zone
- Flight Cooridor Zone
- Flight Cooridor Buffer
- Other Airport environment
- Military

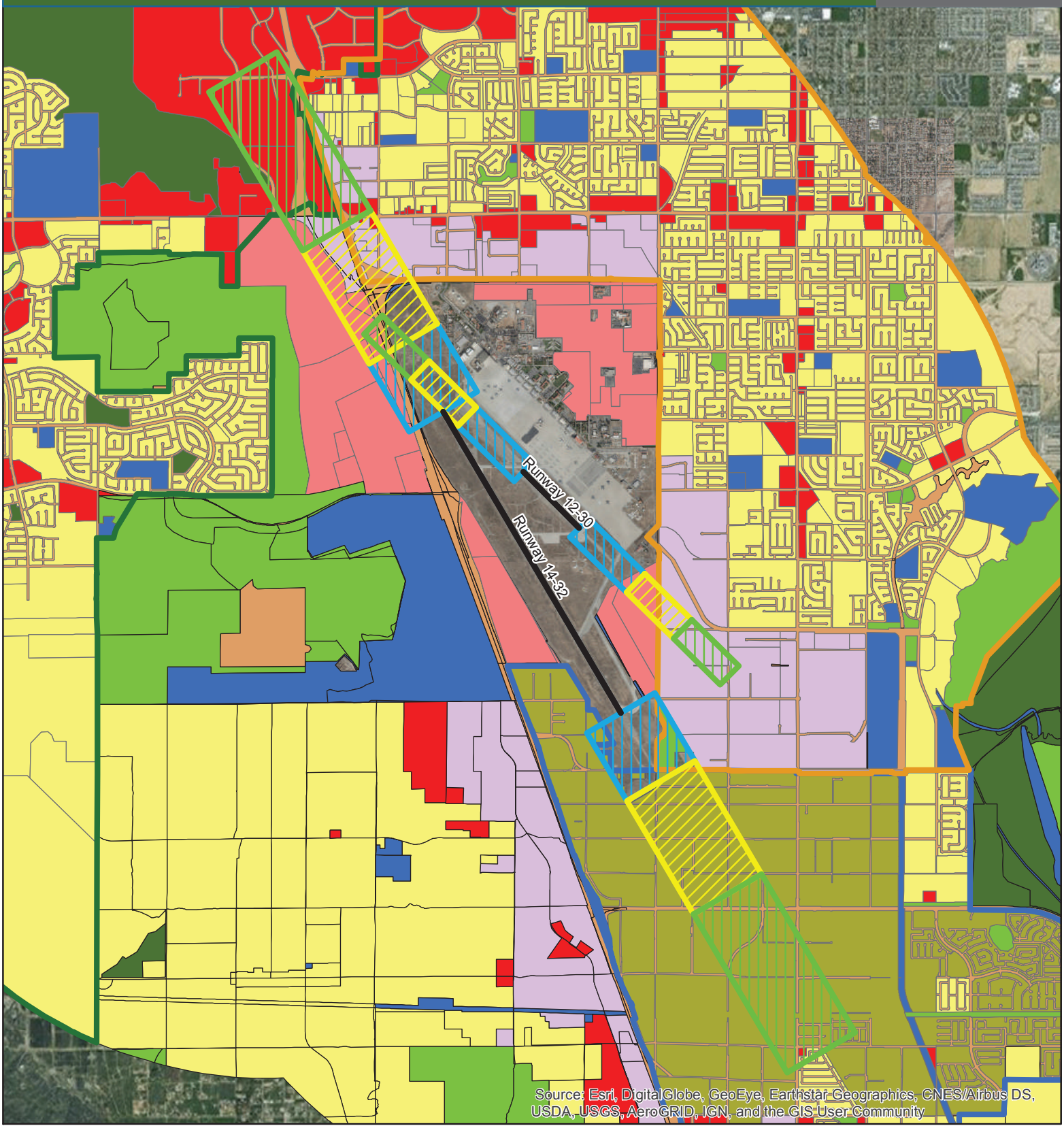
N

0 1.35 Miles

1 inch = 0.94 miles

March ARB Clear Zones/Accident Potential Zones and Surrounding Land Use

Figure 6-3



Legend

- Runway
- AirAccidentZone_A
- sdsFeatureName
- APZ I
- APZ II
- CZ
- City of Moreno Valley
- City of Riverside
- City of Perris
- City of Perris Specific Plan

LANDUSE

- Open/Agriculture/Low Density
- Commercial
- Public/Quasi-Public
- Undesignated
- Commercial/Industrial/Mixeduse
- Residential
- Industrial
- Recreation

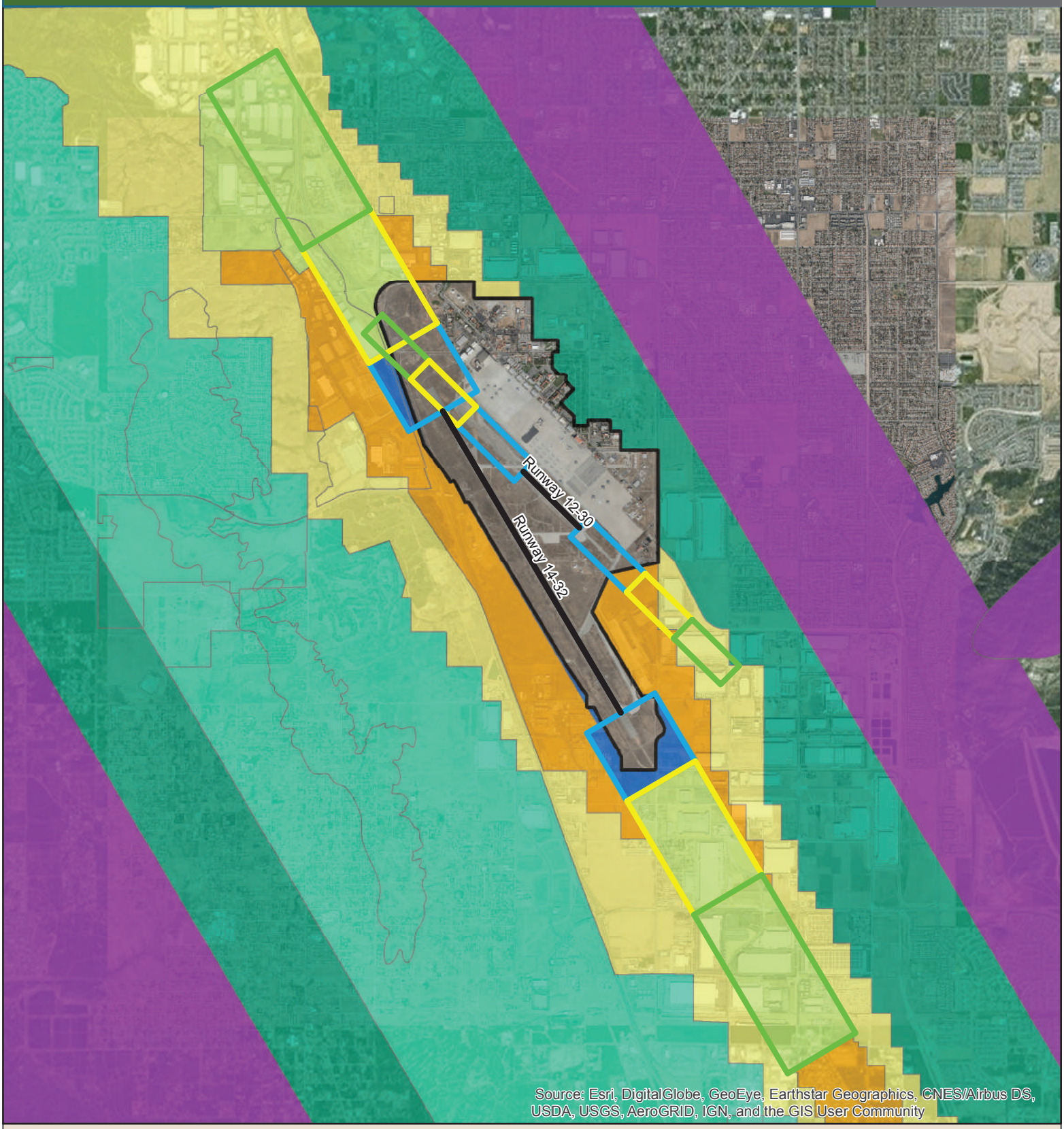
N

0 1.35 Miles

1 inch = 0.94 miles

ALUC Zones and Clear Zones/Accident Potential Zones

Figure 6-4



Legend

- Runway
- APZ I
- APZ II
- CZ

ZONES

- Clear Zone
- Inner Approach/Depature Zone
- High Noise Zone
- Primary Approach/Departure Zone
- Flight Cooridor Zone
- Flight Cooridor Buffer
- Other Airport environment
- Military

N

0 1.35 Miles

1 inch = 0.94 miles

6.4 COMPATIBILITY

6.4.1 Land Use Analysis

Land use describes how land is developed and managed, and is characterized by the dominant function occurring within an area. To compare land use consistently across jurisdictions, this analysis uses generalized land use classifications illustrating land use compatibility across common land use types. These generalized land use categories do not exactly represent the local community's land use designations, but combine similar uses into the one of the following seven categories:

- **Residential.** All types of residential activity, such as single and multi-family residences and mobile homes, at a density greater than one dwelling unit per acre.
- **Commercial.** Offices, retail stores, restaurants and other types of commercial establishments.
- **Industrial.** Manufacturing, warehouses and other similar uses.
- **Public/Quasi-Public.** Publicly owned lands and land to which the public has access, including military reservations and training grounds, public buildings, schools, churches, cemeteries, and hospitals.
- **Recreational.** Land areas designated for recreational activity, such as parks, wilderness areas and reservations, conservation areas, and areas designated for trails, hikes, camping, etc.
- **Open/Agriculture/Low Density.** Undeveloped land areas, agricultural areas, grazing lands and areas with residential activity at densities less than or equal to one dwelling unit per acre.
- **Undesignated.** Applies to parcels that had no indicated value or were listed as 'undesignated' in the original datasets.

