FINAL

F-15 Aircraft Conversion Environmental Impact Statement 144th Fighter Wing California Air National Guard Fresno-Yosemite International Airport

March 2013

National Guard Bureau

ACRONYMS AND ABBREVIATIONS

°F	Degree Fahrenheit
$\mu g/m^3$	Micrograms Per Cubic Meter
120 FW	120th Fighter Wing
144 FW	144th Fighter Wing
162 FW	162d Fighter Wing
ACA	Aerospace Control Alert
ACHP	Advisory Council on Historic Preservation
ACM	Asbestos-Containing Material
ACS	American Community Survey
AFB	Air Force Base
AFCEE	Air Force Center for Engineering and the Environment
AFI	Air Force Instruction
AFNORTH	Air Forces Northern
AFOSH	Air Force Occupational Safety and Health
AFSC	Air Force Safety Center
AGE	Aerospace Ground Equipment
AGL	Above Ground Level
AHAS	Avian Hazard Advisory System
AICUZ	Air Installation Compatible Use Zone
AIRFA	American Indian Religious Freedom Act
ANG	Air National Guard
APZ	Accident Potential Zone
ARB	Air Reserve Base
ARPA	Archaeological Resources Protection Act
ARTCC	Air Route Traffic Control Center
AT/FP	Anti-terrorism/Force Protection
BAI	Back-up Aircraft Inventory
BASH	Bird/Wildlife Aircraft Strike Hazard
bgs	Below Ground Surface
BMP	Best Management Practice
BRAC	Base Realignment and Closure
CA DTSC	California Department of Toxic Substances Control
CAA	Clean Air Act
CA ANG	California Air National Guard
CAAQS	California Ambient Air Quality Standards
CADWR	California Department of Water Resources
CAF REDUX	Combat Air Forces Fighter Reduction
CARB	California Air Resources Board
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CH_4	Methane
CNDDB	California Natural Diversity Database
CNEL	Community Noise Equivalent Level
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CO_2e	Carbon Dioxide Equivalent
CWA	Clean Water Act
CZ	Clear Zone
DA	Drainage Area
dB	Decibel
dBA	A-weighted decibel
DERP	Defense Environmental Restoration Program
DNL	Day-Night Average Sound Level
DoD	Department of Defense
EIAP	Environmental Impact Analysis Process
EIS	Environmental Impact Statement
EISA	Energy Independence and Security Act
EO	Executive Order
EPCRA	Emergency Planning and Community Right-to-Know Act
ERP	Environmental Restoration Program
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FICUN	Federal Interagency Committee on Urban Noise
GHG	Greenhouse Gas
GWP	Global Warming Potential
HAP	Hazardous Air Pollutant
HAZMART	Hazardous Materials Pharmacy
Hz	Hertz
I-215	Interstate 215
IAP	International Airport
IDP	Installation Development Plan
IFR	Instrument Flight Rules
IICEP	Interagency and Intergovernmental Coordination for Environmental Planning
INM	Integrated Noise Model
LBP	Lead-Based Paint
L_{dn}	Day-Night Average Sound Level
LEED	Leadership in Energy and Environmental Design
L_{max}	Maximum Sound Level
MJPA	March Joint Powers Authority
MMRP	Military Munitions Response Program
MOA	Military Operations Area
MSL	Mean Sea Level
MTR	Military Training Route
N_2O	Nitrous Oxide
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NAS	Naval Air Station
NBVC	Naval Base Ventura County
NDI	Non-Destructive Inspection
NEPA	National Environmental Policy Act
NGB	National Guard Bureau
NGB/A3O	National Guard Bureau/Air, Space, and Information Operations Directorate, Current Operations Division
NGB/A8P	National Guard Bureau/Programs and Plans Directorate, Programs Management Division
NHPA	National Historic Preservation Act
NIOSH	National Institute for Occupational Safety and Health
NIPTS	Noise-Induced Permanent Threshold Shift
NO_2	Nitrogen Dioxide
NOA	Notice of Availability
NOI	Notice of Intent
NORAD	North American Aerospace Defense Command
NOTAM	Notice to Airmen
NO_x	Oxides of Nitrogen
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
O_3	Ozone
OHF	Old Hammer Field
OSHA	Occupational Safety and Health Administration
PA	Preliminary Assessment
PAA	Primary Assigned Aircraft
Pb	Lead
PCB	Polychlorinated Biphenyl
PCE	Perchloroethylene
PG&E	Pacific Gas and Electric
PM_{10}	Particulate Matter Less Than or Equal to 10 Microns in Diameter
$PM_{2.5}$	Particulate Matter Less Than or Equal to 2.5 Microns in Diameter
POL	Petroleum, Oils, and Lubricants
POV	Privately-Owned Vehicle
ppm	Parts Per Million
PSD	Prevention of Significant Deterioration
QD	Quantity-Distance
RCRA	Resource Conservation and Recovery Act
ROD	Record of Decision
ROI	Region of Influence
RPZ	Runway Protection Zone
SDO	Stormwater Discharge Outfall
SEL	Sound Exposure Level
SF	Square Feet
SHPO	State Historic Preservation Office(r)
SIP	State Implementation Plan
SKR	Stephens' Kangaroo Rat
SO_2	Sulfur Dioxide
SUA	Special Use Airspace
SWPPP	Stormwater Pollution Prevention Plan
SY	square yard
TCE	Trichloroethene
tpy	Tons Per Year
TRACON	Terminal Radar Approach Control
TSCA	Toxic Substances Control Act
U.S.	United States
UFC	Unified Facilities Criteria
USACE	United States Army Corps of Engineers
USAF	United States Air Force
USC	United States Code
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
VFR	Visual Flight Rules
VOC	volatile organic compound

Cover Sheet

FINAL ENVIRONMENTAL IMPACT STATEMENT FOR THE F-15 AIRCRAFT CONVERSION, 144TH FIGHTER WING, CALIFORNIA AIR NATIONAL GUARD, FRESNO-YOSEMITE INTERNATIONAL AIRPORT

a. *Responsible and Cooperating Agencies:* United States Air Force (Responsible Agency); Federal Aviation Administration (Cooperating Agency)

b. *Title of Action:* Environmental Impact Statement for the F-15 Aircraft Conversion, 144th Fighter Wing, California Air National Guard, Fresno-Yosemite International Airport

c. *Comments and Inquiries:* Robert Dogan, NGB/A7AM, 3501 Fetchet Avenue, Joint Base Andrews MD 20762-5157, (240) 612-8859.

d. *Designation:* Final Environmental Impact Statement (EIS)

e. *Abstract:* This Final EIS has been prepared in accordance with the National Environmental Policy Act (NEPA). The public and agency scoping process resulted in the analysis of the following environmental resources: noise, air quality, land use, socioeconomics and environmental justice, safety, hazardous materials and wastes, infrastructure, earth resources, water resources, biological resources, and cultural resources. For the Preferred Alternative, findings indicate that there may be adverse impacts to the noise environment from increased noise levels associated with the F-15 aircraft operations. Additionally, impacts to air quality would exceed the *de minimis* emissions threshold, and a draft conformity determination has been prepared. Under Alternative #2, there would be adverse impacts to the noise environment from increased noise levels associated with increased F-15 aircraft operations. Furthermore, impacts to air quality would also exceed *de minimis* thresholds. Under the No Action Alternative, the 144th Fighter Wing (144 FW) would continue to conduct their current mission using the existing 18 F-16 primary assigned aircraft and 3 back-up aircraft inventory; the 144 FW would eventually be without an aircraft and associated mission, as the F-16 aircraft will be relocated to the 162d Fighter Wing (162 FW) during the 2012 calendar year; however, the Aerospace Control Alert (ACA) mission and associated aircraft at both Fresno-Yosemite International Airport (IAP) and March Air Reserve Base (ARB) would remain under the No Action Alternative (3 F-16 aircraft at each installation). The elimination of the 144 FW mission at Fresno-Yosemite IAP would not meet the identified needs of the Air National Guard (ANG), the United States Air Force (USAF), or the State of California.

F-15 AIRCRAFT CONVERSION ENVIRONMENTAL IMPACT STATEMENT, 144TH FIGHTER WING, CALIFORNIA AIR NATIONAL GUARD, FRESNO-YOSEMITE INTERNATIONAL AIRPORT

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EXECUTIVE SUMMARY

This Final Environmental Impact Statement (EIS) analyzes the potential environmental impacts associated with an aircraft conversion for the 144th Fighter Wing (144 FW) at Fresno-Yosemite International Airport (IAP) in Fresno, California. The proposal is to convert the unit from the F-16 Fighting Falcon aircraft and operations to the F-15 Eagle aircraft and operations at Fresno-Yosemite IAP, which would also include Detachment 1, based at March Air Reserve Base (ARB).

The Description of the Proposed Action and Alternatives was issued for public and agency review and comment by the National Guard Bureau (NGB). The public scoping period for this proposal was initiated when the Notice of Intent (NOI) to prepare the EIS was published in the *Federal Register* on July 15, 2011 and ended on August 19, 2011. The notice of availability (NOA) for the Draft EIS was published in the *Federal Register* on May 11, 2012, which initiated a 45-day public comment period on the Draft EIS, ending on June 25, 2012. All substantive comments received on the Draft EIS have been fully considered and addressed in the Final EIS, as appropriate.

PURPOSE AND NEED

The airspace over the western coast of the United States (U.S.) and its population centers requires an air superiority capability to defend against threats (airborne, land, or sea) posed by adversaries. The 144 FW currently provides trained F-16 aircrews for the defense of airspace along the west coast from the U.S. border with Mexico to the California border with Oregon; to implement this mission, three aircraft at both March ARB (Detachment 1) and at Fresno-Yosemite IAP remain on alert at all times. In an effort to restructure its fighter fleet to accommodate reduced defense budgets, the United States Air Force (USAF) has launched a program to develop an optimal mix of fighter aircraft, suited to current needs, that will result in a leaner and generally newer fleet of aircraft. As a result of the restructuring developed by the Combat Air Forces Fighter Reduction (CAF REDUX), the F-16 aircraft based at the 144 FW at Fresno-Yosemite IAP would be transferred, under a separate action, to the 162d Fighter Wing (162 FW) in Tucson, Arizona, which will be retiring several of their aircraft that have reached the end of their serviceable life; and the F-15 aircraft based at the 120th Fighter Wing (120 FW) in Great Falls, Montana would be transferred to the west coast of the U.S. to execute the Aerospace Control Alert (ACA) mission. There is a proposal for the 120 FW to convert to an airlift mission. Each of these three actions would happen independent of one another, and therefore are being analyzed under separate and distinct National Environmental Policy Act (NEPA) documents. An Environmental Assessment was completed for the 120 FW conversion and any necessary follow-on NEPA analysis related to that action would be completed, as

appropriate. A categorical exclusion has been prepared for the transfer of the F-16 aircraft from the 144 FW to the 162 FW.

Fresno-Yosemite IAP has been determined to be the only geographic location that satisfies the purpose and need as defined by the screening criteria to support the ACA mission due to its central location along the west coast of the U.S. Upon a review of potential California installations, it is the only installation that has the available required infrastructure to support the mission; and therefore, it is appropriate that a fighter aircraft is assigned to the unit that would be capable of performing the ACA mission and would be able to support missions well into the future. Both the F-16 and F-15 aircraft are capable of performing the ACA mission. The purpose of this action is to ensure that the ACA mission continues to be appropriately positioned geographically to provide air superiority over the west coast of the U.S. and continue to support state missions as identified by the Governor of California.

PROPOSED ACTION AND ALTERNATIVES

The Preferred Alternative: Under the Preferred Alternative, the 144 FW would convert from 18 F-16 aircraft to 18 F-15 aircraft. In general, at least three of these aircraft would always be located at March ARB, serving the ACA mission out of that location. The ACA aircraft at March ARB would be periodically rotated to and from Fresno for maintenance. Thus, 15 F-15 aircraft would be based at their installation at Fresno-Yosemite IAP. Concurrent with the beddown of the 18 F-15 Primary Assigned Aircraft (PAA) and 3 Back-up Aircraft Inventory (BAI) at Fresno-Yosemite IAP and March ARB, the existing fleet of 18 F-16 aircraft would be relocated to the 162 FW at Tucson IAP, Tucson, Arizona under a separate action. Under this alternative, the 144 FW would implement minor construction projects for the conversion, as well as other construction, alteration, and demolition projects associated with their Installation Development Plan (IDP) at Fresno-Yosemite IAP.

***Alternative #2*:** Under Alternative #2, the 144 FW would convert from 18 F-16 aircraft to 24 F-15 PAA and 3 BAI. In general, at least three of these aircraft would always be located at March ARB, serving the ACA mission out of that location. As under the Preferred Alternative, the ACA aircraft at March ARB would be periodically rotated to and from Fresno for maintenance. Thus, 21 F-15 aircraft would be based at their installation at Fresno-Yosemite IAP. Concurrent with the beddown of the 24 F-15 PAA at Fresno-Yosemite IAP and March ARB, the existing fleet of 18 F-16 aircraft would be relocated to the 162 FW at Tucson IAP, Tucson, Arizona under a separate action. Under this alternative, the 144 FW would implement the same minor construction projects as those identified under the Preferred Alternative.

No Action Alternative: The Council on Environmental Quality (CEQ) regulation 40 Code of Federal Regulations (CFR) § 1502.14(d) specifically requires analysis of the "No Action"

alternative in all NEPA documents. Under the No Action Alternative, the proposed aircraft conversion would not occur, and the 144 FW would not implement the components described above under either the Preferred Alternative or Alternative #2. There would be no change in based aircraft; use of the airfield at Fresno-Yosemite IAP; or use of Special Use Airspace (SUA), construction, or personnel assigned to the 144 FW. Under the No Action Alternative, the 144 FW would eventually be without an aircraft or associated mission, as the F-16 aircraft will be relocated to the 162 FW during the 2012 calendar year. The 144 FW would continue to conduct their current mission using the existing 18 F-16 PAA until such time as the aircraft are relocated to the 162 FW. Following the relocation of the aircraft to the 162 FW, the 144 FW would have no aircraft at Fresno-Yosemite IAP to meet their mission needs. The alert missions and associated aircraft at both Fresno-Yosemite IAP and March ARB (three F-16 aircraft at each installation) would remain under the No Action Alternative even if the other F-16 aircraft associated with the 144 FW were relocated to the 162 FW. The elimination of the 144 FW mission at Fresno-Yosemite IAP would not meet the identified needs of the Air National Guard (ANG), the USAF, or the State of California; however, this alternative is carried forward for analysis in this EIS per CEQ regulations, and as a baseline from which to compare the potential impacts of the Proposed Action and alternatives.