For the purpose of this analysis, the DoD AICUZ compatibility guidelines (Tables A-1 and A-2 of Appendix A) have been consolidated into the seven generalized land use classifications. Table 6-2 provides generalized compatibility guidelines. Land use compatibility falls into one of four categories: (1) Compatible, (2) Compatible with Restrictions, (3) Not Compatible, and (4) Not Compatible with Exceptions. The conditionally compatible land use may require incorporation of noise attenuation measures into the design and construction of structures and further evaluation to be considered "compatible" and may require density limitations for land in APZs.

Table 6-2. Generalized Land Use Categories and Noise/Safety Compatibility

Generalized Land Use Category[3]	Noise Zone (dB CNEL)						CZ	APZ I	APZ II
	<65	65-69	70-74	75-79	80-84	85+			
Residential	Yes	No[1]	No[1]	No	No	No	No	No	No
Commercial	Yes	Yes	Yes[2]	Yes[2]	No	No	No	Yes[2]	Yes[2]
Industrial	Yes	Yes	Yes	Yes	Yes[2]	No	No	Yes[2]	Yes[2]
Public/Quasi-Public	Yes	Yes[2]	Yes[2]	Yes[2]	No	No	No	No	Yes[2]
Recreation	Yes	Yes[2]	Yes[2]	No	No	No	No	Yes[2]	Yes[2]
Open/Agriculture/ Low Density	Yes	Yes[2]	Yes[2]	Yes[2]	Yes[2]	Yes[2]	No	Yes[2]	Yes[2]
Undesignated	Yes	No	No	No	No	No	No	No	No

[1] Incompatible with exceptions
[2] Compatible with restrictions
[3] This generalized table demonstrates the land compatibility guidelines. Refer to Appendix A for use in determining land use compatibility.

6.4.2 Existing Land Use Compatibility

Land use compatibility determinations for areas that fall within the boundaries of March ARB CZs and APZs are presented in Figures 6-5 through 6-8 and Table 6-3. Existing land use compatibility for areas exposed to CNEL greater than or equal to 65 dB are presented in Figures 6-9 and 6-10, and Table 6-4. For land use to be considered compatible, it must meet the criteria listed in Table 6-2. Table 6-2 was compared to existing land use plans to determine what type of compatibility was associated with March ARB CZs and APZs and aircraft-generated CNEL.

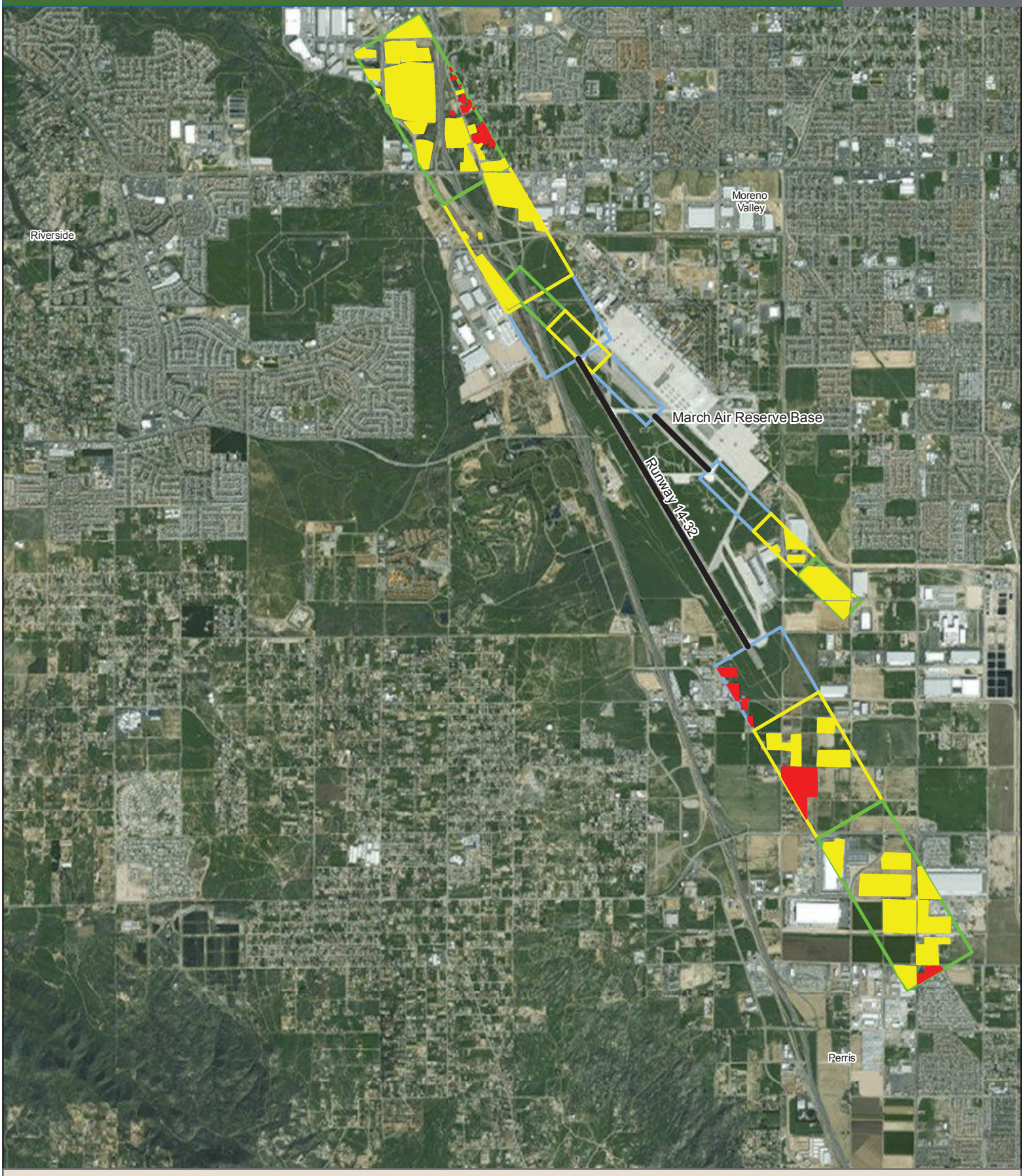
Table 6-3. Compatible and Not Compatible Land Use within March ARB Clear Zones and Accident Potential Zones (Acres)

Designation	Generalized Land Use Category	CZ	Note	APZ I	Note	APZ II	Note	Total
Not Compatible	Residential	-	-	38	(1)(3)	19	(1)(3)	57
	Commercial	30	-					30
	Industrial	31	-					31
	Public/Quasi-Public	-	-	3	-			3
	Recreation	-	-					-
	Open/Agriculture/ Low Density	36	-					36
	Undesignated	-	-	-	-	-	-	-
Compatible	Residential							
	Commercial			271	(2)	646	(2)	917
	Industrial			296	(2)	357	(2)	653
	Public/Quasi-Public					-	-	-
	Recreation			-	-	4	(2)	4
	Open/Agriculture/ Low Density			1	-	-	-	1
	Undesignated							
Subtotals	Not Compatible	97		41		19		157
	Compatible	-		568		1,007		1,575
TOTAL		**97**		**609**		**1,026**		**1,732**

Notes:
(1) Not Compatible with exceptions, Appendix A, Table A-1.
(2) Compatible with restrictions, Appendix A, Table A-1.
(3) Includes residences within commercial and industrial land use areas.
Sources: Amec Foster Wheeler 2017; City of Moreno Valley 2006; City of Perris 2016; City of Riverside 2013; Riverside County 2014.