ENVIRONMENTAL CONSEQUENCES

NEPA requires focused analysis on environmental resources and impact topics potentially affected by the Proposed Action or its alternatives. Based on the potential for the Proposed Action to affect the environment at and surrounding the 144 FW installation at Fresno-Yosemite IAP and March ARB, as well as public and agency concerns, several specific environmental resources were evaluated in detail in this EIS. The potential consequences of each alternative on these resources were evaluated and are summarized in Table ES-1.

Table ES-1. Summary of Impacts
(Page 1 of 8)

Preferred Alternative	*Alternative #2*	*No Action Alternative*
Noise		
Fresno-Yosemite IAP: Under this alternative, the number of operations conducted by the 144 FW would remain the same as those currently flown; however, as a result of conversion to the F-15 aircraft, the noise contours would expand slightly in all directions from the baseline contours. Overall, the number of acres contained within the CNEL 65 dB and greater exposure area would increase by approximately 815 acres, or 41 percent. Approximately 724 of these acres would be off the airport property. Roughly 3,304 persons would be affected by CNEL of 65 dB and above with 1,873 persons newly affected. There are no residences located within the 80+ dB noise contour, therefore there would be no potential hearing loss risk associated with these areas. The primary source of noise from the facility construction would be the equipment involved in construction activities. Construction noise would be intermittent and short-term in duration. Equipment used during the facility construction would contribute little to the general background noise levels around the airfield. Impacts to the noise environment would be adverse. Implementation of a revised Airport Part 150 Study by the FAA would establish mitigation measures that would minimize the impacts of the increase in noise. ***March ARB:*** Under this alternative, noise contours would retain the same basic shape as the baseline contours; however, the acreage contained within the 65 dB noise contour and greater would increase by 424 acres. The noise contours remain relatively unchanged except for the west side of the airfield, where there would be an increase of acreage above CNEL 65 dB approaching I-215 and to the east of the runway approaching Heacock Street. Land uses within the expanded 65 dB noise contour include industrial, public/quasi-public, and rural residential (although no homes are located within the area contained within the 65 dB contour). The 80+ dB noise contours do not go off March ARB, nor do they intersect any base housing; therefore, there would be no potential hearing loss risk associated with this proposal. There are no noise sensitive receptors located within the proposed noise contours for the Preferred Alternative.	***Fresno-Yosemite IAP:*** Under Alternative #2, there would be approximately a 33 percent increase in the number of operations conducted by the 144 FW at Fresno-Yosemite IAP. As a result, the noise contours would expand in all directions compared to the baseline contours. Overall, the number of acres contained within the CNEL 65 dB and greater exposure area would increase by approximately 1,221 acres, or 62 percent. Roughly 4,876 persons would be affected by CNEL of 65 dB and above with 3,455 persons newly affected. There are no residences located within the 80+ dB noise contour, therefore there would be no potential hearing loss risk associated with these areas. Construction noise would be the same as described for the Preferred Alternative. Impacts to the noise environment would be adverse. Implementation of a revised Airport Part 150 Study by the FAA would establish mitigation measures that would minimize the impacts of the increase in noise. ***March ARB:*** Impacts would be as described for the Preferred Alternative.	***Fresno-Yosemite IAP:*** Under this alternative, there would be a temporary reduction in the size of the noise contours at Fresno-Yosemite IAP until a new mission and aircraft could be based there. ***March ARB:*** Under this alternative, there would be no change in the noise environment at March ARB from baseline, as the F-16 alert aircraft would remain.

Table ES-1. Summary of Impacts
(Page 2 of 8)

Preferred Alternative	*Alternative #2*	*No Action Alternative*
Air Quality		
Fresno-Yosemite IAP: Annual emissions under the Preferred Alternative (including both construction and airfield operations) would be below the CAA major source thresholds for attainment pollutants, and would be below the General Conformity Rule *de minimis* thresholds for all pollutants except NO_x. The Final Conformity Determination ensures that the Preferred Alternative conforms to the SIP. ***March ARB:*** Under this alternative, emissions from operations would be below General Conformity Rule *de minimis* thresholds for all pollutants.	***Fresno-Yosemite IAP:*** Annual emissions under Alternative #2 (including both construction and airfield operations) would be below the CAA major source thresholds for attainment for all pollutants except NO_x and VOCs. ***March ARB:*** Impacts would be as described for the Preferred Alternative.	***Fresno-Yosemite IAP:*** Under the No Action Alternative, no change in emissions from baseline conditions would occur until the F-16 aircraft are transferred to the 162 FW. At that time, emissions would be reduced until such a time as the USAF identified a new mission/aircraft for the 144 FW. ***March ARB:*** Under this alternative, no change in emissions from baseline conditions would occur. There would therefore be no potential for adverse air quality impacts beyond existing conditions.
Land Use		
Fresno-Yosemite IAP: As a result of the Preferred Alternative, an additional 724 acres of land off-airport property would be exposed to CNEL of 65 dB or greater. Overall, there would be an estimated increase of 1,873 persons residing within the noise contours. To the west of the installation, additional industrial, residential, educational, and commercial land uses would be exposed to aircraft CNEL of 65 dB. To the south and east the additional land exposed would be primarily industrial and open space, with a small portion of residential area. Under the Preferred Alternative there would be three new schools within the noise contours of 65 dB and above. In addition, two additional churches would be impacted by the new noise contours. Proposed construction activities would be short-term and intermittent but may cause minor traffic and/or noise disruptions to local businesses as well as employees at the 144 FW installation. However, construction activities would be temporary and would occur during normal business hours. Furthermore, all of the construction activities would occur on the 144 FW installation and would not	***Fresno-Yosemite IAP:*** Under this alternative, approximately 1,221 acres of land off the airport property would be newly exposed to CNEL of 65 dB or greater. Overall, there would be an estimated increase of 3,445 persons residing within the noise contours. To the west of the installation, additional industrial, residential, educational, and commercial land uses would be exposed to aircraft CNEL between 65 dB and 75 dB. To the south and east the additional land exposed would be primarily industrial and open space, with a small portion of residential area. Under Alternative #2 there would be four new schools	***Fresno-Yosemite IAP:*** Under this alternative, there would be a temporary reduction in the size of the noise contours at Fresno-Yosemite IAP until a new mission and aircraft could be based there.

Table ES-1. Summary of Impacts
(Page 3 of 8)

Preferred Alternative	*Alternative #2*	*No Action Alternative*
Land Use (continued)		
introduce any new land uses. Impacts to land use would be adverse, particularly as a result of new residential areas within the noise contours. Implementation of a revised Airport Part 150 Study by the FAA would establish mitigation measures that would minimize the impacts to land use. ***March ARB:*** This alternative would generate an increase of 424 acres exposed to CNEL of 65 dB and greater, with 336 of these acres occurring off the installation. The land uses that are newly contained within these noise contours are within industrial areas; there is no residential area included in these contours.	exposed to aircraft CNEL of 65 dB or above. Also, three additional churches would be impacted by the new noise contours. Proposed construction activities would be as described for the Preferred Alternative. Impacts to land use would be adverse, particularly as a result of new residential areas within the noise contours. Implementation of a revised Airport Part 150 Study by the FAA would establish mitigation measures that would minimize the impacts to land use. ***March ARB:*** Impacts would be as described for the Preferred Alternative.	***March ARB:*** Under this alternative, there would be no change to baseline land use at March ARB.
Socioeconomics and Environmental Justice		
Fresno-Yosemite IAP: Of the roughly 3,304 persons that would be affected by CNEL between 65 and 70 dB, approximately 2,424 would be minority (73.4 percent). This is an increase of 2.2 percent of minorities affected over baseline conditions. The number of low-income persons affected by CNEL greater than 65 dB would be approximately 733 (22.2 percent of the total). Overall, the number of persons affected by CNEL of 65 dB and greater would increase under this alternative, and the percentage of minority and low-income persons affected would increase slightly. Economic activity associated with proposed construction activities at the 144 FW installation, such as employment and materials purchasing, would provide short-term economic benefits to the local economy. However, short-term beneficial impacts resulting from construction payrolls and materials purchased would be negligible on a regional scale. Under this alternative, the F-15 mission would add an additional 22 military positions. Total payroll associated with these personnel would amount to an estimated salary increase of $1,571,761 for full-time employees.	***Fresno-Yosemite IAP:*** Under Alternative #2, population contained within the noise contours at Fresno-Yosemite IAP would increase from baseline and the Preferred Alternative levels. Of the roughly 4,876 persons that would be affected by CNEL greater than 65 dB, approximately 3,581 would be minority (73.4 percent). This is an increase of 2.2 percent of minorities affected. The number of low-income persons affected by CNEL greater than 65 dB would be approximately 1,065 (21.8 percent). Economic activity associated with proposed construction activities at the 144 FW installation would	***Fresno-Yosemite IAP:*** As a result of the No Action Alternative, the total population that would be impacted by noise would decrease temporarily until a new mission/aircraft was based at the installation. This alternative would have a negative impact on the surrounding communities due to the loss of jobs for 144 FW personnel. The alert mission and associated aircraft at Fresno-Yosemite IAP would remain under the No Action Alternative. Impacts to socioeconomics from the No Action Alternative would be negative. ***March ARB:*** Under this alternative, there would be no change to baseline

Table ES-1. Summary of Impacts
(Page 4 of 8)

Preferred Alternative	*Alternative #2*	*No Action Alternative*
Socioeconomics and Environmental Justice (continued)		
March ARB: Under this alternative, no construction would occur on March ARB. Therefore, there would be no economic activity associated with proposed construction activities. In addition, there would be no change in personnel numbers for March ARB under this alternative. Therefore, there would be no impact to housing or population. The noise contours at March ARB would increase minimally; however, they would not contain any residential areas. As a result, there would be no disproportionate impacts to minority or low-income populations in the vicinity of March ARB.	be as described for the Preferred Alternative. Under this alternative, the F-15 mission would add an additional 29 military positions. Total payroll associated with these personnel would amount to an estimated salary increase of $2,071,867 for full-time employees. ***March ARB:*** Impacts would be as described for the Preferred Alternative.	socioeconomics at March ARB.
Safety		
Fresno-Yosemite IAP: Providing new and renovated facilities for the 144 FW that support operational requirements and are properly sited with adequate space and a modernized supporting infrastructure would generally enhance ground and flight safety during required operations, training, maintenance and support procedures, security functions, and other activities conducted by the 144 FW. AT/FP requirements have also been addressed to the extent practicable in all facility construction projects. The fire and crash response capability currently provided by the 144 FW at Fresno-Yosemite IAP is sufficient to meet all requirements. The aircraft conversion and mission change would not increase the number of daily operations flown by the 144 FW. Therefore, no adverse impacts to ground safety are anticipated at the airfield. Therefore, there would be no increase in the safety risk to aircrews and personnel due to the accident and mishap potential associated with aircraft operations. Under this alternative, the 144 FW would add a 4,365 SF addition to the existing munitions storage area. This would expand the current QD arcs slightly to the northeast and the southeast, and would remain within the installation boundary. All facilities would be sited to be in compliance with the proposed QD arcs and no unauthorized construction would occur within the proposed QD arcs. Impacts to safety under this alternative would be negligible.	***Fresno-Yosemite IAP:*** While operations would increase approximately 33 percent over the Preferred Alternative, impacts to safety would be expected to be similar to that described for the Preferred Alternative. ***March ARB:*** Impacts would be as described for the Preferred Alternative.	***Fresno-Yosemite IAP:*** Impacts to safety as a result of the No Action Alternative would be temporarily beneficial, due to a decrease in operations as well as personnel, which would result in less opportunity for safety issues until a new mission and/or aircraft was established at the installation. ***March ARB:*** Under this alternative, there would be no change to safety at March ARB as a result of the No Action Alternative.

Table ES-1. Summary of Impacts
(Page 5 of 8)

Preferred Alternative	*Alternative #2*	*No Action Alternative*
Safety (continued)		
March ARB: No construction would occur at March ARB under this alternative. The fire and crash response capability currently provided by the 144 FW at March ARB is sufficient to meet all requirements. No adverse impacts to ground safety are anticipated at the airfield. There would be a minimal increase in airfield operations at March ARB from those previously analyzed. No increase in the safety risk is expected due to the accident and mishap potential associated with aircraft operations. Impacts to safety would be negligible.		
Hazardous Materials and Wastes		
Fresno-Yosemite IAP: The type of hazardous materials needed for maintenance and operation of the F-15 would be expected to remain similar to those currently used for maintenance and operation of the F-16 fleet; however, the proposed F-15 aircraft would no longer require the use of hydrazine, a highly toxic and unstable compound. Since the F-15 aircraft is a dual engine aircraft (compared with the single engine F-16 aircraft), the throughput of petroleum substances (e.g., fuels, oils) used during operations would be expected to increase from what is currently used to maintain the F-16 fleet. Additionally, it is expected that short-term increases would be realized in terms of the quantity of fuel stored and used during construction activities. None of the proposed construction projects would occur on or in the vicinity of the existing ERP sites within the 144 FW installation. The 144 FW would continue to operate within its small quantity generator hazardous waste permit conditions. Impacts from hazardous materials and wastes would be negligible under this alternative. ***March ARB:*** This alternative does not include any ground disturbance through construction at March ARB, and the there is no change to the proposed number of operations or type of hazardous materials and wastes generated or stored at March ARB. Further, all scheduled maintenance on the alert aircraft at March ARB is conducted at Fresno-Yosemite IAP. Impacts from hazardous materials and wastes would be negligible under this alternative.	***Fresno-Yosemite IAP:*** While operations would increase approximately 33 percent over the Preferred Alternative, impacts from hazardous materials and wastes would be expected to be similar to that described for the Preferred Alternative. There would be additional deliveries of fuels and oils, but this would not be expected to result in any negative impacts. ***March ARB:*** Impacts would be as described for the Preferred Alternative.	***Fresno-Yosemite IAP:*** Baseline hazardous materials and waste under the No Action Alternative would experience a substantial reduction in the type and quantity of hazardous materials and associated hazardous waste streams associated with the loss of a flying mission. This reduction in hazardous waste streams would be temporary in nature until the flying mission was reinstated by the USAF. As the proposed construction would not occur, there would be no temporary increase in hazardous materials and wastes associated with these projects. F-16 aircraft at Fresno-Yosemite IAP would remain even if the other F-16 aircraft associated with the 144 FW were relocated to the 162 FW. ***March ARB:*** There would be no change to hazardous materials and wastes at March ARB as a result of the No Action Alternative.

Table ES-1. Summary of Impacts
(Page 6 of 8)

Preferred Alternative	*Alternative #2*	*No Action Alternative*
Infrastructure		
Fresno-Yosemite IAP: Demand for electricity and natural gas would be expected to increase slightly as a result of the increase in personnel (22), and the building space and facilities to be constructed would require additional electricity. In addition, wastewater, solid waste, demand for potable water, and traffic would temporarily increase during construction, and would increase slightly in the long-term due to increase in personnel. The proposed construction and demolition activities could temporarily affect the quality of stormwater runoff through potential increases in soil erosion. BMPs would be implemented during construction and demolition to minimize runoff. Any new facilities and additions associated with the Proposed Action would be implemented with more energy efficient design standards and utility systems than are currently in place. In addition, construction projects would incorporate LEED and sustainable development concepts to achieve optimum resource efficiency, sustainability, and energy conservation. In general, impacts to infrastructure would be minimal as a result of this alternative. ***March ARB:*** This alternative does not include any construction at March ARB, and there is no change to the proposed number of authorized personnel at March ARB. Therefore, there would be no impacts to infrastructure at March ARB as a result of the Preferred Alternative.	***Fresno-Yosemite IAP:*** While the increase in personnel would be slightly higher under this alternative (29 versus 22) impacts to infrastructure would be expected to be similar to that described for the Preferred Alternative. In general, impacts to infrastructure would be minimal as a result of this alternative. ***March ARB:*** Impacts would be as described for the Preferred Alternative.	***Fresno-Yosemite IAP:*** Under this alternative, a decrease in population would in turn decrease demand for utilities, including the consumption of electricity, natural gas, and potable water and the generation of wastewater and solid waste. Traffic within the installation and surrounding community would also decrease, until a new mission was identified. Therefore, no enduring impacts to infrastructure and transportation would occur as a result of implementation of the No Action Alternative. ***March ARB:*** Impacts are as described for the Preferred Alternative and Alternative #2.
Earth Resources		
Fresno-Yosemite IAP: While proposed construction would require some minor modification of terrain by cut and fill techniques and other minor grading, no major topographic or geologic features would be affected as a result of implementation of these activities. There are no limitations associated with the three soils types found within the project area for the type of construction activities proposed. Under this alternative, there would be approximately 2.2 acres of surface disturbance with 1.9 acres of net new impervious surface as a result of proposed new construction. To minimize potential impacts associated with erosion, runoff, and sedimentation, BMPs as described in the 144 FW SWPPP would be implemented during and following the construction period. Impacts to earth resources would be minor. ***March ARB:*** There is no proposed surface disturbance/construction at March ARB. There would be no impacts to earth resources.	***Fresno-Yosemite IAP:*** Impacts would be similar to those described under the Preferred Alternative. ***March ARB:*** Impacts would be as described for the Preferred Alternative.	***Fresno-Yosemite IAP:*** Under this alternative, baseline earth resources would remain unchanged. Therefore, no significant impacts to earth resources would occur as a result of implementation of this alternative. ***March ARB:*** Impacts are as described for the Preferred Alternative and Alternative #2.

Table ES-1. Summary of Impacts
(Page 7 of 8)

Preferred Alternative	*Alternative #2*	*No Action Alternative*
Water Resources		
Fresno-Yosemite IAP: Impacts to water resources as a result of this alternative would be minimal. There would be approximately 1.9 acres of net new impervious surface from the proposed facility construction and demolition. This could result in localized increases in surface runoff and total suspended particulates to nearby surface waters. However, any increase in surface water runoff as a result of the proposed construction would be attenuated through the use of temporary and/or permanent drainage management features such as use of bioretention, filter strips, vegetated buffers, grassed swales, infiltration trenches, water harvesting, and other applicable BMPs. To minimize potential impacts associated with erosion, runoff, and sedimentation, BMPs as described in the 144 FW SWPPP would be implemented during and following the construction period. All proposed construction is outside the 100-year floodplain. Impacts to water resources would be negligible. ***March ARB:*** There is no proposed surface disturbance/construction at March ARB. There would be no impacts to water resources.	***Fresno-Yosemite IAP:*** Impacts would be similar to those described under the Preferred Alternative. ***March ARB:*** Impacts would be as described for the Preferred Alternative.	***Fresno-Yosemite IAP:*** Under this alternative, baseline water resources would remain unchanged. Therefore, no significant impacts to water resources would occur as a result of implementation of this alternative. ***March ARB:*** Impacts are as described for the Preferred Alternative and Alternative #2.
Biological Resources		
Fresno-Yosemite IAP: Noise levels are expected to increase from baseline with the conversion to the F-15 aircraft. However, these noise levels from operations and construction are not expected to impact wildlife in the area because they are likely accustomed to elevated noise levels associated with current aircraft and military operations. The opportunity for bird-aircraft strikes to occur, including those with migratory birds would remain the same as baseline. No threatened and endangered or special status species are currently known to reside on Fresno-Yosemite IAP or within the land area under the projected noise contours. Construction-related impacts to the vegetation at the installation would be minor due to the lack of sensitive vegetation in the project area. There are no wetland areas that occur within 144 FW installation. Impacts to biological resources would be minor. ***March ARB:*** Noise levels are expected to increase slightly from baseline with the conversion to the F-15 aircraft; however, these noise levels from operations are not expected to impact wildlife in the area because they are likely accustomed to elevated noise levels associated with aircraft and military	***Fresno-Yosemite IAP:*** Impacts would be similar to those described under the Preferred Alternative. ***March ARB:*** Impacts would be as described for the Preferred Alternative.	***Fresno-Yosemite IAP:*** There would be negligible impacts to biological resources as a result of this alternative. Wildlife found at the airport is well-adjusted to the noisy, industrial environment. ***March ARB:*** Impacts are as described for the Preferred Alternative and Alternative #2.

Table ES-1. Summary of Impacts
(Page 8 of 8)

Preferred Alternative	*Alternative #2*	*No Action Alternative*
Biological Resources (continued)		
operations. The opportunity for bird-aircraft strikes to occur, including those with migratory birds would remain the same as baseline. No impacts to any federally or state threatened, endangered, or special status species is expected.		
Cultural Resources		
Fresno-Yosemite IAP: As a result of the 2010 Integrated Cultural Resources Management Plan (144 FW 2010a), the 144 FW installation is considered to have no to low probability of containing archaeological resources. In the unlikely event that archaeological or human remains were identified during proposed construction activities, the 144 FW would immediately cease all activities in the area of the discovery and contact the 144 FW Environmental Manager who would contact a qualified archaeologist to evaluate the discovery. No architectural resources have been identified to date at the 144 FW. Under the Preferred Alternative, none of the buildings proposed for demolition (Building 160) or addition (Buildings 121 and 2640) have been reviewed for NRHP eligibility as they have been too recently constructed, and they were not recommended for survey or evaluation in the 2010 Integrated Cultural Resources Management Plan. There would be no impacts to cultural resources as a result of implementation of this alternative. ***March ARB:*** There is no proposed surface disturbance/construction at March ARB. The change in noise contours is nominal and does not contain any sensitive areas. There would be no impacts to cultural resources.	***Fresno-Yosemite IAP:*** Impacts would be similar to those described under the Preferred Alternative. ***March ARB:*** Impacts would be as described for the Preferred Alternative.	***Fresno-Yosemite IAP:*** Under this alternative, baseline cultural resources would remain unchanged. ***March ARB:*** Impacts are as described for the Preferred Alternative and Alternative #2.

144 FW = 144th Fighter Wing; 162 FW = 162d Fighter Wing; ARB = Air Reserve Base; AT/FP = Anti-Terrorism/Force Protection; BMP = Best Management Practice; CAA = Clean Air Act; CNEL = Community Noise Equivalent Level; dB = decibel; ERP = Environmental Restoration Program; FAA = Federal Aviation Administration; I-215 = Interstate 215; IAP = International Airport; LEED = Leadership in Energy and Environmental Design; NO_x = oxides of nitrogen; NRHP = National Register of Historic Places; QD = quantity-distance; SF = square foot; SIP = State Implementation Plan; SWPPP = Stormwater Pollution Prevention Plan; USAF = United States Air Force; VOC = volatile organic compound

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CHAPTER 1
PURPOSE AND NEED FOR THE PROPOSED ACTION

1.1 INTRODUCTION

The National Guard Bureau (NGB) proposes to implement an aircraft conversion for the 144th Fighter Wing (144 FW) at Fresno-Yosemite International Airport (IAP) in Fresno, California. The 144 FW currently flies and maintains 18 F-16 Fighting Falcon aircraft. The proposal is to convert the unit from the F-16 Fighting Falcon aircraft and operations to the F-15 Eagle aircraft and operations at Fresno-Yosemite IAP, which would also include Detachment 1, based at March Air Reserve Base (ARB). The 144 FW currently provides support for federal, state, and community interests by maintaining a highly trained, well-equipped military force that provides combat-ready support elements in response to wartime and peacetime tasking; protecting life and property; and preserving peace, order, and public safety.

In accordance with the National Environmental Policy Act (NEPA) of 1969 (42 United States Code [USC] 4321-4347), Council on Environmental Quality (CEQ) *Regulations for Implementing the Procedural Provisions of NEPA* (40 Code of Federal Regulations [CFR] Parts 1500-1508), and Air Force Instruction (AFI) 32-7061 as promulgated at 32 CFR Part 989 *et seq.*, *Environmental Impact Analysis Process*, the NGB has prepared this Environmental Impact Statement (EIS), which considers the potential consequences to the human and natural environment that may result from implementation of this action.

1.2 PURPOSE AND NEED FOR THE PROPOSED ACTION

The airspace over the western United States (U.S.) and its population centers requires an air superiority capability to defend against threats (airborne, land, or sea) posed by adversaries. The 144 FW currently provides trained F-16 aircrews for the defense of airspace from the western U.S. border with Mexico to the California border with Oregon; to implement this mission, three aircraft at both March ARB (Detachment 1) and at Fresno-Yosemite IAP remain on alert at all times. In an effort to restructure its fighter fleet to accommodate reduced defense budgets, the United States Air Force (USAF) has launched a program to develop an optimal mix of fighter aircraft, suited to current needs, that will result in a leaner and generally newer fleet of aircraft. As a result of the restructuring developed by the Combat Air Forces Fighter Reduction (CAF REDUX), the F-16 aircraft based at the 144 FW at Fresno-Yosemite IAP would be transferred, under a separate action, to the 162d Fighter Wing (162 FW) in Tucson, Arizona, which will be retiring several of their aircraft that have reached the end of their serviceable life; and the F-15 aircraft based at the 120th Fighter Wing (120 FW) in Great Falls, Montana would be transferred to the west coast of the U.S. to execute the ACA mission. There is a proposal for the 120 FW to convert to an airlift mission. Each of these three actions would happen independent of one another and therefore are being analyzed under separate and distinct NEPA documents. An

Environmental Assessment was completed for the 120 FW conversion and any necessary follow-on NEPA analysis related to that action would be completed, as appropriate. A categorical exclusion has been prepared for the transfer of the F-16s from the 144 FW to the 162 FW.

Fresno-Yosemite IAP has been determined to be the only geographic location that satisfies the purpose and need as defined by the screening criteria to support the ACA mission due to its central location along the west coast of the U.S. Upon a review of potential California installations, it is the only installation that has the available required infrastructure to support the mission; and therefore, it is appropriate that a fighter aircraft is assigned to the unit that would be capable of performing the ACA mission and would be able to support missions well into the future. The F-16 and F-15 aircraft are capable of performing the ACA mission. The purpose of this action is to ensure that the ACA mission continues to be appropriately positioned geographically to provide air superiority over the west coast of the U.S. and continue to support state missions as identified by the Governor of California.

1.3 LOCATION AND MISSION OF THE 144TH FIGHTER WING

Fresno-Yosemite IAP is located in the City of Fresno approximately 5 miles east of downtown Fresno, in Fresno County, California. Fresno-Yosemite IAP is a public use airport owned and operated by the City of Fresno. March ARB is located in Riverside County, California between the cities of Moreno Valley and Riverside (Figures 1.3-1 through 1.3-3). The 144 FW of the California Air National Guard (CA ANG) is collocated with, and operates on a lease basis at, Fresno-Yosemite IAP. There is a lease between the U.S. federal government and the City of Fresno, and a subsequent license between the State of California and the Air National Guard (ANG) for use of approximately 110.5 acres at Fresno-Yosemite IAP. The installation contains facilities and infrastructure developed to support the administrative, maintenance, and operational functions associated with the 144 FW mission. The main portion of the 144 FW installation is situated along the southern portion of the airfield. A 25.5-acre, detached parcel serves as the unit's weapons storage area and is located along the northeast portion of the airfield. The 144 FW originated as the 61st Fighter Wing on April 4, 1948, at Alameda, California, shortly after the official establishment of the ANG. The 194th Fighter Squadron, currently a component of the 144 FW's Operations Group, was activated at Alameda on June 25, 1948. In 1950, the 61st Fighter Wing was redesignated the 144th Fighter Bomber Wing. On November 1, 1954, the 194th Fighter Squadron relocated to Fresno-Yosemite IAP (then known as Hammer Field) and made the transition from the propeller-driven P-51 to the F-86A jet aircraft. On July 7, 1955, the 144th Fighter Bomber Wing was redesignated as the 144th Fighter Interceptor Wing, and the unit relocated to Hammer Field in 1957. The 144th Fighter Interceptor Wing was redesignated the 144 FW in 1992 and was reassigned from the Tactical Air Command to Air Combat Command. Since its inception, the 144 FW has flown several types of aircraft under varying missions, making the transition to its current primary aircraft type, the F-16C, in September 1995.