March ARB Clear Zones/Accident Potential Zones and Land Use Compatibility

Figure 6-5



Legend

- Runway
- Compatible with Restrictions (refer to Section 6.4.2)
- Not Compatible (refer to Section 6.4.2)
- APZ I
- APZ II
- CZ

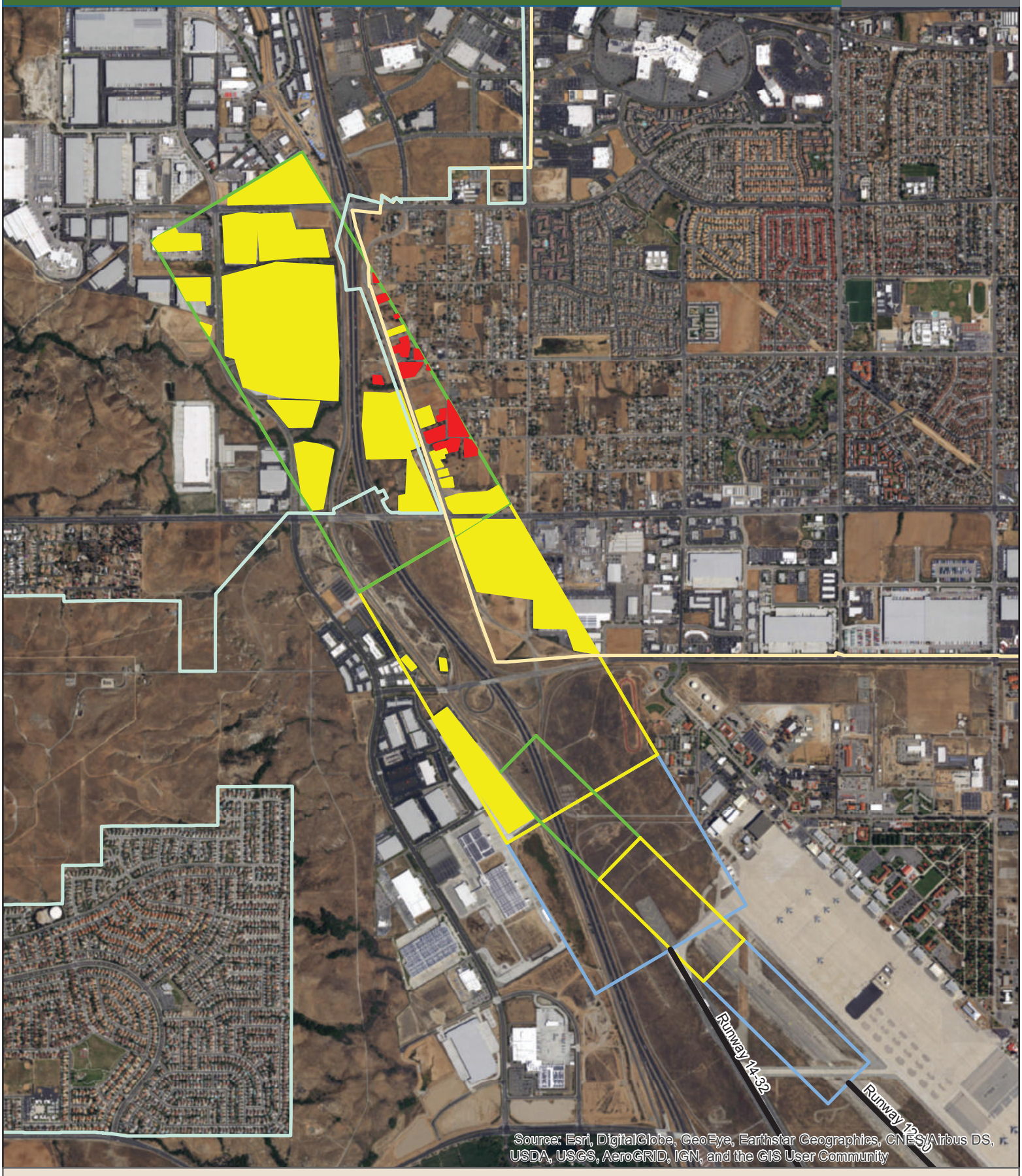
N

0 1.35 Miles

1 inch = 0.95 miles

March ARB Runway 12 and 14 Clear/Accident Potential Zones and Land Use Compatibility

Figure 6-6



Legend

- Runway
- City of Riverside
- City of Moreno Valley
- Compatible with Restrictions (refer to Section 6.4.2)
- Not Compatible (refer to Section 6.4.2)
- APZ I
- APZ II
- CZ

N

0 0.6 Miles

1 inch = 0.41 miles

March ARB Runway 30 Clear/Accident Potential Zones and Land Use Compatibility

Figure 6-7

Legend

- Runway
- City of Perris
- City of Moreno Valley
- Compatible with Restrictions (refer to Section 6.4.2)
- Not Compatible (refer to Section 6.4.2)
- APZ I
- APZ II
- CZ

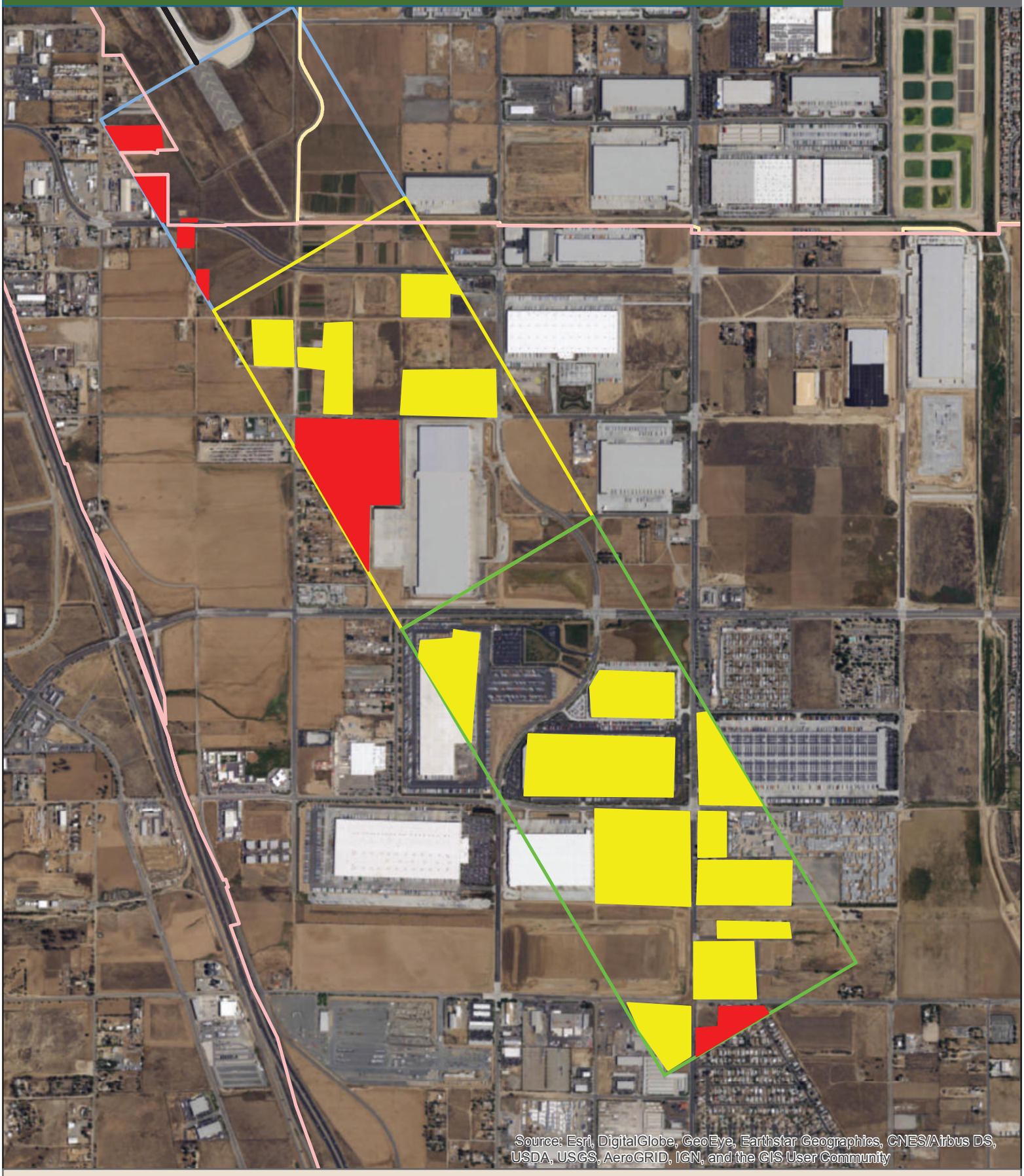
N

0 0.3 Miles

1 inch = 0.24 miles

March ARB Runway 32 Clear/Accident Potential Zones and Land Use Compatibility

Figure 6-8



Legend

- Runway
- City of Perris
- City of Moreno Valley
- Compatible with Restrictions (refer to Section 6.4.2)
- Not Compatible (refer to Section 6.4.2)
- APZ I
- APZ II
- CZ