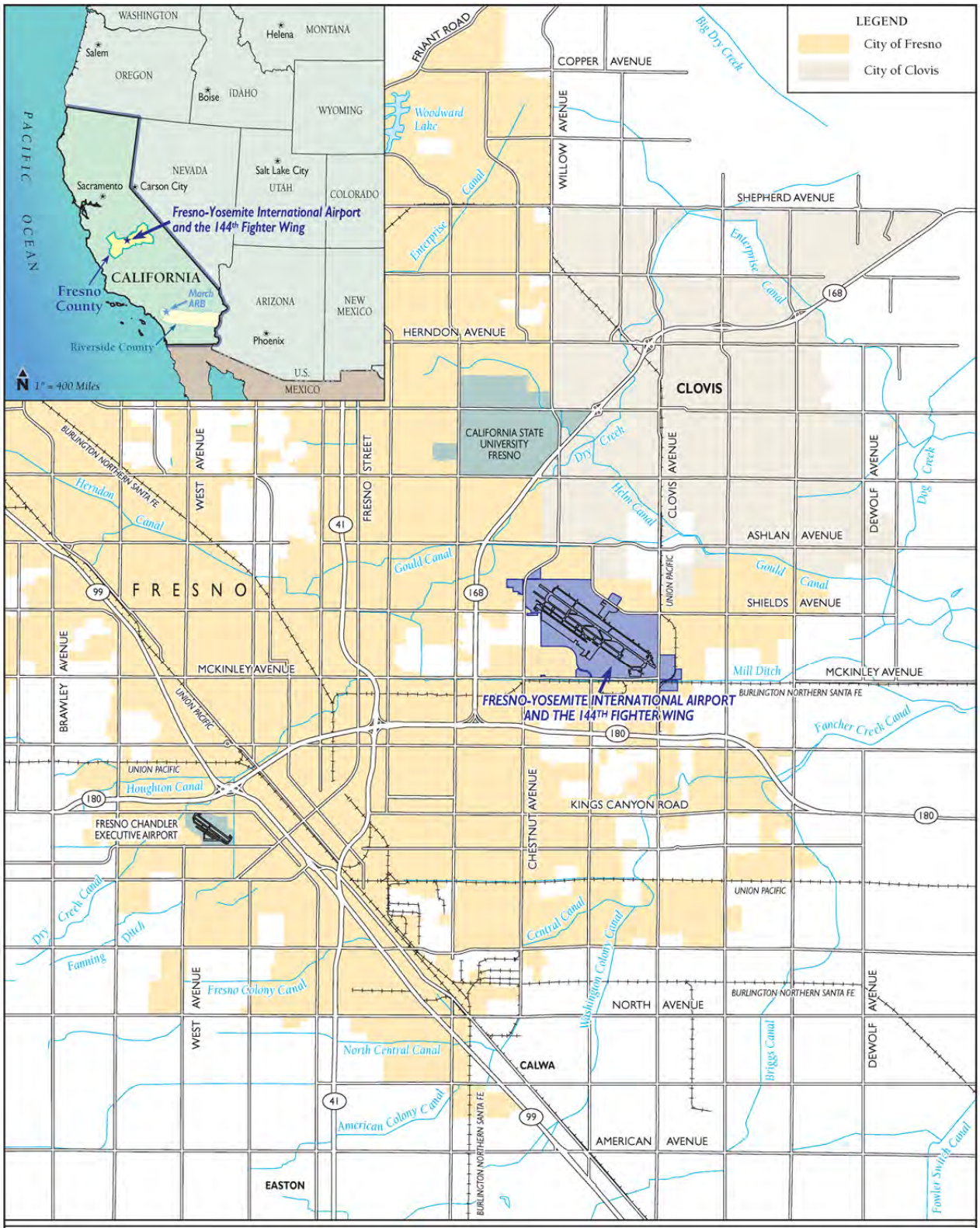


Figure 1.3-1
Regional Location
Fresno-Yosemite IAP

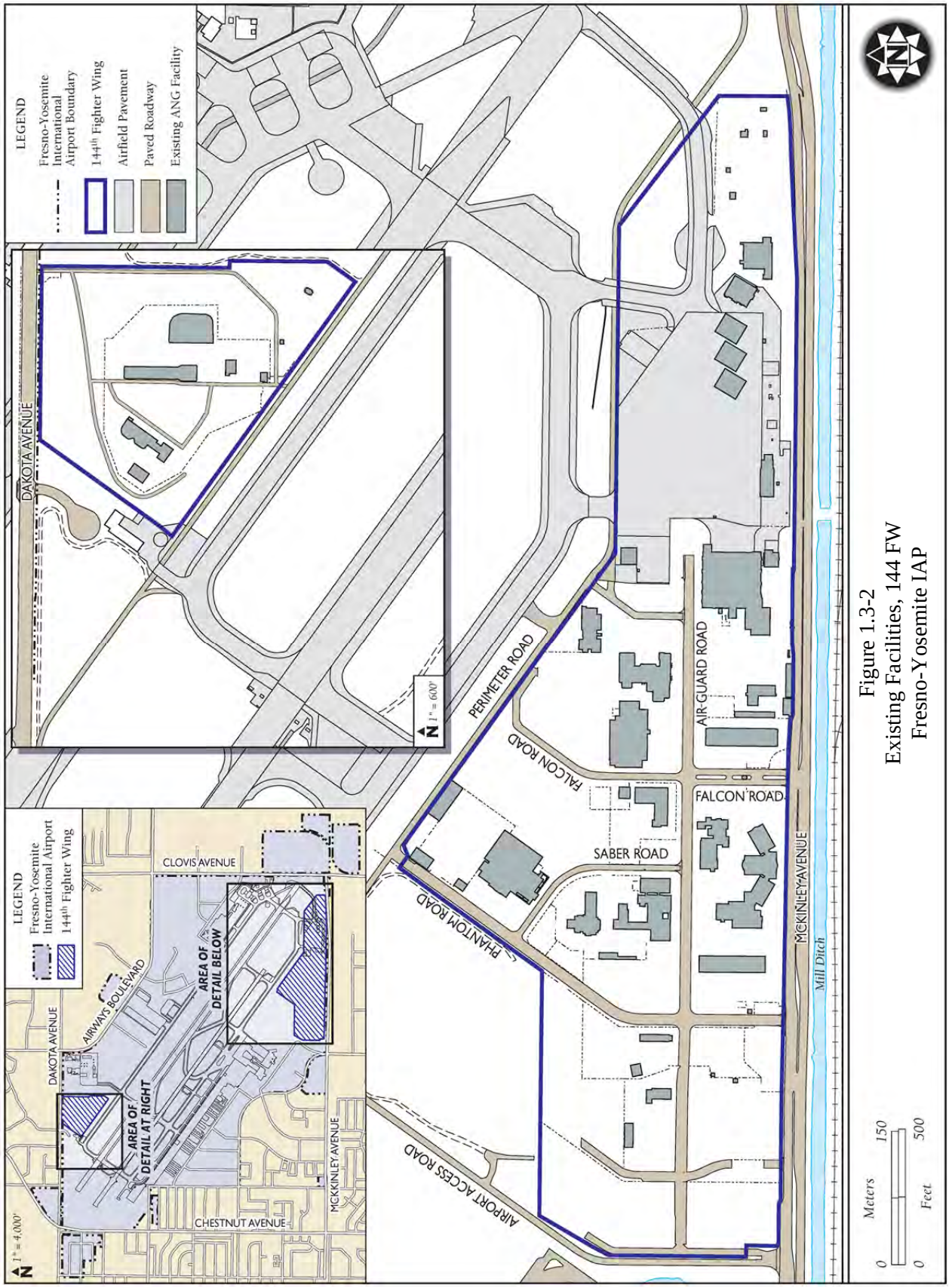


Figure 1.3-2
Existing Facilities, 144 FW
Fresno-Yosemite IAP

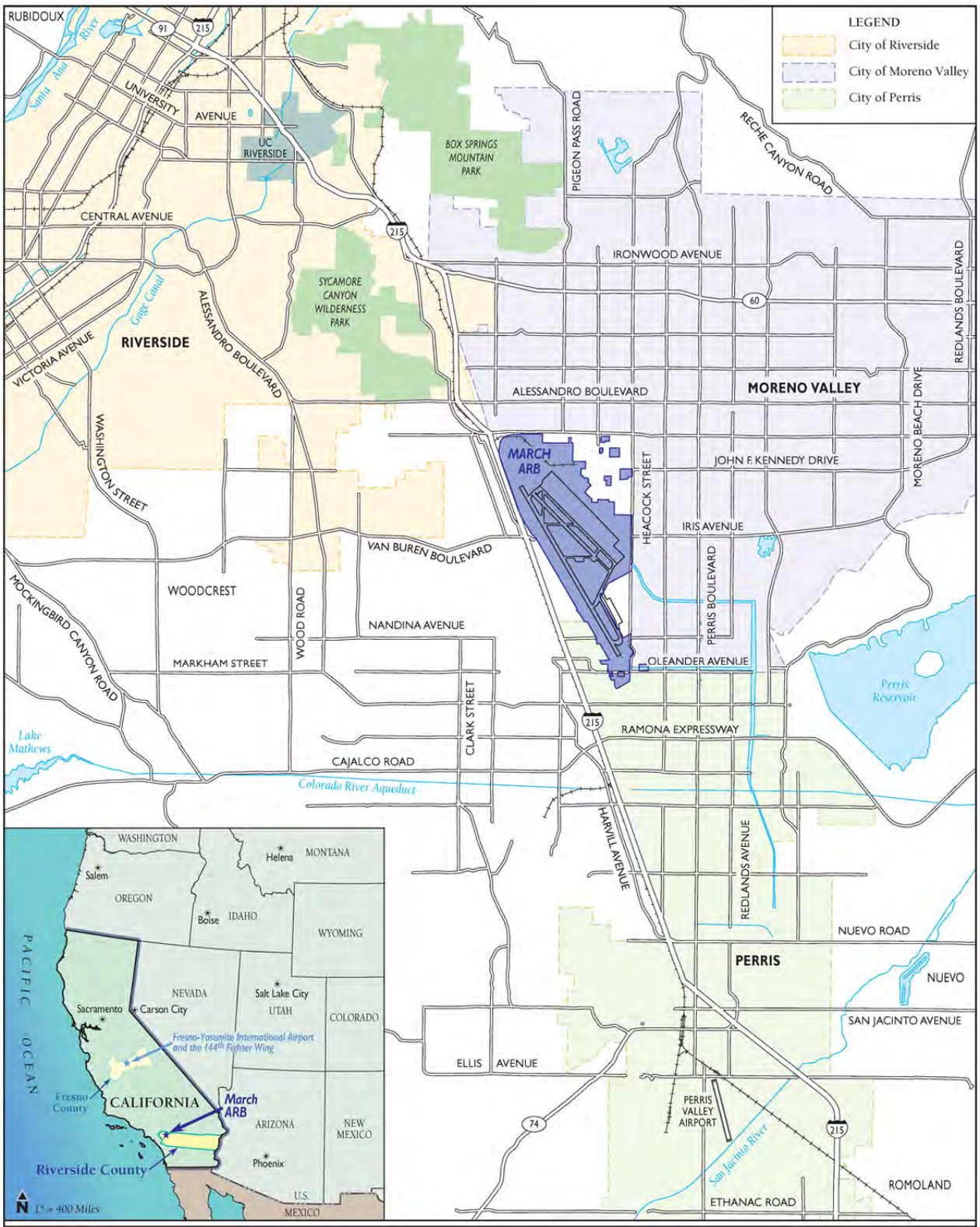


Figure 1.3-3
Regional Location
March ARB

144 FW, CA ANG

The 144 FW mission is to provide air superiority worldwide and air defense protection for the western U.S. Detachment 1 of the 144 FW also maintains an ACA mission at March ARB near Riverside, California. The overall ACA mission in general is to ensure air sovereignty and air defense of the airspace of Canada and the U.S. using an operations system designed to quickly detect, identify, and engage air, land, and sea threats to the U.S. and Canada 24 hours a day, 7 days a week. The ACA program includes both ANG and active duty USAF personnel who are dual tasked to conduct both expeditionary missions as well as ACA operations, such as those of the 144 FW. ANG ACA units are typically located near critical infrastructure and dense population areas that are seen as a priority for protection. The ACA mission requires three dedicated, armed alert aircraft (two primary aircraft and one spare) at each of the 16 alert locations throughout the U.S., with two pilots and associated maintenance and support personnel on duty 24 hours a day, 7 days a week. The 144 FW peacetime mission includes providing air defense protection along the west coast from the U.S. border with Mexico to the California border with Oregon currently utilizing the F-16 Fighting Falcon jet fighter aircraft. The 144 FW also supports the nation's Counterdrug Program and responds to state emergencies when tasked by the Governor of California.

1.4 SUMMARY OF KEY ENVIRONMENTAL REQUIREMENTS

1.4.1 National Environmental Policy Act

In accordance with NEPA of 1969 (42 USC 4321-4347), CEQ *Regulations for Implementing the Procedural Provisions of NEPA* (40 CFR Parts 1500-1508), and AFI 32-7061 as promulgated at 32 CFR Part 989 *et seq.*, *Environmental Impact Analysis Process*, the NGB is preparing an EIS, which will consider the potential consequences to the human and natural environment that may result from implementation of these activities.

NEPA requires federal agencies to take into consideration the potential environmental consequences of proposed actions in their decision-making process. The intent of NEPA is to protect, restore, and enhance the environment through well-informed federal decisions. The CEQ was established under NEPA to implement and oversee federal policy in this process. The CEQ subsequently issued the *Regulations for Implementing the Procedural Provisions of NEPA* (40 CFR Parts 1500-1508) (CEQ 1978).

The activities addressed within this document constitute a major federal action and therefore must be assessed in accordance with NEPA. To comply with NEPA, as well as other pertinent environmental requirements, the decision-making process for the Proposed Action includes the development of this EIS to address the environmental issues related to the proposed activities.

The USAF implementing procedures for NEPA are contained in AFI 32-7061 as promulgated at 32 CFR Part 989 *et seq.*, *Environmental Impact Analysis Process.*

1.4.2 Water Resources Regulatory Requirements

The Clean Water Act (CWA) of 1977 (33 USC § 1251 *et seq*.) regulates pollutant discharges that could affect aquatic life forms or human health and safety. Section 404 of the CWA, and Executive Order (EO) 11990, *Protection of Wetlands*, regulate development activities in or near streams or wetlands. Section 404 also regulates development in streams and wetlands and requires a permit from the United States Army Corps of Engineers (USACE) for dredging and filling in wetlands. EO 11988, *Floodplain Management*, requires federal agencies to take action to reduce the risk of flood damage; minimize the impacts of floods on human safety, health, and welfare; and to restore and preserve the natural and beneficial values served by floodplains. Federal agencies are directed to consider the proximity of their actions to or within floodplains.

In addition, federal projects with a footprint larger than 5,000 square feet (SF) must maintain predevelopment hydrology and prevent any net increase in stormwater runoff as outlined in Unified Facilities Criteria (UFC) 3-210-10, *Low Impact Development* (as amended, 2010), and consistent with the United States Environmental Protection Agency's (USEPA's) *Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects under Section 438 of the Energy Independence and Security Act (EISA)* (December 2009).