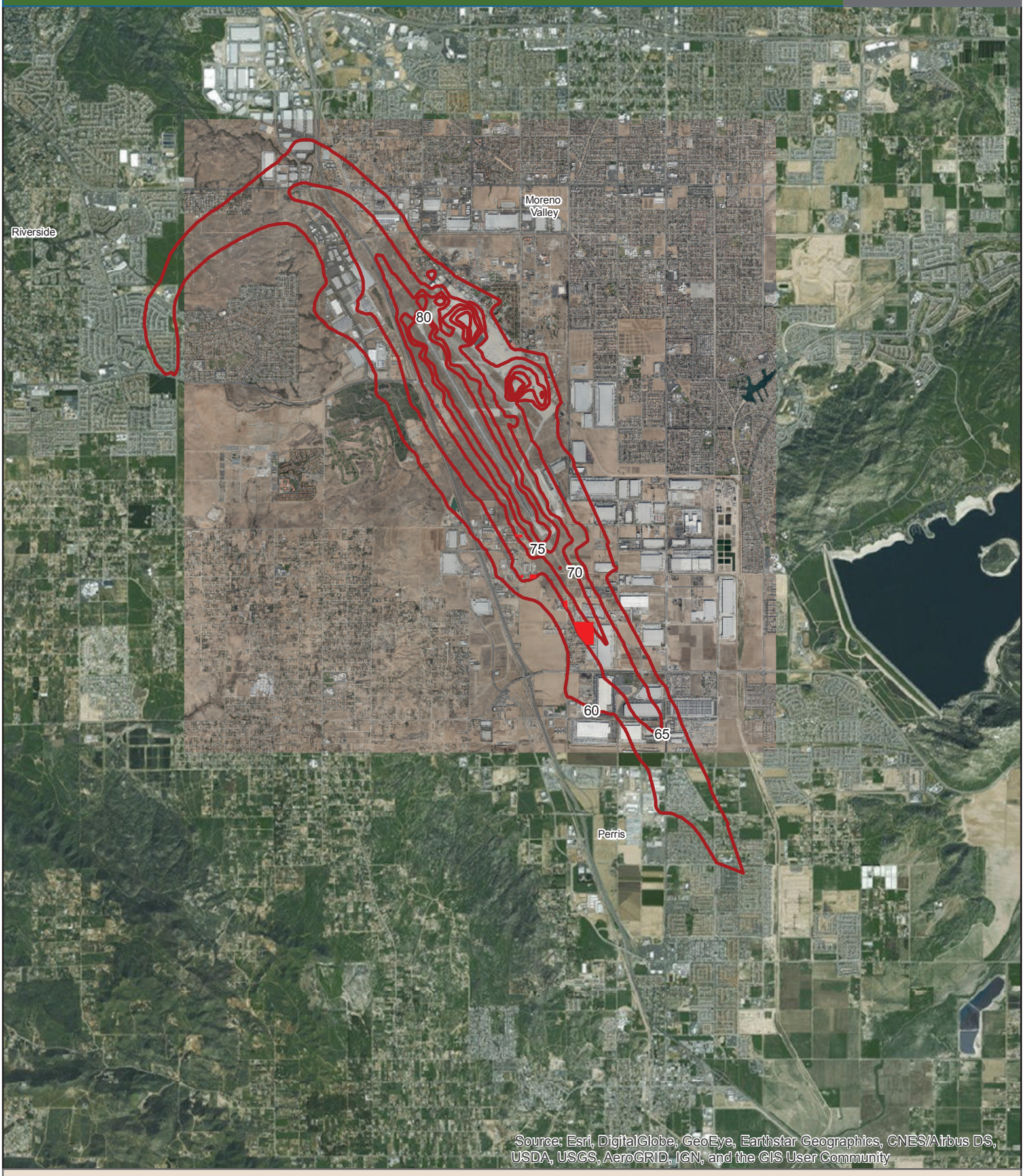
N

0 0.45 Miles

1 inch = 0.32 miles

March ARB 2018 Noise Contours and Land Use Compatibility

Figure 6-9



Legend

Not Compatible with Exceptions (refer to Section 6.4.2)

March ARB 2018 Noise Contours

Noise Contour Levels (CNEL) 60dB, 65dB, 70dB, 75dB, 80dB

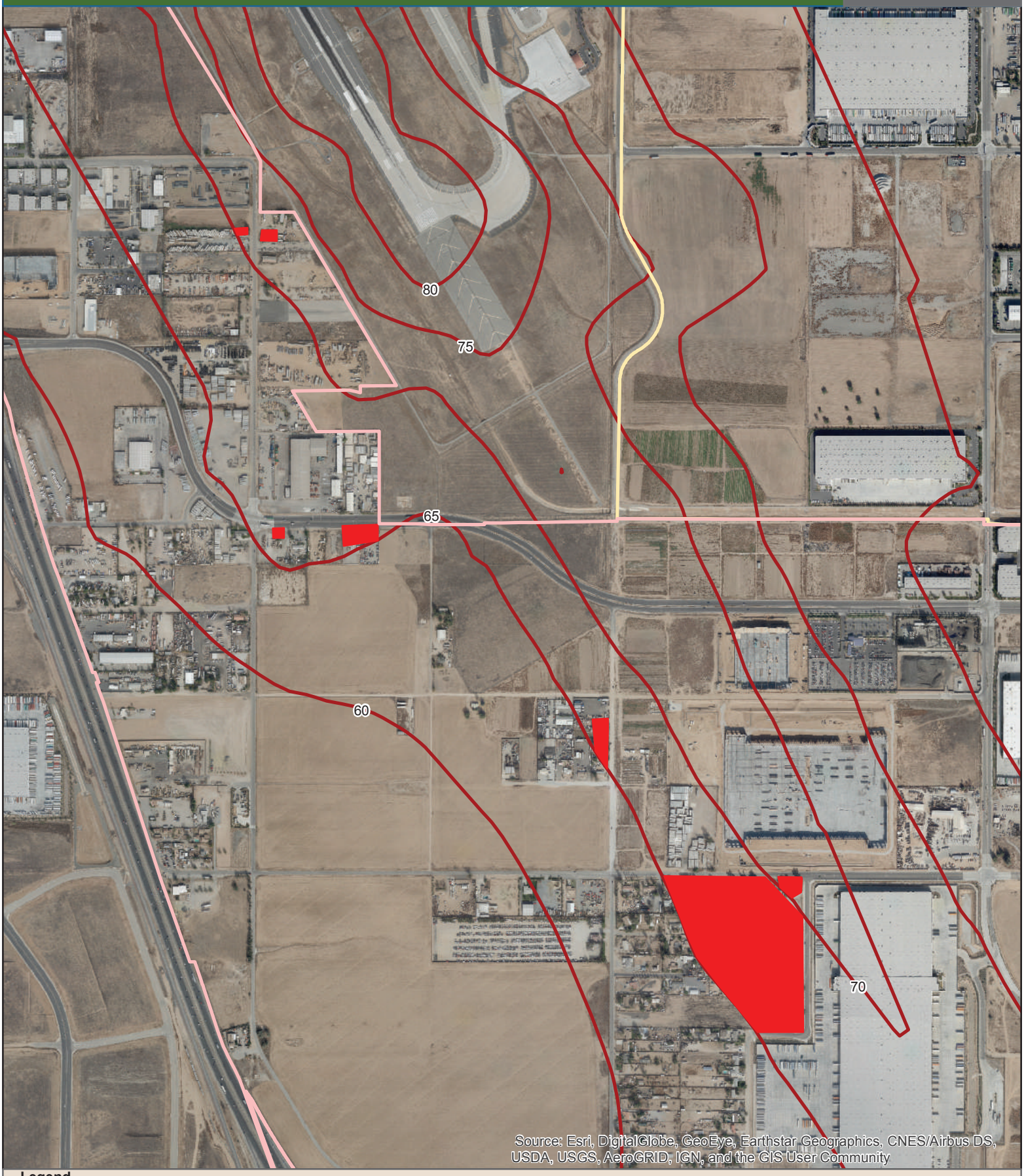
N

0 1.95 Miles

1 inch = 1.29 miles

March ARB 2018 Noise Contours and Land Use Compatibility

Figure 6-10



Legend

- City of Perris
- City of Moreno Valley
- Not Compatible with Exceptions (refer to Section 6.4.2)

March ARB 2018 Noise Contours

- Noise Contour Levels (CNEL) 60dB, 65dB, 70dB, 75dB, 80dB

N

0 0.255 Miles

1 inch = 0.18 miles

Table 6-4. Compatible and Not Compatible Land Use within March ARB 2018 CNEL Zones (Acres)

Designation	Generalized Land Use Category	Noise Zone (dB CNEL)								Total
		65-69	Note	70-74	Note	75-79	Note	80+	Note	
Not Compatible	Residential	20	(1)	`1	(1)	-	-	-	-	21
	Commercial							-	-	-
	Industrial									
	Public/Quasi-Public							-	-	-
	Recreation					-	-	-	-	-
	Open/Agriculture/ Low Density									
	Undesignated	-	-	-	-	-	-	-	-	-
Compatible	Residential									
	Commercial (3)	539		42	-	-	-			581
	Industrial (3)	447		42	-	-		-	-	489
	Public/Quasi-Public	23	(2)	-	-	-	-			23
	Recreation	-	-	-	-					-
	Open/Agriculture/ Low Density	23	(2)	5	(2)	-	-	-	-	28
	Undesignated									
Subtotals	Not Compatible	20	(1)	1	(1)	-	-	-	-	21
	Compatible	1,032		89		-		-	-	1,121
Total		**1,052**		**90**		**-**		**-**		**1,142**

Notes: All contour areas on-base are excluded from the counts.
(1) Not Compatible with exceptions, Appendix A, Table A-2.
(2) Compatible with restrictions, Appendix A, Table A-2.
(3) Includes residences within commercial and industrial land use areas.
Sources: Amec Foster Wheeler 2017; City of Moreno Valley 2006; City of Perris 2016; City of Riverside 2013; Riverside County 2014.

6.4.2.1 Riverside County/Riverside Airport Land Use Commission

Clear Zones and Accident Potential Zones

Within Riverside County, approximately 236 acres within APZ I and APZ II were identified as commercial/industrial, thus *Compatible with Restrictions* (i.e., buildings should meet recommended APZ I FAR criteria). This area is within the

Approach/Departure Zones identified by the Riverside ALUC where industrial and commercial land use is permitted, but not in excess of 25 people per gross acre.

Noise

The 65 dB CNEL noise zone (noise levels between 65 dB and 69 dB CNEL) associated with aircraft operations at March ARB extends into Riverside County over areas designated commercial/industrial and public/quasi-public land use, which is *Compatible* and *Compatible with Restrictions* (i.e., noise level reduction measures included in building development), respectively. With regards to ALUC, the 65-69 dB CNEL noise zone associated with March ARB aircraft operations is within the area designated *Inner Approach/Departure Zones* and *High Noise Zones*; both areas are noted to be subject to high noise levels and "within or near the 65 dB CNEL contour."

6.4.2.2 City of Moreno Valley

Clear Zones and Accident Potential Zones

Within APZ II, 12.2 acres have been determined *Not Compatible;* this includes 44 residences that do not meet the *Not Compatible with Exceptions* criteria (i.e., 2 du/acre). Within APZ I and APZ II, approximately 186 acres of commercial and industrial land use has been identified as *Compatible with Restrictions*, conditioned on these buildings meeting the recommended FAR criteria described in the SLUCM table (Appendix A, Table A-1).

Noise

The 65-69 dB CNEL noise zone associated with aircraft operations at March ARB that extends into the city of Moreno Valley is compatible with the city's existing land use designation (industrial) in this area.

6.4.2.3 City of Perris

Clear Zones and Accident Potential Zones

The CZs and APZs associated with the southern end of Runway 14/32 extend into the city of Perris which has assigned land use via the *City of Perris Specific Plan* which encourages commercial and industrial land use but also includes existing residences. Approximately 11.4 acres within the CZ would be considered *Not Compatible*. An additional 38.1 acres within APZ I would also be considered *Not Compatible* including 37 residences. Within APZ II, 6.6 acres have been determined *Not Compatible* including 38 residences that do not qualify as *Not Compatible with Exceptions* (i.e., 2 du/acre).

Both APZ I and APZ II associated with the south end of Runway 14/32 contain commercial and industrial land use that would be considered *Compatible with Restrictions*, conditioned on buildings meeting the recommended FAR criteria described in the SLUCM table (Appendix A, Table A-1).

Noise

The approximately 20 acres and 18 residences that exist within the 65- 69 dB CNEL noise zone are considered *Not Compatible with Exceptions*. Further, 0.8 acres and 3 residences within the 70 -74 dB CNEL noise zone are considered *Not Compatible with Exceptions*.

6.4.2.4 City of Riverside

Clear Zones and Accident Potential Zones

Within the city of Riverside, an area of approximately 367 acres within APZ II was identified as commercial, thus *Compatible with Restrictions* (i.e., buildings should meet recommended APZ II FAR criteria).

Noise

The 65 dB CNEL noise zone associated with aircraft operations at March ARB that extends into the city of Riverside is compatible with the city's existing land use designation (commercial) in this area.

6.5 AVIGATION EASEMENTS

While the majority of the CZs associated with March ARB runways are within the March ARB boundaries, small areas of the CZs are within the City of Perris and Riverside County jurisdiction, to the south and north, respectively. March ARB has engaged in the establishment of avigation easements with specific land holders to deal with these CZ areas outside of the base boundaries. Currently, March ARB has approximately 39 avigation clearance easements associated with Runway 14/32 CZs that extend beyond the base boundary (March ARB 2016d).

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SECTION 7
IMPLEMENTATION

Implementation of the AICUZ Study must be a joint effort between March ARB and the surrounding communities. This AICUZ study provides the best source of information to ensure land use planning decisions made by the local municipalities are compatible with a future installation presence. This chapter discusses the roles of all the partners in the collaborative planning.

7.1 AIR FORCE ROLE

The goal of the Air Force AICUZ program is to minimize the noise and safety concerns on the surrounding communities and to advise these communities on potential impacts from base operations on the safety, welfare, and quality of life of their citizens.

March ARB's AICUZ responsibilities encompass the areas of flight safety, noise abatement, and participation in the land use planning process.

Air Force policy and guidance requires that base leadership periodically review existing practices for flight operations and evaluate these factors in relationship to populated areas and other local situations.

- March ARB should ensure that wherever possible flights be routed over sparsely populated areas as to reduce the exposure of lives and property to a potential accident.
- March ARB should periodically review existing traffic patterns, instrument approaches, weather conditions, and operating practices and evaluate these factors in relationship to populated areas and other local situations. This is done in order to limit, reduce and control the impact of noise from flying operations on surrounding communities.
- March ARB should establish a community forum between the installation and surrounding stakeholders to discuss land use and other issues of concern; these meetings should be held on a quarterly basis.
- March ARB should schedule land use planning meetings to provide a forum for agencies to meet and discuss future developments and to address issues that may surface as a result of new proposals. In an effort to further

facilitate and promote straightforward, consistent two-way discussion and information sharing.

- March ARB should provide copies of AICUZ studies to local, county, tribal, and regional planning departments and zoning administrators to aid in the planning process. Also provide copies of the AICUZ study to appropriate state and federal agencies.

Preparation and presentation of this March ARB AICUZ Study is one phase of continuing Air Force participation in the local planning process. The Air Force recognizes that as the local community updates its land use plans, March ARB must be ready to provide additional input as needed.

7.2 STATE AND REGIONAL ROLES

Community and Military Compatibility Planning, a supplement to California General Plan Guidelines prepared by the State of California Governor's Office of Planning and Research (OPR), assists cities and counties in addressing military compatibility issues when developing, updating or significantly amending their general plans. The State recommends that cities and counties near military facilities consider such facilities to be part of the community and, therefore, there is a need to address these facilities and local land use impacts within the general plan to reduce land use conflicts between civilian development and military readiness activities.

The State of California requires the OPR to prepare and publish an advisory planning handbook for local officials, planners and developers to include information about how to reduce land use conflicts between the effects of civilian development and military readiness. This document, known as the California Advisory Handbook for Community and Military Compatibility Planning (OPR Handbook), was published in 2006 and updated in 2016.

OPR's handbook outlines instruction for collaboration on land use compatibility between local governments and the military particularly with regard to the general plan.

To further aid in the promotion and long-term operation of March ARB, the State should consider the following (Association of Defense Communities 2016):

- Economic Impact/Strategic Planning Study;
- Encroachment Mitigation Planning; and
- Funding of Encroachment Efforts.

7.3 LOCAL GOVERNMENT ROLE

The role of the local government is to enact planning, zoning, and development principles and practices that are compatible with the base and which protect the base's mission. The residents of the surrounding community have a long history of working with personnel from March ARB. Adoption of the following recommendations during the revision of relevant land use planning or zoning regulations will strengthen this relationship, increase the health and safety of the public, and protect the integrity of the base's flying mission:

- Recommend local government planners consider AICUZ policies and guidelines when developing or revising city comprehensive plans and use AICUZ overlay maps and Air Force Land Use Compatibility Guidelines (see Appendix A) to evaluate existing and future land use proposals.
- Ensure that new development applications or "changed use of property" are submitted to March ARB to afford the opportunity to assess those applications for potential impacts on defense missions. The March ARB Public Affairs Office can provide a land use planning point of contact.
- Recommend zoning ordinances be adopted or modified to reflect the compatible land uses outlined in the AICUZ report, including the creation of military airport overlay zones.
- Recommend local government and county planners establish procedures to consult on land use matters within overlapping extra-territorial jurisdictions near March ARB**.**
- Recommend local governments review their capital improvement plan, infrastructure investments and development policies to ensure they do not encourage incompatible land use patterns near March ARB, with particular emphasis on utility extension and transportation planning.
- Recommend local governments implement height and obstruction ordinances that reflect current Air Force and Title 14 of the Code of Federal Regulations Part 77 requirements, presented in this study as Hazards to Aircraft Flight Zones.

- Recommend fair disclosure ordinances be enacted to require disclosure to the public for those AICUZ items that directly relate to aircraft operations at March ARB.
- Recommend local governments, where allowed, require real estate disclosure for individuals purchasing property within noise contours or CZs/APZs.
- Enact or modify building/residential codes to ensure that any new construction near March ARB has the recommended noise-level reduction measures incorporated into the design and construction of structures.
- Recommend government planning bodies monitor proposals for tall structures such as wind turbines and communication towers to ensure that new construction does not pose a hazard to navigable airspace around March ARB. Where appropriate coordinate with the FAA on height of structures.
- Recommend that local government land use plans and ordinances reflect AICUZ recommendations for development in CZs/APZs and noise zones.
- Recommend that local governments consult with March ARB on planning and zoning actions that have the potential to affect base operations.
- Invite the Air Force leadership to sit on as an ex officio member on boards, commissions and regional councils addressing long range development and other planning policies.
- Encourage the development of a working group of city, county, and March ARB representatives to discuss land use concerns and major development proposals that could affect aircraft operations.