1.4.3 Cultural Resources Regulatory Requirements

The National Historic Preservation Act (NHPA) of 1966 (16 USC § 470) established the National Register of Historic Places (NRHP) and the Advisory Council on Historic Preservation (ACHP) outlining procedures for the management of cultural resources on federal property. Cultural resources can include archaeological remains, architectural structures, and traditional cultural properties such as ancestral settlements, historic trails, and places where significant historic events occurred. NHPA requires federal agencies to consider potential impacts to cultural resources that are listed, nominated to, or eligible for listing on the NRHP; designated a National Historic Landmark; or valued by modern Native Americans for maintaining their traditional culture. Section 106 of NHPA requires federal agencies to consult with State Historic Preservation Officers (SHPOs) if their undertakings might affect such resources. *Protection of Historic and Cultural Properties* (36 CFR Part 800 [2004]) provided an explicit set of

procedures for federal agencies to meet their obligations under the NHPA, which includes inventory of resources and consultation with SHPO.

The American Indian Religious Freedom Act (AIRFA) (42 USC § 1996) established federal policy to protect and preserve the rights of Native Americans to believe, express, and exercise their traditional religions, including providing access to sacred sites.

The Native American Graves Protection and Repatriation Act (NAGPRA) (25 USC §§ 3001-3013) requires consultation with Native American tribes prior to excavation or removal of human remains and certain objects of cultural importance.

The Archaeological Resources Protection Act (ARPA) of 1979 (16 USC §§ 470aa-mm) was created to protect archaeological resources and sites on public and Native American lands in addition to encouraging cooperation and exchange of information between governmental authorities, professionals, and private individuals. The act established civil and criminal penalties for destruction and alteration of cultural resources.

On November 27, 1999, the Department of Defense (DoD) promulgated its Annotated American Indian and Alaska Native Policy, which emphasizes the importance of respecting and consulting with tribal governments on a government-to-government basis. This Policy requires an assessment, through consultation, of the effect of proposed DoD actions that may have the potential to significantly affect protected tribal resources, tribal rights, and Indian lands before decisions are made by the respective services (DoD American Indian/Alaska Native Policy), as does DoD Instruction 4710.02, *Interaction with Federally Recognized Tribes* (September 14, 2006). In addition, coordination with federally recognized Native American tribes must occur in accordance with EO 13175, *Consultation and Coordination with Indian Tribal Governments*. Section 106 consultation and government-to-government consultation for this project continued throughout the duration of EIS preparation (see Appendix A and Section 4.11.2.1).

1.4.4 Clean Air Act

The Clean Air Act (CAA) (42 USC §§ 7401-7671q, as amended) provided the authority for the USEPA to establish nationwide air quality standards to protect public health and welfare. Federal standards, known as the National Ambient Air Quality Standards (NAAQS), were developed for six criteria pollutants: ozone (O_3), nitrogen dioxide (NO_2), carbon monoxide (CO), sulfur dioxide (SO_2), both coarse and fine inhalable particulate matter (less than or equal to 10 microns in diameter [PM_{10}], and particulate matter less than or equal to 2.5 microns in diameter [$PM_{2.5}$]), and lead (Pb). The Act also requires that each state prepare a State Implementation Plan (SIP) for maintaining and improving air quality and eliminating violations of the NAAQS. In nonattainment and maintenance areas, the CAA requires federal agencies to determine whether their proposed actions conform with the applicable SIP and demonstrate that

their actions will not (1) cause or contribute to a new violation of the NAAQS, (2) increase the frequency or severity of any existing violation, or (3) delay timely attainment of any standard, emission reduction, or milestone contained in the SIP. The EIS will present the project conformity applicability analysis and document the conformity-related emission calculation estimates. Conformity with the SIP must be demonstrated prior to implementation of the action.

1.4.5 Greenhouse Gas Emissions

Greenhouse gases (GHGs) are gases that trap heat in the atmosphere. These emissions occur from natural processes as well as human activities. The accumulation of GHGs in the atmosphere regulates, in part, the earth's temperature. Scientific evidence suggests a trend of increasing global temperature over the past century potentially due to an increase in GHG emissions from human activities. Potential climate change associated with GHGs may produce negative economic and social consequences across the globe.

On a national scale, federal agencies are addressing emissions of GHGs by reductions mandated in federal laws and EOs. Most recently, EO 13423, *Strengthening Federal Environmental, Energy, and Transportation Management*, and EO 13514, *Federal Leadership in Environmental, Energy, and Economic Performance*, were enacted to address GHG in detail, including GHG emissions inventory, reduction, and reporting. Several states have promulgated laws as a means to reduce statewide levels of GHG emissions.

1.4.6 Endangered Species Act

The Endangered Species Act (ESA) of 1973 (16 USC §§ 1531-1544, as amended) established measures for the protection of plant and animal species that are federally listed as threatened and endangered, and for the conservation of habitats that are critical to the continued existence of those species. Federal agencies must evaluate the effects of their proposed actions through a set of defined procedures, which can include the preparation of a Biological Assessment and can require formal consultation with the United States Fish and Wildlife Service (USFWS) under Section 7 of the Act.

1.4.7 Environmental Coordination Requirements

EO 12372, *Intergovernmental Review of Federal Programs*, requires intergovernmental notifications prior to making any detailed statement of environmental impacts. Through the process of Interagency and Intergovernmental Coordination for Environmental Planning (IICEP), the proponent must notify concerned federal, state, and local agencies and allow them sufficient time to evaluate potential environmental impacts of a proposed action. Comments from these agencies are subsequently incorporated into the environmental impact analysis process (EIAP). A list of relevant federal, state, and local agencies are provided in Appendix A.

1.4.8 Other Environmental Requirements

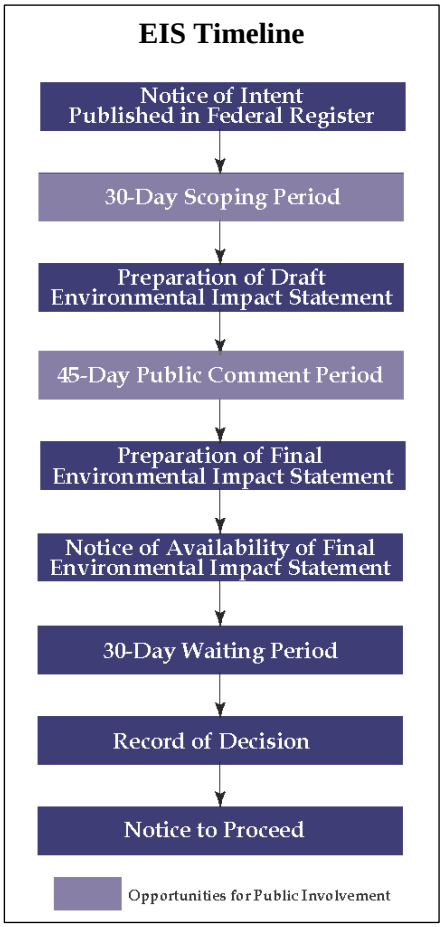
Other environmental requirements that potentially apply to the implementation of this proposal include guidelines promulgated by EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, to ensure that disproportionately high and adverse human health or environmental effects on citizens in these categories are identified and addressed, as appropriate. Additionally, potential health and safety impacts that could disproportionately affect children are considered under the guidelines established by EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*.

1.5 LEAD AND COOPERATING AGENCIES

The role of a federal agency in the NEPA process depends on the agency's expertise and relationship to the proposed undertaking. The agency carrying out the proposed action is responsible for complying with the requirements of NEPA. In some cases, there may be more than one federal agency involved in an undertaking. In this situation, a lead agency is designated to supervise preparation of the environmental analysis. Federal agencies, together with state, tribal, or local agencies, may act as joint lead agencies. The NGB is the proponent for this proposal and is the lead agency for preparation of the EIS. Due to the potential environmental impacts on airport operations, the Federal Aviation Administration (FAA) has agreed to participate as a cooperating agency on this EIS. As defined in 40 CFR § 1508.5, a cooperating agency is "any Federal agency other than a lead agency that has jurisdiction by law or special expertise with respect to any environmental impact involved in a proposal (or a reasonable alternative) for legislation or other major Federal action significantly affecting the quality of the human environment. A state or local agency of similar qualifications, or when the effects are on a reservation, an Indian Tribe may, by agreement with the lead agency, become a cooperating agency."

1.6 ENVIRONMENTAL IMPACT ANALYSIS PROCESS

This EIS has been prepared in accordance with all environmental requirements as described in Section 1.4. An EIS is prepared as a tool for compiling information for a proposal and provides a full and fair discussion of environmental impacts to the natural and human environment. Reasonable alternatives to the Proposed Action, including the No Action Alternative are also evaluated in an EIS. The NGB has analyzed all reasonable alternatives to ensure that fully informed decisions are made after review of the comprehensive, multidisciplinary analysis of potential environmental consequences.



Compliance with NEPA guidance for preparation of an EIS involves several critical steps summarized below.

1. *Announce that an EIS will be prepared.* For this EIS, a Notice of Intent (NOI) was published in the *Federal Register* on July 15, 2011.

2. *Conduct scoping.* This is the first major step in identifying the relevant issues to be analyzed in detail, and to eliminate issues that are not relevant. Scoping for this EIS occurred between July 15, 2011 and August 19, 2011. Throughout the scoping period, the NGB actively solicited public comments on the proposal. Information related to the proposal has been disseminated to the public through several avenues, including newspaper advertisements, a project website (www.eis144fw.com), and periodic fact sheets. In addition, letters requesting input have been distributed to federal, state, and local agencies and are a part of the official project record. Concerns and comments identified during the scoping process have been included in the analyses, as appropriate. Scoping meetings were held both in Fresno and Moreno Valley, California on August 2 and August 4, 2011, respectively. During the scoping meetings, the NGB presented details about the proposal, the NEPA process, and provided an opportunity for public and agency involvement. In addition to receiving verbal and written comments at the scoping meeting, the NGB has also accepted written comments from the public and agencies through U.S. mail, email, and fax. To the extent possible, scoping comments have been used to shape the analysis and focus the issues in this EIS. Although the official scoping period was from July 15 through August 19, 2011, comments on the Proposed Action and alternatives will

continue to be accepted throughout the process, until a decision regarding the action is made.

3. *Prepare a Draft EIS.* The Draft EIS is a comprehensive document for public and agency review. The Draft EIS describes the purpose and need of the Proposed Action and alternatives; presents the existing conditions in the region potentially affected; and provides analysis of the environmental consequences of the Proposed Action and alternatives, including the No Action Alternative. The Draft EIS was distributed to agencies, regional libraries, and members of the public who requested copies.

4. *Public/Agency Review.* There was a 45-day public comment period following the Notice of Availability (NOA) for the Draft EIS, which was published in the *Federal Register* on May 11, 2012. This initiated the public comment period, which ended on June 25, 2012. Public hearings were held both in Moreno Valley and Fresno, California on June 5 and June 7, 2012, respectively. During the public hearings, the NGB presented details about the proposal, the NEPA process, and provided attendees an opportunity to provide written and/or oral comments. In addition to receiving verbal and written comments at the hearings, the NGB has also accepted written comments from the public and agencies through U.S. mail, fax, and email. All substantive comments received during the public comment period have been fully considered and addressed in the Final EIS, as appropriate. Written comments submitted at the public hearing and those received via other means were given equal consideration in the preparation of the Final EIS.

5. *Prepare a Final EIS.* The Final EIS was prepared following the public comment period and includes all written comments and verbal testimony from public and agency reviewers during the public hearing and the comment period. The Final EIS was revised to reflect public and agency comments, the proponent's responses, and additional information received from reviewers. The Final EIS provides the decision-maker with a comprehensive review of the potential environmental consequences of selecting any of the alternatives carried forward for detailed analysis. A NOA will be published in the *Federal Register* to announce availability of the Final EIS.

6. *Issue a Record of Decision.* The final step in the NEPA process is approval of the Record of Decision (ROD). The NOA begins a 30-day waiting period before the ROD is signed. The ROD identifies which action has been selected by the Deputy Assistant Secretary of the Air Force (Installations) decision-maker and what management actions or other measures would be carried out to reduce, where possible, adverse impacts to the environment.

CHAPTER 2
DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

2.1 PROPOSED ACTION

The USAF has a requirement to provide ACA capability to protect the west coast of the U.S. and its population centers. The NGB proposes to implement an aircraft conversion for the 144 FW at Fresno-Yosemite IAP in Fresno, California. The 144 FW currently flies and maintains 18 F-16 Fighting Falcon aircraft. The proposal is to convert the unit (including Detachment 1 based at March ARB) from F-16 Fighting Falcon aircraft and operations to the F-15 Eagle aircraft and operations at Fresno-Yosemite IAP. As described in Section 1.2, the 18 F-16 aircraft would be relocated to the 162 FW in Tucson, Arizona under a separate action. In addition, the 144 FW would implement construction projects associated with aircraft conversion and/or their Installation Development Plan (IDP) at Fresno-Yosemite IAP. The 144 FW currently provides support for federal, state, and community interests by maintaining highly trained, well-equipped, military forces to provide combat-ready support elements in response to wartime and peacetime tasking; protecting life and property; and preserving peace, order, and public safety.

As a result of the Proposed Action, there would be a change to the type of aircraft based at Fresno-Yosemite IAP and March ARB; a change to the type of aircraft using the associated airspace; changes to staffing and manpower at the 144 FW; as well as some proposed construction, building renovation, and facility demolition (at Fresno-Yosemite IAP only). There would be no new or modified airspace required and no additional sortie-operations would be expected. The proposed conversion would begin in 2012, while it is unlikely that construction would begin before 2013. Although proposed construction is necessary for the long-term viability of the conversion, aircraft operations with the F-15 could begin prior to implementation of the construction.

F-16C FIGHTING FALCON

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.

In an air combat role, the F-16's maneuverability and combat radius (distance it can fly to enter air combat, stay, fight and return) exceed that of all potential threat fighter aircraft. It can locate targets in all weather conditions and detect low flying aircraft in radar ground clutter. In an air-to-surface role, the F-16 can fly more than 500 miles (860 kilometers), deliver its weapons with superior accuracy, defend itself against enemy aircraft, and return to its starting point. An all-weather capability allows it to accurately deliver ordnance during non-visual conditions.

The F-16 was designed to be smaller and lighter than some of its fighter aircraft predecessors. The light weight of the fuselage is achieved without reducing its strength. With a full load of internal fuel, the F-16 can withstand up to nine G's -- nine times the force of gravity -- which exceeds the capability of other current fighter aircraft. The cockpit and its bubble canopy give the pilot unobstructed forward and upward vision, and greatly improved vision over the side and to the rear. The seat-back angle was expanded from the usual 13 degrees to 30 degrees, increasing pilot comfort and gravity force tolerance. The pilot has excellent flight control of the F-16 through its "fly-by-wire" system. Electrical wires relay commands, replacing the usual cables and linkage controls. For easy and accurate control of the aircraft during high G-force combat maneuvers, a side stick controller is used instead of the conventional center-mounted stick. Avionics systems include a highly accurate inertial navigation system in which a computer provides steering information to the pilot. The plane has UHF and VHF radios plus an instrument landing system. It also has a warning system and modular countermeasure pods to be used against airborne or surface electronic threats. The fuselage has space for additional avionics systems.

The F-16A, a single-seat model, first flew in December 1976. The F-16B, a two-seat model, has tandem cockpits that are about the same size as the F-16A model. All F-16s delivered since November 1981 have built-in structural and wiring provisions and systems architecture that permit expansion of the multi-role flexibility to perform precision strike, night attack and beyond-visual-range interception missions. This improvement program led to the F-16C and F-16D aircraft, which are the single- and two-place counterparts to the F-16A/B, and incorporate the latest cockpit control and display technology. All active units and many Air National Guard and Air Force Reserve units have converted to the F-16C/D. Since Sept. 11, 2001, the F-16 has been a major component of the combat forces committed to the Global War on Terrorism flying thousands of sorties in support of operations Noble Eagle (Homeland Defense), Enduring Freedom in Afghanistan and Iraqi Freedom.

The F-16 is operated by one or two pilots. This aircraft features one Pratt & Whitney F100-PW-200/220/229 or General Electric F110-GE-100/129 turbofan engine with an afterburner that produces 27,000 pounds of thrust. The aircraft is 49.5 feet long, has a height of 16 feet, and its wingspan is 32.8 feet. It has a flight ceiling of above 50,000 feet and a range of more than 2,002 miles (1,740 NM) with a combination of standard fuel tanks and two external tanks. Top speed is 1,500 miles per hour. The F-16 is armed with one M-61A1 20mm multi-barrel cannon with 500 rounds; external stations can carry up to six air-to-air missiles, conventional air-to-air and air-to-surface munitions and electronic countermeasure pods.

Source: USAF 2009a.

F-15 EAGLE

The F-15 Eagle is an all-weather, extremely maneuverable, tactical fighter designed to permit the Air Force to gain and maintain air supremacy over the battlefield. The F-15's air superiority is achieved through a mixture of unprecedented maneuverability and acceleration, range, weapons and avionics. It can penetrate enemy defense and outperform and outfight any current enemy aircraft. The F-15 has electronic systems and weaponry to detect, acquire, track and attack enemy aircraft while operating in friendly or enemy-controlled airspace. The weapons and flight control systems are designed so one person can safely and effectively perform air-to-air combat.

The F-15's superior maneuverability and acceleration are achieved through high engine thrust-to-weight ratio and low wing loading. Low wing-loading (the ratio of aircraft weight to its wing area) is a vital factor in maneuverability, and combined with the high thrust-to-weight ratio, enables the aircraft to turn tightly without losing airspeed. A multi-mission avionics system sets the F-15 apart from other fighter aircraft. It includes a head-up display, advanced radar, inertial navigation system, flight instruments, ultrahigh frequency communications, tactical navigation system and instrument landing system. It also has an internally mounted, tactical electronic-warfare system, "identification friend or foe" system, electronic countermeasures set and a central digital computer.

The pilot's head-up display projects on the windscreen all essential flight information gathered by the integrated avionics system. This display, which is visible in any light condition, provides information necessary to track and destroy an enemy aircraft without having to look down at cockpit instruments.

The F-15's versatile pulse-Doppler radar system can look up at high-flying targets and down at low-flying targets without being confused by ground clutter. It can detect and track aircraft and small high-speed targets at distances beyond visual range down to close range, and at altitudes down to treetop level. The radar feeds target information into the central computer for effective weapons delivery. For close-in dogfights, the radar automatically acquires enemy aircraft, and this information is projected on the head-up display. The F-15's electronic warfare system provides both threat warning and automatic countermeasures against selected threats.

A variety of air-to-air weaponry can be carried by the F-15. An automated weapon system enables the pilot to perform aerial combat safely and effectively, using the head-up display and the avionics and weapons controls located on the engine throttles or control stick. When the pilot changes from one weapon system to another, visual guidance for the required weapon automatically appears on the head-up display.

The F-15 is operated by a single pilot. This aircraft features two Pratt & Whitney F100-PW-100, or -220, or -229 turbofan engines with afterburners that produce 23,450 pounds of thrust each. The aircraft is 63.8 feet long, has a height of 18.5 feet, and its wingspan is 42.8 feet. They have a flight ceiling of 65,000 feet and a range of 3,450 miles (3,000 NM) with a combination of standard fuel tanks and three external fuel tanks. Top speed is 1,875 miles per hour. The F-15 is armed with one internally mounted M-61A1 20 mm, six-barrel cannon with 940 rounds of ammunition; four AIM-9L/M Sidewinder and four AIM-7F/M sparrow air-to-air missiles, or eight AIM-120 Advanced Medium Range Air-to-Air Missiles (AMRAAMs), which are carried on the exterior of the aircraft.

Source: USAF 2009b.

2.2 SCREENING CRITERIA

As previously described, as a result of the CAF REDUX, the 144 FW is programmed to convert from F-16 Fighting Falcon aircraft and operations to the F-15 Eagle aircraft and operations. Based on extensive analysis by the NGB and USAF operations community, a siting study, *Proponent Analysis of Alternatives – EIAP for F-15 Aircraft Conversion* (NGB 2011) was conducted to determine the specific requirements for basing the F-15 aircraft and to identify candidate military installations where this basing could occur. Based on this study, it was determined that converting the 144 FW in place at their existing installation at the Fresno-Yosemite IAP is the only viable alternative, and there were no reasonable locational alternatives to this (NGB 2011). Upon a review of potential California military installations, Fresno-Yosemite IAP is the only west coast installation that has nearly all available required infrastructure to support the mission; therefore, it is appropriate that they have fighter aircraft assigned to the unit that will be capable of performing the ACA mission and will be able to support missions well into the future. While there are no viable alternative locations for the aircraft, there are viable alternatives to the number of aircraft that would be based at Fresno-Yosemite IAP (NGB 2011).

General components of the proposed relocation include:

- Facilities necessary to support the F-15 mission, including: airfield pavements, aircraft maintenance, aircraft operations, industrial, and command and support functions;
- Proposed aircraft operations and the full-time and part-time personnel anticipated to change from existing F-16 mission levels with growth needed to meet F-15 Unit Manning Document requirements; and
- Compliance with North American Aerospace Defense Command (NORAD) and Air Forces Northern (AFNORTH) ACA response capability and requirements.

Identification and analysis of alternatives is one of the core elements of the environmental process under NEPA and the USAF's implementing regulations. The NGB may expressly eliminate alternatives from detailed analysis based on reasonable selection standards (32 CFR 989.8(c)). Consequently, the Air, Space, and Information Operations Directorate, Current Operations Division (NGB/A3O) and the Programs and Plans Directorate, Programs Management Division (NGB/A8P) systematically evaluated sites to identify potential location alternatives for the proposed mission conversion. The site evaluation process involved the assessment of planning factors such as infrastructure requirements for F-15 aircraft, operational and safety requirements, military operations parameters, general aviation and military airspace issues, programmatic planning and funding actions, and compliance with NORAD and AFNORTH criteria for ACA response (NGB 2011).

Subsequently, a series of planning and site suitability factors were developed to identify a full set of feasible relocation options. For evaluating the potential relocation options, the most critical siting criteria are those associated with the availability of airfield infrastructure and ACA capability/proximity. Specifically, the siting criteria for identifying a suitable relocation site were:

- **Located in California.** The 144 FW has a state mission (to respond to state emergencies), and a California-centric federal mission, and therefore must remain in the State of California. The 144 FW also is prepared to contribute to Defense Support of Civil Authorities missions when called upon by the Governor of California.

- **Suitable Airfield Infrastructure.** Airfield infrastructure must be suitable for F-15 operations. This includes an airfield of sufficient length and weight-bearing capacity for F-15 aircraft, and airfield pavements for aircraft parking and maintenance.

- **Available Installation Facilities.** It is necessary to identify a location with suitable existing airfield infrastructure that would require minimum or no improvement or renovation due to funding constraints that would be applicable to construction of a completely new ANG installation or major renovation/expansion of an existing military installation. In addition to being suitable for use, the installation infrastructure and support facilities (i.e., support facilities for aircraft maintenance, aircraft operations, industrial, medical, administrative, and command and support functions) must be available for lease/license to the CA ANG.

- **Training Airspace Proximity.** The 144 FW currently conducts much of its training in central and southern California as well as in over-water ranges. Proximity to these training ranges is necessary to avoid excessive travel time costs and unnecessary increase in flying hours. An average F-15 sortie duration is 1.4 hours; therefore, travel in excess of 30 minutes in each direction from training airspace/ranges would result in inadequate duration at training destinations thus reducing overall effectiveness and efficiency of training. While high altitude air-to-air intercepts are the primary mission, aircrew training also includes maneuvering against low/slow targets and/or fighter adversaries, which would highlight gravity force awareness exercise; low level navigation; fuel management; low level turns; tactical formation; visual lookout; altitude awareness/control; offensive/defensive maneuvering; low-altitude tactical intercepts; and low-altitude weapons employment considerations (AFI 11-2F-15V1 September 2010). Conceivably, aircraft could travel a greater distance when in-flight refueling is available; however, this is not typically available (personal communication, Hutchison 2011).

- **ACA Capability/Proximity.** The 144 FW currently flies ACA from Fresno and Detachment 1, located at March ARB. Compliance with NORAD and AFNORTH criteria for ACA response times and distances must be met.

To be in compliance with NORAD and AFNORTH criteria for ACA response, the following bases were found to be acceptable: Beale Air Force Base (AFB), Marysville; Castle Airport, Atwater; Fresno-Yosemite IAP, Fresno; March ARB, Moreno Valley; McClellan Airfield, Sacramento; Naval Air Station (NAS) Lemoore, Lemoore; Naval Base Ventura County (NBVC), Point Mugu; Sacramento Mather Airport (formerly an AFB), Rancho Cordova; and Travis AFB, Fairfield (NGB 2011).

In accordance with 32 CFR 989.8(c), sites that failed to meet one or more of the criteria listed above were removed from further consideration. A matrix comparing the relocation options to the siting criteria is shown in Table 2.2-1. As shown, all sites except Fresno-Yosemite IAP were eliminated from further consideration, primarily because existing airfield property and installation infrastructure were not readily available for use by the 144 FW.

Table 2.2-1. Compatibility of Potential Relocation Options with Siting Criteria

	POTENTIAL SITES								
Siting Criteria	*Current Site Fresno-Yosemite IAP*	*Beale AFB*	*Castle Airport*	*NBVC Point Mugu*	*NAS Lemoore*	*March ARB*	*McClellan Airfield*	*Sacramento Mather Airport*	*Travis AFB*
1) Located in California	X	X	X	X	X	X	X	X	X
2) Suitable Airfield Infrastructure	X	X	X	X	X	X	X	X	X
3) Available Installation Facilities	X								
4) Training Airspace Proximity	X	X	X	X	X	X	X	X	X
5) ACA Capability/ Proximity	X	X	X				X	X	X

ACA = Aerospace Control Alert; AFB = Air Force Base; ARB = Air Reserve Base; IAP = International Airport; NAS = Naval Air Station; NBVC = Naval Base Ventura County
Source: NGB 2011

Based on the results of the systematic siting process described above, the operationally and economically feasible location to convert the 144 FW from F-16 to F-15 aircraft is their current location, Fresno-Yosemite IAP. The infrastructure at their current installation requires only very minor construction/renovation to support the F-15 mission, while other locations would require extensive construction/renovation. In addition, no construction is needed at March ARB to support the Detachment 1 F-15 aircraft; although extensive construction would be required to support an entire wing at that location. Furthermore, the necessary existing facilities are

available for lease until 2047 from the Fresno-Yosemite IAP. Following the conversion, the 144 FW would still be able to continue with both their federal mission and their state mission.

It is feasible that there could be alternatives to the number of F-15 aircraft based at Fresno-Yosemite IAP and still meet the purpose and need for the proposed action as well as the siting criteria. NGB identified two feasible action alternatives based on the number of F-15 aircraft based at the 144 FW installation (18 and 24 aircraft), and these two alternatives will be carried forward for detailed analysis in this EIS. The ACA mission requires adequately trained and available aircrews to support the ACA mission. Fewer than 18 aircraft for the required flying hours would increase the frequency of flight on each airframe, each aircraft would become more maintenance-intensive, and ultimately shorten the airframe's service life. As the USAF continues to consolidate the F-15 force, there is a likelihood that the unit could absorb increased aircraft and flying hours, thus making the 24-aircraft a reasonable alternative. NGB typically does not have more than 24 aircraft assigned to a particular location. Therefore, these two alternatives to the number of based aircraft will be carried forward for detailed analysis in the EIS.

Aircraft Activity - Terms

To provide the training to ensure combat readiness, aircrews typically conduct operations in two types of areas: 1) an airfield; and 2) in airspace. This EIS uses three terms to describe different components of aircraft flying activities: *sortie, operation,* and *event.* Each has a distinct meaning and commonly applies to a specific set of activities in a particular airspace environment or unit. These terms also provide a means to quantify activities for the purposes of analysis. A *sortie* consists of a single military aircraft from a take-off through a landing, and includes everything that might be conducted during that flying mission. For this EIS, the term *sortie* is commonly used when summarizing an amount of flight activity from the airfield. A sortie can include more than one *operation.* The term *operation* can apply to both airfield and airspace activities. At an airfield, an operation consists of a single action such as a landing or take-off. For airspace and ranges, an operation consists of the use of one airspace unit (e.g. Military Operations Area [MOA], Military Training Route [MTR]) by one aircraft. Each time a single aircraft flies in a different airspace unit, one operation is counted for the unit. As a subset of operations, the term *event* is used to define specific training elements (e.g., supersonic flight or ordnance delivery). More than one event may be performed during the use of an airspace unit. During a single sortie, aircraft could fly in several airspace units, conduct a number of operations and events. For these reasons, the number of operations and events may exceed total number of sorties.

2.3 PREFERRED ALTERNATIVE

2.3.1 Aircraft Conversion

Under the Preferred Alternative, the 144 FW would convert from 18 F-16 Primary Assigned Aircraft (PAA) and 3 Back-up Aircraft Inventory (BAI) to 18 F-15 PAA and 3 BAI. In general, at least three of these aircraft would always be located at March ARB, serving the ACA mission out of that location. Thus, 15 F-15 aircraft would be based at their installation at Fresno-Yosemite IAP. The ACA aircraft at March ARB would be periodically rotated to and from Fresno for maintenance. Concurrent with the beddown of the 18 F-15 PAA at Fresno-Yosemite IAP and March ARB, the

existing fleet of 18 F-16 aircraft would be relocated to the 162 FW at Tucson IAP, Tucson, Arizona under a separate action.