7.4 COMMUNITY ROLES

Neighboring residents and base personnel have a long-established history of working together for the mutual benefit of the March ARB mission and local community. Adoption of the following recommendations will strengthen this relationship, protect the health and ensure the safety of the public, and help protect the integrity of the base's flying mission:

Real Estate Professionals and Brokers:

- Adhere to the State of California Business and Professions Code Section 11010. (13)(A), as it relates to real estate professional responsibility to disclose the location of all existing airports, and all proposed airports

shown on the general plan of any city or county, located within two-statute miles of real property/subdivision.

- Know where the noise zones and CZs/APZs encumber land near the airbase and invite base representative to brokers' meeting to discuss the AICUZ program with the real estate professionals.
- Disclose noise impact to all prospective buyers of properties within areas greater than 60 dB CNEL or within the CZs/APZs.
- Require the Multiple Listing Service to disclose noise zones and CZs/APZs on all listings.

Developers:

- Know where the noise zones and CZs/APZs encumber land near the airbase. Consult with March ARB on proposed developments within the AICUZ.
- Make recommendations regarding existing zoning ordinances and subdivision regulations to support the compatible land uses outlined in this study through implementation of a zoning overlay district based on noise contours and CZs/APZs.

Local Citizens:

- Participate in local forums with the base to learn more about the base's missions.
- Become informed about the AICUZ Program and learn about the program's goals, objectives, and value in protecting the public's health, safety, and welfare.
- When considering property purchases, ask local real estate professionals, city planners, and base representatives about noise and accident potential.

Whereas the base and community are separated by a fence, what the Air Force does affects the community and conversely what the community does, can affect the Air Force mission. Collaborative planning, forging partnerships, open communications, and close relationships help the Air Force and its neighbors achieve their mutual goals.

7.5 JOINT LAND USE STUDY PROGRAM AND NOMINATIONS

To assist local communities to determine what steps they need to take to incorporate the AICUZ land use recommendations into their land use and comprehensive plans and zoning, Congress has authorized DoD to provide planning assistance to local communities to address encroachment issues.

The Office of Economic Adjustment's (OEA) Compatible Use Program provides direct federal assistance to help states and communities work with the Military Services to prevent and mitigate impacts where encroachment of the civilian community impairs the use of military installations. Technical and financial assistance is available through a JLUS to partner with the local military leadership to plan and carry out strategies promoting compatible civilian use adjacent to an installation complex, including related ranges, special use airspace and associated military training routes and military operations areas. Through the community-driven JLUS planning process, adjacent communities and often the state, in partnership with the installation, identify and evaluate a wide range of both existing and potential future encroachment challenges that may impair the continued operational utility of the military installation complex. The affected communities then develop a strategic action plan to identify specific actions, responsible parties, and a proposed timeline to address the encroachment challenges. The JLUS is a partnership between OEA and the local communities. The military's role in the JLUS process is advisory, providing technical information on noise, safety and installation flight and/or ground training activities.

JLUS nominations are submitted to OEA by the MAJCOM, and communities should consider nominating an installation or range if civilian development has impaired or is likely to impair the continued operational utility of the installation complex.

Given that March ARB CZs and APZs fall within jurisdictions of the surrounding municipalities, and the desire for the municipalities to both protect the operational ability of the base and encourage compatible development, a JLUS update would be a logical next step, and is recommended.

SECTION 8
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Appendix A. Land Use Compatibility Tables

Table A-1. Land Use Compatibility Recommendations in APZs and CZs

SLUCM NO.	LAND USE NAME	CLEAR ZONE Recommendation[1]	APZ-I Recommendation[1]	APZ-II Recommendation[1]	DENSITY Recommendation[1]
10	Residential				
11	Household Units				
11.11	Single units: detached	N	N	Y[2]	Maximum density of 2 Du/Ac
11.12	Single units: semi-detached	N	N	N	
11.13	Single units: attached row	N	N	N	
11.21	Two units: side-by-side	N	N	N	
11.22	Two units: one above the other	N	N	N	
11.31	Apartments: walk-up	N	N	N	
11.32	Apartment: elevator	N	N	N	
12	Group quarters	N	N	N	
13	Residential hotels	N	N	N	
14	Mobile home parks or courts	N	N	N	
15	Transient lodgings	N	N	N	
16	Other residential	N	N	N	
20	Manufacturing [3]				
21	Food and kindred products; manufacturing	N	N	Y	Maximum FAR 0.56 IN APZ II
22	Textile mill products; manufacturing	N	N	Y	Maximum FAR 0.56 IN APZ II
23	Apparel and other finished products; products made from fabrics, leather and similar materials; manufacturing	N	N	N	
24	Lumber and wood products (except furniture); manufacturing	N	Y	Y	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II
25	Furniture and fixtures; manufacturing	N	Y	Y	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II

SLUCM NO.	LAND USE NAME	CLEAR ZONE Recommendation[1]	APZ-I Recommendation[1]	APZ-II Recommendation[1]	DENSITY Recommendation[1]
26	Paper and allied products; manufacturing	N	Y	Y	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II
27	Printing, publishing, and allied industries	N	Y	Y	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II
28	Chemicals and allied products; manufacturing	N	N	N	
29	Petroleum refining and related industries	N	N	N	
30	Manufacturing[3] (continued)				
31	Rubber and miscellaneous plastic products; manufacturing	N	N	N	
32	Stone, clay, and glass products; manufacturing	N	N	Y	Maximum FAR 0.56 in APZ II
33	Primary metal products; manufacturing	N	N	Y	Maximum FAR 0.56 in APZ II
34	Fabricated metal products; manufacturing	N	N	Y	Maximum FAR 0.56 in APZ II
35	Professional, scientific, and controlling instruments; photographic and optical goods; watches and clocks	N	N	N	
39	Miscellaneous manufacturing	N	Y	Y	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II
40	Transportation, communication, and utilities[3, 4]				
41	Railroad, rapid rail transit, and street railway transportation	N	Y[6]	Y	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II
42	Motor vehicle transportation	N	Y[6]	Y	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II
43	Aircraft transportation	N	Y[6]	Y	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II
44	Marine craft transportation	N	Y[6]	Y	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II
45	Highway and street right-of-way	Y[5]	Y[6]	Y	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II

SLUCM NO.	LAND USE NAME	CLEAR ZONE Recommendation[1]	APZ-I Recommendation[1]	APZ-II Recommendation[1]	DENSITY Recommendation[1]
46	Automobile parking	N	Y[6]	Y	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II
47	Communication	N	Y[6]	Y	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II
48	Utilities[7]	N	Y[6]	Y[6]	Maximum FAR of 0.28 in APZ I & 0.56 in APZ II
48.5	Solid waste disposal (landfills, incinerators, etc.)	N	N	N	
49	Other transportation, communication, and utilities	N	Y[6]	Y	See Note 6 below
50			Trade		
51	Wholesale trade	N	Y	Y	Maximum FAR of 0.28 in APZ I & .56 in APZ II
52	Retail trade – building materials, hardware and farm equipment	N	Y	Y	See Note 8 below
53	Retail trade – including, discount clubs, home improvement stores, electronics superstores, etc.	N	N	Y	Maximum FAR of 0.16 in APZ II
53	Shopping centers-Neighborhood, Community, Regional, Super-regional[9]	N	N	N	
54	Retail trade – food	N	N	Y	Maximum FAR of 0.24 in APZ II
55	Retail trade – automotive, marine craft, aircraft, and accessories	N	Y	Y	Maximum FAR of 0.14 in APZ I & 0.28 in APZ II
56	Retail trade – apparel and accessories	N	N	Y	Maximum FAR of 0.28 in APZ II
57	Retail trade – furniture, home, furnishings and equipment	N	N	Y	Maximum FAR of 0.28 in APZ II

SLUCM NO.	LAND USE NAME	CLEAR ZONE Recommendation[1]	APZ-I Recommendation[1]	APZ-II Recommendation[1]	DENSITY Recommendation[1]
58	Retail trade – eating and drinking establishments	N	N	N	
59	Other retail trade	N	N	Y	Maximum FAR of 0.16 in APZ II
60	Services[10]				
61	Finance, insurance and real estate services	N	N	Y	Maximum FAR of 0.22 in APZ II
62	Personal services	N	N	Y	Office uses only. Maximum FAR of 0.22 in APZ II.
62.4	Cemeteries	N	Y[11]	Y[11]	
63	Business services (credit reporting; mail, stenographic, reproduction; advertising)	N	N	Y	Maximum FAR of 0.22 in APZ II
63.7	Warehousing and storage services[12]	N	Y	Y	Maximum FAR of 1.0 in APZ I; 2.0 in APZ II
64	Repair Services	N	Y	Y	Maximum FAR of 0.11 APZ I; 0.22 in APZ II
65	Professional services	N	N	Y	Maximum FAR of 0.22 in APZ II
65.1	Hospitals, nursing homes	N	N	N	
65.1	Other medical facilities	N	N	N	
66	Contract construction services	N	Y	Y	Maximum FAR of 0.11 APZ I; 0.22 in APZ II
67	Government Services	N	N	Y	Maximum FAR of 0.24 in APZ II
68	Educational services	N	N	N	
68.1	Child care services, child development centers, and nurseries	N	N	N	
69	Miscellaneous Services	N	N	Y	Maximum FAR of 0.22 in APZ II
69.1	Religious activities (including places of worship)	N	N	N	
70	Cultural, entertainment and recreational				
71	Cultural activities	N	N	N	
71.2	Nature exhibits	N	Y[13]	Y[13]	
72	Public assembly	N	N	N	