2.3.2 Airfield Operations Associated with the Preferred Alternative

2.3.2.1 Fresno-Yosemite International Airport

Fresno-Yosemite IAP is located in the City of Fresno approximately 5 miles east of downtown Fresno, in Fresno County. Fresno-Yosemite IAP is a public use airport owned and operated by the City of Fresno. The airport features two active parallel runways, Runway 11L/29R and Runway 11R/29L. Runway 11L/29R is the primary runway and is 9,227 feet long and 150 feet wide. The threshold for Runway 29R, which is the beginning of the useable runway for landings and take-offs, has been displaced by 312 feet in order to assure compliance with FAA safety criteria and to provide adequate clearances over Clovis Avenue. The secondary Runway, 11R/29L is 7,206 feet long and 100 feet wide and is equipped for visual landings only. The threshold for Runway 11R is displaced by 1,448 feet due to runway gradient issues at this end. Two full-length parallel taxiways occur north and south of the runways (Fresno-Yosemite IAP 2006).

A 2011 noise study conducted by the Fresno-Yosemite IAP identified the baseline airport operations and noise contours with approximately 122,319 annual operations at Fresno-Yosemite IAP. General aviation and commercial aircraft (including air taxi and scheduled air service) and transient military aircraft account for approximately 117,639 annual operations. The 144 FW F-16 aircraft accomplish approximately 4,680 annual operations at Fresno-Yosemite IAP (Table 2.3-1).

Following the aircraft conversion under the Preferred Alternative, there would be no change to the number or type of airfield operations conducted by the 144 FW at Fresno-Yosemite IAP. All operations would remain as described under existing conditions; however, the F-16 would be replaced with the F-15. The 144 FW would be expected to fly the same number of operations at the airfield as they currently do. There would be no changes expected to departure/arrival patterns and tracks, flight profiles, use of runways, and current noise abatement procedures would continue to be followed.

Table 2.3-1. 2011 Current Operations and Proposed Military Changes to Airfield Operations[1]-Fresno-Yosemite IAP, Fresno, California

	Arrivals[2]			Departures[2]			Closed Pattern Operations[3]			Total			
Aircraft	*Day*	*Evening*	*Night*	*Day*	*Evening*	*Night*	*Day*	*Evening*	*Night*	*Day*	*Evening*	*Night*	*All*
Current Operations[4]													
F-16	2,017	162	20	2,017	182	0	282	0	0	4,316	344	20	4,680
Other[5]	43,391	4,900	4,202	42,788	3,127	4,646	13,127	729	729	99,306	8,756	9,577	117,639
Total	**45,408**	**5,062**	**4,222**	**44,805**	**3,309**	**4,646**	**13,409**	**729**	**729**	**103,622**	**9,100**	**9,597**	**122,319**
Proposed Operations													
F-16	0	0	0	0	0	0	0	0	0	0	0	0	**0**
F-15[5]	2,017	162	20	2,017	182	0	282	0	0	4,316	344	20	4,680
Other[5]	43,391	4,900	4,202	42,788	3,127	4,646	13,127	729	729	99,306	8,756	9,577	117,639
Total	**45,408**	**5,062**	**4,222**	**44,805**	**3,309**	**4,646**	**13,409**	**729**	**729**	**103,622**	**9,100**	**9,597**	**122,319**

Notes:
1. An airfield operation represents the single movement or individual portion of a flight in the airfield airspace environment, such as one landing, one take-off, or one transit of the airport traffic area.
   A sortie consists of a single aircraft from take-off through landing. A single sortie generates at least two airfield operations (take-off and landing).
2. Day time operation = 7 a.m. - 7 p.m. local time
   Evening time operations = 7 p.m. – 10 p.m. local time
   Night time operation = 10 p.m. - 7 a.m. local time
3. Each closed pattern consists of two airfield operations: a touch down immediately followed by a take-off; therefore, closed pattern *operations* are divided by 2 to calculate total number of *closed patterns*. These are additional to the initial take-off and final landing of each sortie at the airfield.
4. Current airfield operations from July 1, 2010 through June 30, 2011.
5. Other aircraft include general aviation, commercial and air taxi, and transient military aircraft (with the Fresno Air Traffic Control Tower counting three operations for one F-16 overhead arrival).

Sources: Personal communications: Lough 2011, Davis 2011, Coffman Associates, Inc. 2012

2.3.2.2 March Air Reserve Base

March ARB is located in Riverside County, California, approximately 15 miles south of the City of San Bernardino and 50 miles east of Los Angeles. The City of Moreno Valley borders the Base to the north and east and the City of Riverside borders to the west. Interstate 215 (I-215) is located directly west of the installation. The installation occupies approximately 2,150 acres. Under the Base Realignment and Closure (BRAC) initiative, the former March AFB was selected for realignment and became March ARB in 1996. As part of this conversion, authority for about 4,400 acres of the former air base was transferred to the March Joint Powers Authority (MJPA), a public entity representing the local cities and Riverside County. Under this action, the facilities became joint use, allowing for civilian, commercial, and military use of the airfield.

The airfield features two active runways, Runway 14/32, which is 13,300 feet long and 200 feet wide and Runway 12/30, which is 3,059 feet long and 100 feet wide. There are currently 53,847 annual operations, of which the F-16 typically flies 1,061 (Table 2.3-2).

Following the aircraft conversion under the Preferred Alternative, all operations would remain as described under existing conditions; however, the F-16s would be replaced with the F-15 aircraft. There would be no increase in the number of closed patterns flown by the 144 FW Detachment 1 at March ARB as a result of the Proposed Action. However, the number of

operations currently performed at March ARB is a slight increase over the number that were evaluated in previous documentation (2008), and therefore this current analysis will show that increase from the previously analyzed number of operations to the current number flown today (Air Force Center for Engineering and the Environment [AFCEE] 2008). There would be no changes expected to departure/arrival patterns and tracks, flight profiles, noise abatement procedures, or use of runways (Table 2.3-2).

Table 2.3-2. Current and Proposed Annual Airfield Operations[1]-March ARB, California

	Arrivals[2]			Departures[2]			Closed Pattern Operations[3]			Total			
Aircraft	*Day*	*Evening*	*Night*	*Day*	*Evening*	*Night*	*Day*	*Evening*	*Night*	*Day*	*Evening*	*Night*	*All*
Current Operations													
F-16	390	18	30	394	43	0	172	14	0	956	75	30	**1,061**
Other[4]	5,169	585	62	5,169	196	43	35,617	3,932	2,013	45,955	4,713	2,118	52,786
Total	**5,559**	**603**	**92**	**5,563**	**239**	**43**	**35,789**	**3,946**	**2,013**	**46,911**	**4,788**	**2,148**	**53,847**
Proposed Operations													
F-16	0	0	0	0	0	0	0	0	0	0	0	0	**0**
F-15	390	18	30	394	43	0	404	25	0	1,188	86	30	**1,305**
Other[4]	5,169	585	62	5,169	196	43	35,617	3,932	2,013	45,955	4,713	2,118	52,786
Total	**5,559**	**603**	**92**	**5,563**	**239**	**43**	**36,021**	**3,957**	**2,013**	**47,143**	**4,799**	**2,148**	**54,091**

Notes:
1. An airfield operation represents the single movement or individual portion of a flight in the airfield airspace environment, such as one landing, one take-off, or one transit of the airport traffic area.
   A sortie consists of a single aircraft from take-off through landing. A single sortie generates at least two airfield operations (take-off and landing).
2. Day time operation = 7 a.m. – 7 p.m. local time
   Evening time operations = 7 p.m. – 10 p.m. local time
   Night time operation = 10 p.m. – 7 a.m. local time
3. Each closed pattern consists of two airfield operations: a touch down immediately followed by a take-off; therefore, closed pattern *operations* are divided by 2 to calculate total number of *closed patterns*. These are additional to the initial take-off and final landing of each sortie at the airfield.
4. Other: Consists of based aircraft and transient aircraft using March ARB other than based F-16/F-15.

Sources: Personal communications: Reilly 2011, Mabie 2011; AFCEE 2008

2.3.3 Airspace Operations Associated with the Preferred Alternative

The 144 FW's mission is to provide air defense protection from the southwestern border of the U.S. with Mexico to the northern border of California. Pilots assigned to the 144 FW use Special Use Airspace (SUA) for training in basic fighter maneuvers and continuation training that includes air-to-air flight intercept training, air-to-air combat flight training, and other flight maneuvers that requires restricted airspace that keeps non-participating aircraft separate from the military flight training as dictated by AFI 11-2F-16 Vol 1 dated 19 January 2007.

SUA currently used by the 144 FW for their flight training includes two Warning Areas off the California coast (W-532 and W-283), two Military Operations Areas (MOA), and one Restricted Area (Figure 2.3-1). Under the Preferred Alternative, the 144 FW would continue to use all the same airspace in the same manner, and with similar frequency and duration of use. Effective times of use for the Warning Areas are intermittent by Notice to Airmen (NOTAMs) for both visual flight rules (VFR) and instrument flight rules (IFR) flight traffic. They range from the surface to unlimited altitude. W-532 is controlled by FAA, Los Angeles Air Route Traffic Control Center (ARTCC) and scheduled for use by the U.S. Navy, Naval Air Warfare Center, Weapons Division at Point Mugu NAS. W-283 is controlled by FAA, Oakland ARTCC and scheduled by the U.S. Navy, Fleet Area Control and Surveillance Facility, San Diego.

Turtle MOA, which is another SUA used by the 144 FW, is just east of Lake Havasu, Arizona and overlies the California/Arizona border. Hunter High MOA is located north of San Luis Obispo, California along the coast to 30 nautical miles inland to just south of King City, California.

R-2508 - China Lake Complex overlies the community of China Lake, California, and it continues from the surface to unlimited altitude, continuously. R-2508 is controlled by the FAA, Hi-Desert Terminal Radar Approach Control (TRACON) Edwards AFB, California. It is managed by the Naval Air Warfare Center Weapons Division, China Lake and scheduled by the Central Coordination Facility, Edwards AFB.

Currently, the 144 FW flies approximately 2,600 annual sortie operations in the SUA, at both high altitude, as well as low altitude air-to-air training with the largest majority in the Warning Areas overwater and in the Restricted Area at the China Lake Complex. F-15 or similar aircraft (such as the F-18), performing like maneuvers, currently operate in each of these SUAs (Naval Air Weapons Station and Bureau of Land Management 2002; Wyle Laboratories 2004). There would be no expected change to the frequency of use, duration of use, or number of operations conducted in any of the SUA described.

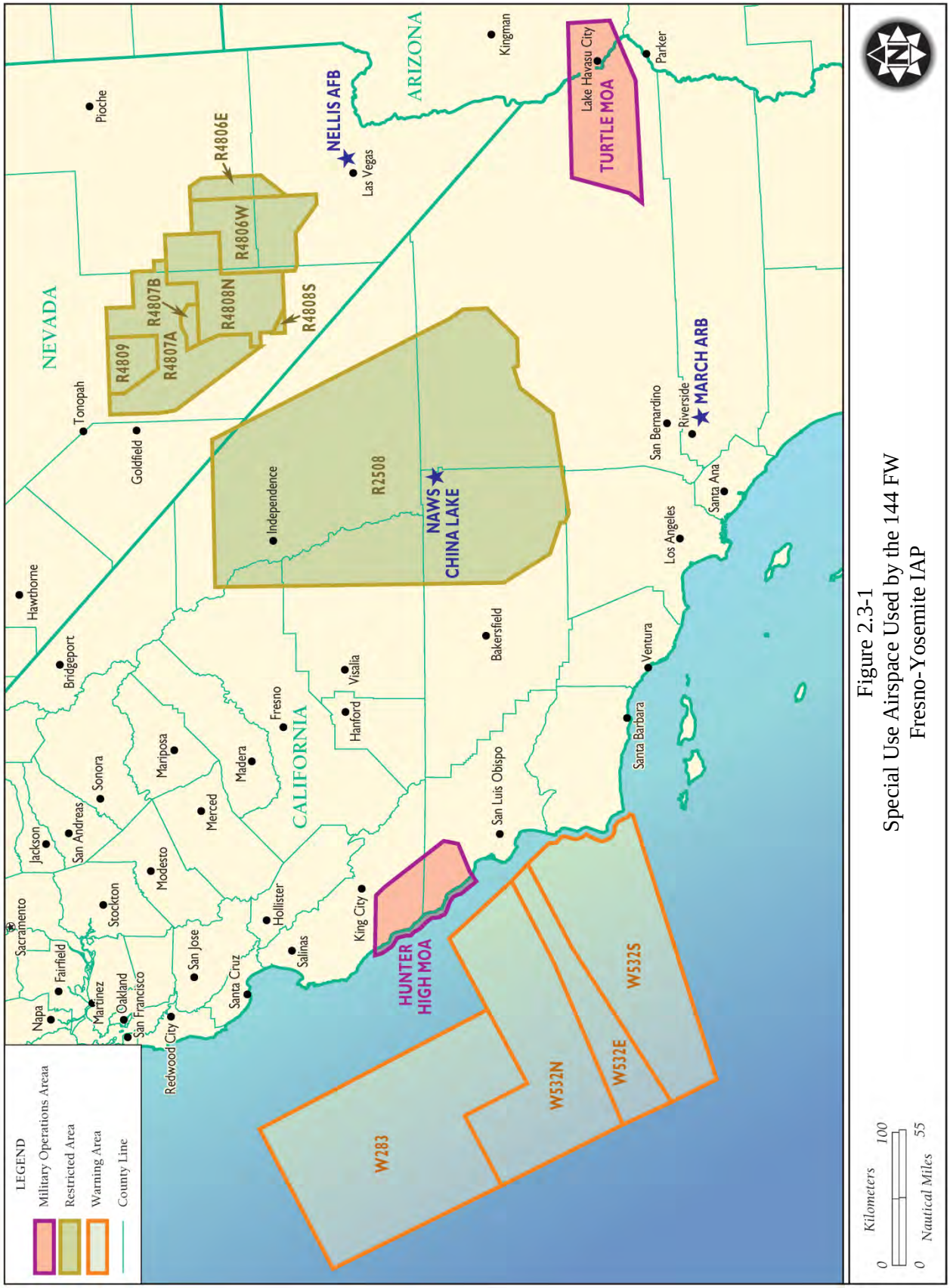


Figure 2.3-1
Special Use Airspace Used by the 144 FW
Fresno-Yosemite IAP

2.3.4 Construction Associated with the Preferred Alternative

Under the Preferred Alternative, the 144 FW would undergo an aircraft conversion and implement minor construction projects for that conversion, as well as other construction, alteration, and demolition projects associated with their IDP at Fresno-Yosemite IAP (Table 2.3-3). These proposed construction projects would meet all criteria specified in Air Force Handbook 32-1084, *Facility Requirements*. Anti-Terrorism/Force Protection (AT/FP) requirements would also be addressed to the extent practicable. Proposed facilities would be sited approximately as shown in Figure 2.3-2. The precise layout and design of proposed facilities is in the early planning stages, and therefore, exact locations and layouts are not finalized. Should locations and final layout of the facilities differ substantially from those anticipated and depicted herein, further environmental analysis would be required. Some facility demolitions are proposed for facilities that are either obsolete, deteriorated beyond repair/renovation, or in the footprint of proposed facilities. Each of these projects is described in more detail in the following sections.