SLUCM NO.	LAND USE NAME	CLEAR ZONE Recommendation[1]	APZ-I Recommendation[1]	APZ-II Recommendation[1]	DENSITY Recommendation[1]
72.1	Auditoriums, concert halls	N	N	N	
72.11	Outdoor music shells, amphitheaters	N	N	N	
72.2	Outdoor sports arenas, spectator sports	N	N	N	
73	Amusements – fairgrounds, miniature golf, driving ranges; amusement parks, etc.	N	N	Y[20]	
74	Recreational activities (including golf courses, riding stables, water recreation)	N	Y[13]	Y[13]	Maximum FAR of 0.11 in APZ I; 0.22 in APZ II
75	Resorts and group camps	N	N	N	
76	Parks	N	Y[13]	Y[13]	Maximum FAR of 0.11 in APZ I; 0.22 in APZ II
79	Other cultural, entertainment and recreation	N	Y[11]	Y[11]	Maximum FAR of 0.11 in APZ I; 0.22 in APZ II
80	Resource production and extraction				
81	Agriculture (except live-stock)	Y[4]	Y[14]	Y[14]	
81.5-81.7,	Agriculture-Livestock farming, including grazing and feedlots	N	Y[14]	Y[14]	
82	Agriculture related activities	N	Y[15]	Y[15]	Maximum FAR of 0.28 in APZ I; 0.56 in APZ II, no activity which produces smoke, glare, or involves explosives
83	Forestry activities[16]	N	Y	Y	Maximum FAR of 0.28 in APZ I; 0.56 in APZ II, no activity which produces smoke, glare, or involves explosives

SLUCM NO.	LAND USE NAME	CLEAR ZONE Recommendation[1]	APZ-I Recommendation[1]	APZ-II Recommendation[1]	DENSITY Recommendation[1]
84	Fishing activities[17]	N[17]	Y	Y	Maximum FAR of 0.28 in APZ I; 0.56 in APZ II, no activity which produces smoke, glare, or involves explosives
85	Mining activities[18]	N	Y[18]	Y[18]	Maximum FAR of 0.28 in APZ I; 0.56 in APZ II, no activity which produces smoke, glare, or involves explosives
89	Other resource production or extraction	N	Y	Y	Maximum FAR of 0.28 in APZ I; 0.56 in APZ II, no activity which produces smoke, glare, or involves explosives
90	Other				
91	Undeveloped land	Y	Y	Y	
93	Water areas[19]	N[19]	N[19]	N[19]	

[1] A "Yes" or a "No" designation for compatible land use is to be used only for general comparison. Within each, uses exist where further evaluation may be needed in each category as to whether it is clearly compatible, normally compatible, or not compatible due to the variation of densities of people and structures. In order to assist air installations and local governments, general suggestions as to FARs are provided as a guide to density in some categories. In general, land use restrictions that limit occupants, including employees, of commercial, service, or industrial buildings or structures to 25 an acre in APZ I and 50 an acre in APZ II are considered to be low density. Outside events should normally be limited to assemblies of not more than 25 people an acre in APZ I, and maximum assemblies of 50 people an acre in APZ II. Recommended FARs are calculated using standard parking generation rates for various land uses, vehicle occupancy rates, and desired density in APZ I and II. For APZ I, the formula is FAR = 25 people an acre/ (Average Vehicle Occupancy x Average Parking Rate x (43560/1000)). The formula for APZ II is FAR = 50/ (Average Vehicle Occupancy x Average Parking Rate x (43560/1000)).

[2] The suggested maximum density for detached single-family housing is two Du/Ac. In a planned unit development (PUD) of single family detached units, where clustered housing development results in large open areas, this density could possibly be increased slightly provided the amount of surface area covered by structures does not exceed 20 percent of the PUD total area. PUD encourages clustered development that leaves large open areas.

[3] Other factors to be considered: Labor intensity, structural coverage, explosive characteristics, air-pollution, electronic interference with aircraft, height of structures, and potential glare to pilots.

[4] No structures (except airfield lighting and navigational aids necessary for the safe operation of the airfield when there are no other siting options), buildings, or above-ground utility and communications lines should normally be located in Clear Zone areas on or off the air installation. The Clear Zone is subject to the most severe restrictions.

[5] Roads within the graded portion of the Clear Zone are prohibited. All roads within the Clear Zone are discouraged, but if required, they should not be wider than two lanes and the rights-of-way should be fenced (frangible) and not include sidewalks or bicycle trails. Nothing associated with these roads should violate obstacle clearance criteria.

[6] No above ground passenger terminals and no above ground power transmission or distribution lines. Prohibited power lines include high-voltage transmission lines and distribution lines that provide power to cities, towns, or regional power for unincorporated areas.

[7] Development of renewable energy resources, including solar and geothermal facilities and wind turbines, may impact military operations through hazards to flight or electromagnetic interference. Each new development should to be analyzed for compatibility issues on a case-by-case basis that considers both the proposal and potentially affected mission.

[8] Within SLUCM Code 52, maximum FARs for lumberyards (SLUCM Code 521) are 0.20 in APZ-I and 0.40 in APZ-11; the maximum FARs for hardware, paint, and farm equipment stores, (SLUCM Code 525), are 0.12 in APZ I and 0.24 in APZ II.

[9] A shopping center is an integrated group of commercial establishments that is planned, developed, owned, or managed as a unit. Shopping center types include strip, neighborhood, community, regional, and super-regional facilities anchored by small businesses, a supermarket or drug store, discount retailer, department store, or several department stores, respectively.

[10] Ancillary uses such as meeting places, auditoriums, etc. are not recommended.

[11] No chapels or houses of worship are allowed within APZ I or APZ II.

[12] Big box home improvement stores are not included as part of this category.

[13] Facilities must be low intensity, and provide no playgrounds, etc. Facilities such as club houses, meeting places, auditoriums, large classes, etc., are not recommended.

[14] Activities that attract concentrations of birds creating a hazard to aircraft operations should be excluded.

[15] Factors to be considered: labor intensity, structural coverage, explosive characteristics, and air pollution.

[16] Lumber and timber products removed due to establishment, expansion, or maintenance of Clear Zone lands owned in fee will be disposed of in accordance with applicable DoD guidance.

[17] Controlled hunting and fishing may be permitted for the purpose of wildlife management.

[18] Surface mining operations that could create retention ponds that may attract waterfowl and present bird/wildlife aircraft strike hazards (BASH), or operations that produce dust or light emissions that could affect pilot vision are not compatible.

[19] Naturally occurring water features (e.g., rivers, lakes, streams, wetlands) are pre-existing, nonconforming land uses. Naturally occurring water features that attract waterfowl present a potential BASH. Actions to expand naturally occurring water features or construction of new water features should not be encouraged. If construction of new features is necessary for storm water retention, such features should be designed so that they do not attract waterfowl.

[20]. Amusement centers, family entertainment centers or amusement parks designed or operated at a scale that could attract or result in concentrations of people, including employees and visitors, greater than 50 people per acre at any given time are incompatible in APZ II.

Table A-2. Recommended Land Use Compatibility for Noise Zones

LAND USE			SUGGESTED LAND USE COMPATIBILITY			
SLUCM NO.	LAND USE NAME	DNL or CNEL 65-69	DNL or CNEL 70-74	DNL or CNEL 75-79	DNL or CNEL 80-84	DNL or CNEL 85+
10	Residential					
11	Household units	N[1]	N[1]	N	N	N
11.11	Single units: detached	N[1]	N[1]	N	N	N
11.12	Single units: semidetached	N[1]	N[1]	N	N	N
11.13	Single units: attached row	N[1]	N[1]	N	N	N
11.21	Two units: side-by-side	N[1]	N[1]	N	N	N
11.22	Two units: one above the other	N[1]	N[1]	N	N	N
11.31	Apartments: walk-up	N[1]	N[1]	N	N	N
11.32	Apartment: elevator	N[1]	N[1]	N	N	N
12	Group quarters	N[1]	N[1]	N	N	N
13	Residential hotels	N[1]	N[1]	N	N	N
14	Mobile home parks or courts	N	N	N	N	N
15	Transient lodgings	N[1]	N[1]	N[1]	N	N
16	Other residential	N[1]	N[1]	N	N	N
20	Manufacturing					
21	Food and kindred products; manufacturing	Y	Y[2]	Y[3]	Y[4]	N
22	Textile mill products; manufacturing	Y	Y[2]	Y[3]	Y[4]	N
23	Apparel and other finished products; products made from fabrics, leather, and similar materials; manufacturing	Y	Y[2]	Y[3]	Y[4]	N
24	Lumber and wood products (except furniture); manufacturing	Y	Y[2]	Y[3]	Y[4]	N
25	Furniture and fixtures; manufacturing	Y	Y[2]	Y[3]	Y[4]	N
26	Paper and allied products; manufacturing	Y	Y[2]	Y[3]	Y[4]	N
27	Printing, publishing, and allied industries	Y	Y[2]	Y[3]	Y[4]	N
28	Chemicals and allied products; manufacturing	Y	Y[2]	Y[3]	Y[4]	N
29	Petroleum refining and related industries	Y	Y[2]	Y[3]	Y[4]	N
30	Manufacturing (continued)					
31	Rubber and misc. plastic products; manufacturing	Y	Y[2]	Y[3]	Y[4]	N

LAND USE			SUGGESTED LAND USE COMPATIBILITY			
SLUCM NO.	LAND USE NAME	DNL or CNEL 65-69	DNL or CNEL 70-74	DNL or CNEL 75-79	DNL or CNEL 80-84	DNL or CNEL 85+
32	Stone, clay and glass products; manufacturing	Y	Y[2]	Y[3]	Y[4]	N
33	Primary metal products; manufacturing	Y	Y[2]	Y[3]	Y[4]	N
34	Fabricated metal products; manufacturing	Y	Y[2]	Y[3]	Y[4]	N
35	Professional scientific, and controlling instruments; photographic and optical goods; watches and clocks	Y	25	30	N	N
39	Miscellaneous manufacturing	Y	Y[2]	Y[3]	Y[4]	N
40	Transportation, communication and utilities					
41	Railroad, rapid rail transit, and street railway transportation	Y	Y[2]	Y[3]	Y[4]	N
42	Motor vehicle transportation	Y	Y[2]	Y [3]	Y[4]	N
43	Aircraft transportation	Y	Y[2]	Y[3]	Y[4]	N
44	Marine craft transportation	Y	Y[2]	Y[3]	Y[4]	N
45	Highway and street right-of-way	Y	Y	Y	Y	N
46	Automobile parking	Y	Y	Y	Y	N
47	Communication	Y	255	305	N	N
48	Utilities	Y	Y[2]	Y[3]	Y[4]	N
49	Other transportation, communication and utilities	Y	255	305	N	N
50	Trade					
51	Wholesale trade	Y	Y[2]	Y[3]	Y[4]	N
52	Retail trade – building materials, hardware and farm equipment	Y	25	30	Y[4]	N
53	Retail trade – including shopping centers, discount clubs, home improvement stores, electronics superstores, etc.	Y	25	30	N	N
50	Trade (continued)					
54	Retail trade – food	Y	25	30	N	N
55	Retail trade – automotive, marine craft, aircraft and accessories	Y	25	30	N	N
56	Retail trade – apparel and accessories	Y	25	30	N	N

LAND USE			SUGGESTED LAND USE COMPATIBILITY			
SLUCM NO.	LAND USE NAME	DNL or CNEL 65-69	DNL or CNEL 70-74	DNL or CNEL 75-79	DNL or CNEL 80-84	DNL or CNEL 85+
57	Retail trade – furniture, home, furnishings and equipment	Y	25	30	N	N
58	Retail trade – eating and drinking establishments	Y	25	30	N	N
59	Other retail trade	Y	25	30	N	N
60	Services					
61	Finance, insurance and real estate services	Y	25	30	N	N
62	Personal services	Y	25	30	N	N
62.4	Cemeteries	Y	Y[2]	Y[3]	Y[4,11]	Y[6,11]
63	Business services	Y	25	30	N	N
63.7	Warehousing and storage	Y	Y[2]	Y[3]	Y[4]	N
64	Repair services	Y	Y[2]	Y[3]	Y[4]	N
65	Professional services	Y	25	30	N	N
65.1	Hospitals, other medical facilities	25	30	N	N	N
65.16	Nursing homes	N[1]	N[1]	N	N	N
66	Contract construction services	Y	25	30	N	N
67	Government services	Y[1]	25	30	N	N
68	Educational services	25	30	N	N	N
68.1	Child care services, child development centers, and nurseries	25	30	N	N	N
69	Miscellaneous Services	Y	25	30	N	N
69.1	Religious activities (including places of worship)	Y	25	30	N	N
70	Cultural, entertainment and recreational					
71	Cultural activities	25	30	N	N	N
71.2	Nature exhibits	Y[1]	N	N	N	N
72	Public assembly	Y	N	N	N	N
72.1	Auditoriums, concert halls	25	30	N	N	N
72.11	Outdoor music shells, amphitheaters	N	N	N	N	N
72.2	Outdoor sports arenas, spectator sports	Y[7]	Y[7]	N	N	N
73	Amusements	Y	Y	N	N	N
74	Recreational activities (including golf courses, riding stables, water recreation)	Y	25	30	N	N
75	Resorts and group camps	Y	25	N	N	N
76	Parks	Y	25	N	N	N

LAND USE			SUGGESTED LAND USE COMPATIBILITY			
SLUCM NO.	LAND USE NAME	DNL or CNEL 65-69	DNL or CNEL 70-74	DNL or CNEL 75-79	DNL or CNEL 80-84	DNL or CNEL 85+
79	Other cultural, entertainment and recreation	Y	25	N	N	N
80	Resource production and extraction					
81	Agriculture (except live-stock)	Y[8]	Y[9]	Y[10]	Y[10,11]	Y[10,11]
81.5-81.7	Agriculture-Livestock farming including grazing and feedlots	Y[8]	Y[9]	N	N	N
82	Agriculture related activities	Y[8]	Y[9]	Y[10]	Y[10,11]	Y[10,11]
83	Forestry activities	Y[8]	Y[9]	Y[10]	Y[10,11]	Y[10,11]
84	Fishing activities	Y	Y	Y	Y	Y
85	Mining activities	Y	Y	Y	Y	Y
89	Other resource production or extraction	Y	Y	Y	Y	Y

[1.] General

[a.] Although local conditions regarding the need for housing may require residential use in these zones, residential use is discouraged in DNL 65-69 and strongly discouraged in DNL 70-74. The absence of viable alternative development options should be determined and an evaluation should be conducted locally prior to local approvals indicating that a demonstrated community need for the residential use would not be met if development were prohibited in these zones. Existing residential development is considered as pre-existing, non-conforming land uses.

[b.] Where the community determines that these uses must be allowed, measures to achieve outdoor to indoor NLR of at least 25 decibels (dB) in DNL 65-69 and 30 dB in DNL 70-74 should be incorporated into building codes and be considered in individual approvals; for transient housing, an NLR of at least 35 dB should be incorporated in DNL 75-79.

[c.] Normal permanent construction can be expected to provide an NLR of 20 dB, thus the reduction requirements are often stated as 5, 10, or 15 dB over standard construction and normally assume mechanical ventilation, upgraded sound transmission class ratings in windows and doors, and closed windows year round. Additional consideration should be given to modifying NLR levels based on peak noise levels or vibrations.

[d.] NLR criteria will not eliminate outdoor noise problems. However, building location, site planning, design, and use of berms and barriers can help mitigate outdoor noise exposure particularly from ground level sources. Measures that reduce noise at a site should be used wherever practical in preference to measures that only protect interior spaces.

[2.] Measures to achieve NLR of 25 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 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 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.

[5.] If project or proposed development is noise sensitive, use indicated NLR; if not, land use is compatible without NLR.

[6.] Buildings are not permitted.

[7.] Land use is compatible provided special sound reinforcement systems are installed.

[8.] Residential buildings require an NLR of 25

[9.] Residential buildings require an NLR of 30.

[10.] Residential buildings are not permitted.

[11.] Land use that involves outdoor activities is not recommended, but if the community allows such activities, hearing protection devices should be worn when noise sources are present. Long-term exposure (multiple hours per day over many years) to high noise levels can cause hearing loss in some unprotected individuals.

Appendix B. Key Terms

Community Noise Equivalent Level (CNEL) – CNEL is a composite noise metric accounting for the sound energy of all noise events in a 24-hour period. In order to account for increased human sensitivity to noise in the evening and at night, a 5 dB penalty is applied to events that occur between 7 p.m. and 10 p.m. and a 10 dB penalty is applied to events occurring during the acoustical nighttime period (10 p.m. through 7 a.m.).

Decibel (dB) – Decibel is the unit used to measure the intensity of a sound.

Flight Profiles – Flight profiles consist of aircraft conditions (i.e. altitude, speed, power setting, etc.) defined at various locations along each assigned flight track.

Flight Track – The flight track locations represent the various types of arrivals, departures, and closed patterns accomplished at March ARB. The location for each track is representative for the specific track and may vary due to air traffic control, weather, and other reasons (e.g. one pilot may fly the on one side of the depicted track, while another pilot may fly slightly to the other side of the track).

Operation – An aircraft operation is defined as one takeoff or one landing. A complete closed pattern or circuit is counted as two operations because it has a takeoff component and a landing component. A sortie is a single military aircraft flight from the initial takeoff through the termination landing. The minimum number of aircraft operations for one sortie is two operations, one takeoff (departure) and one landing (approach).