Table 2.3-3. 144 FW Construction Projects Associated with the Preferred Alternative

Project Number	*Project Description*	*Total New Facility Footprint (SF)*	*New Impervious Surface (SF)*	*Estimated Year of Implementation*
Project #1 – Construction of New Aircraft Corrosion Control Hangar and Shops				
HAYW109006	This project would involve the construction of a new 10,600 SF Aircraft Corrosion Control Hangar that is adequate in size to accommodate the new F-15 aircraft.	10,600	0	2013
Project #2 – Expansion of Existing Arm and Dearm Pads				
HAYW109006	This project would include the expansion of 8,700 square yards of new arm and dearm pad space, relocation of the existing Airport Access Road, and the installation of earthen berms.	8,700 square yards (78,300 SF)	8,700 square yards (78,300 SF)	2013
Project #3 – Addition to Existing Munitions Storage Facility				
HAYW069175	This project would include an addition of 4,365 SF to the existing Munitions Storage Facility to accommodate the needs of the new F-15 aircraft.	4,365	4,365	2013
Project #4 – Addition to Existing Non-Destructive Inspection (NDI) Shop				
HAYWXXXXX	The NDI Shop is not adequately sized to accommodate the F-15 NDI equipment.	2,500	0	2013
Total		**95,765 SF (2.2 acres)**	**82,665 SF (1.9 acres)**	

NDI = Non-Destructive Inspection; SF = square foot

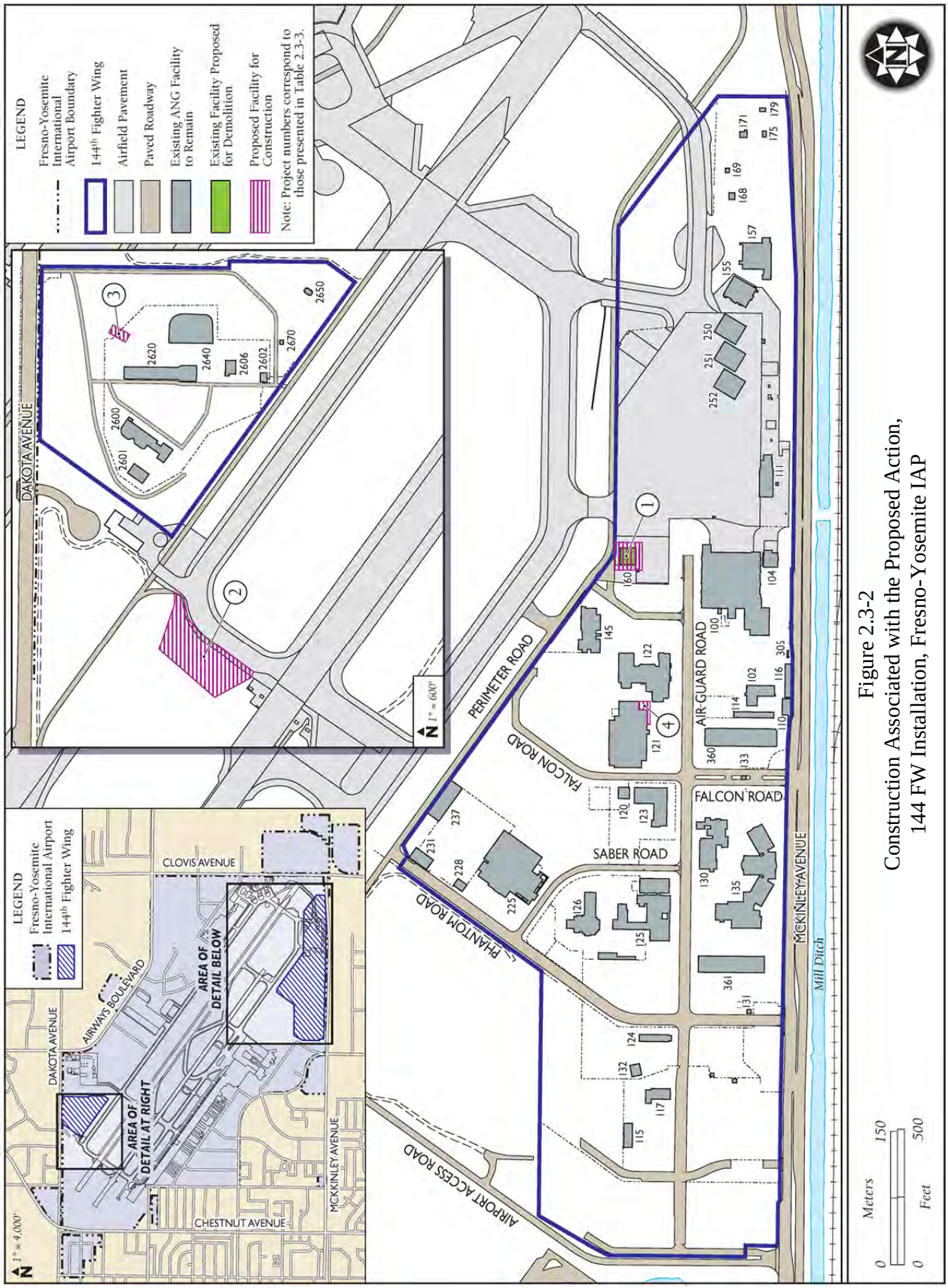


Figure 2.3-2
Construction Associated with the Proposed Action,
144 FW Installation, Fresno-Yosemite IAP

Implementation of the conversion to the F-15 aircraft would require the 144 FW to ensure their installation has properly sized and adequately configured facilities to support 18 F-15 aircraft. Although the Fresno-Yosemite IAP location was deemed to have an acceptable level of facilities to support this conversion, there remain some functional areas that require modification. These are: construction of a new aircraft corrosion control hangar and shops; expansion to the existing arm and dearm pads, an addition to the existing munitions storage, and an addition to the existing Non-Destructive Inspection (NDI) Shop.

The projects described below would incorporate Leadership in Energy and Environmental Design (LEED) and sustainable development concepts, so as to achieve optimum resource efficiency, constructability, sustainability, and energy conservation, while minimizing adverse impacts to the built and natural environments through all phases of their life cycle. This may result in primary facility costs exceeding DoD costing standards, but the initial investment in higher acquisition cost would be rewarded with lower life cycle costs. This is consistent with the requirements of the Energy Policy Act of 2005, 10 USC 2802, EO 13423, and other applicable laws and EOs.

2.3.4.1 Construction of a New Aircraft Corrosion Control Hangar and Shops

The Aircraft Corrosion Control Hangar and Shops provide an environmentally controlled area to wash aircraft, as well as hangar space for corrosion treatment, corrosion repair, paint stripping, and repainting. This facility also provides space for the corrosion control shop, which includes preparation and drying areas, abrasive blasting rooms, booths for mixing and/or applying paint, storage, and administrative areas. The existing Aircraft Corrosion Control Hangar, Building 160, is currently sized at 3,600 SF. The authorized area for the F-15 aircraft is 9,000 SF as identified in the ANG Handbook 32-1084, *Facility Requirements*. The F-15 airframe is larger than the F-16 (see pages 2-2 and 2-3 for aircraft dimensions) and the existing space within the hangar is considered undersized for the F-16 operations currently in use. Without construction of a new Aircraft Corrosion Control Hangar, personnel would be unable to adequately perform corrosion control operations on the F-15 airframe.

Construction of a new Aircraft Corrosion Control Hangar would include reinforced concrete foundations, floor slabs with exterior steel masonry walls, a roof structure, interior walls, and utility systems. Exterior work would include pavements, utility support, fire protection, and drainage improvements. In addition, the existing Aircraft Corrosion Control Hangar (Building 160) would be demolished. The existing facility cannot be modified or expanded to support the F-15 conversion as it is more economically efficient to construct a new hangar due to requirements of the new aircraft.

2.3.4.2 Expansion of Existing Arm and Dearm Pads

The purpose of this project is to provide adequate room for multiple F-15s to properly maneuver while arming and dearming procedures take place. Arm and dearm pads are used for both the arming of aircraft immediately before take-off and the disarming of any weapons retained or not expended upon the aircraft's return. Currently, these arm/dearm areas are undersized for the F-16 aircraft and the current mission of the 144 FW, as the pads currently only support two aircraft. Requirements for the F-15 aircraft include that each arm/dearm pad should be capable of servicing four aircraft at the same time, as identified in ANG Handbook 32-1084, *Facility Requirements*. The proposed construction project would add 8,700 square yards of new arm and dearm pad space allowing the 144 FW to accommodate four aircraft at the same time.

Additionally, in accordance with ANG Handbook 32-1084, *Facility Requirements*, arm and dearm pads should be sited such that armed aircraft are oriented towards the least populated areas or towards earthen revetments (barriers). As a result of the 144 FW joint use of the runways with Fresno-Yosemite IAP, earthen berms would need to be constructed to provide additional safety in the event of any accidental release of munitions held on the F-15 aircraft. The existing arm and dearm pads do not currently satisfy this safety requirement. The new arm and dearm pads would be constructed in accordance with the criteria for ammunition and explosive safety standards as discussed in UFC 3-260-01, *Airfield and Heliport Planning and Design*.

2.3.4.3 Munitions Storage Addition

The purpose of a munitions igloo is to store various explosives. They are earth covered and of either steel or concrete construction. The existing munitions storage area is currently undersized for live missile storage associated with the F-15 mission, as required by ANG Handbook 32-1084, *Facility Requirements*, which requires an authorized area of 8,600 SF for the ACA mission. The current munitions storage igloo is 6,968 SF and is operating with a waiver due to inadequate capacity, which results in inadequate segregation and separation from other munitions, in violation of quantity-distance (QD) guidelines. Implementation of this project would enable the 144 FW to operate the munitions storage facility without the waiver.

2.3.4.4 Non-Destructive Inspection Shop

The NDI Shop function is to provide space for inspection of aircraft components, a process that investigates the quality, integrity, properties, and dimensions of an aircraft without damaging or impairing their serviceability. The existing facility at the 144 FW is undersized for the function per ANG Handbook 32-1084, *Facility Requirements*. Providing additional space for the NDI function would allow personnel to adequately perform their mission by providing increased

space for inspection spaces including a joint oil-analysis program lab, X-ray room, film developing room, tool crib and parts storage, locker space, penetrant storage, magnetic particle lines, and office areas.

There would be a 2,500 SF addition to Building 121 to provide for the required NDI functional space. Further, there would be interior modifications to approximately 1,200 SF of Building 121. The walls of the radiographic exposure room would be lead-lined as specified in National Bureau of Standards Handbook 93.

2.3.5 Personnel Changes Associated with the Preferred Alternative

The 144 FW currently is authorized 1,045 personnel (Table 2.3-4). A total of 1,010 are currently stationed at Fresno-Yosemite IAP, while 35 are stationed at March ARB. Under the Preferred Alternative, the F-15 mission would add an additional 22 military positions to the authorized manning requirement. The changes would include:

- A reduction of 6 positions to the Operations Group.
- An increase of 28 positions to the Maintenance Group.

Table 2.3-4. Comparison of Currently Authorized Personnel and the Preferred Alternative

	Baseline Personnel	*Proposed Personnel*	*Change (+/-)*
Full-time	327	350	+23
Traditional Guard	718	717	-1
Total Authorization	1,045	1,067	+22

Source: Personal communication, Tipton 2011

2.4 ALTERNATIVE #2

2.4.1 Aircraft Conversion

Under Alternative #2, the 144 FW would convert from 18 F-16 aircraft to 24 F-15 aircraft. In general, at least three of these aircraft would always be located at March ARB, serving the ACA mission out of that location. The ACA aircraft at March ARB would be periodically rotated to and from Fresno for maintenance. Thus, 21 F-15 aircraft would be based at their installation at Fresno-Yosemite IAP. Concurrent with the beddown of the 24 F-15 PAA at Fresno-Yosemite IAP and March ARB, the existing fleet of 18 F-16 aircraft would be relocated to the 162 FW at Tucson IAP, Tucson, Arizona under a separate action.

2.4.2 Airfield Operations Associated with Alternative #2

2.4.2.1 Fresno-Yosemite International Airport

Under Alternative #2, there would be approximately a 33 percent increase in the 144 FW's use of the airfield at Fresno-Yosemite IAP (Table 2.4-1). It is expected that the ratio of operations on the runways would be similar to the current distribution but would increase the 144 FW's use by approximately 33 percent over both baseline conditions and the Preferred Alternative. There would be no changes expected to departure/arrival patterns, flight profiles, or use of runways.

Table 2.4-1. Current and Proposed Annual Airfield Operations (24 F-15 PAA)[1]-Fresno-Yosemite IAP

	Arrivals			Departures			Closed Pattern Operations[3]			Total			
Aircraft	*Day[2]*	*Evening*	*Night[2]*	*Day*	*Evening*	*Night*	*Day*	*Evening*	*Night*	*Day*	*Evening*	*Night*	*All*
Current Operations[4]													
F-16[5]	2,017	162	20	2,017	182	0	282	0	0	4,316	344	20	4,680
Other[5]	43,391	4,900	4,202	42,788	3,127	4,646	13,127	729	729	99,306	8,756	9,577	117,639
Total	**45,408**	**5,062**	**4,222**	**44,805**	**3,309**	**4,646**	**13,409**	**729**	**729**	**103,622**	**9,100**	**9,597**	**122,319**
Proposed Operations													
F-16	0	0	0	0	0	0	0	0	0	0	0	0	0
F-15	2,683	215	27	2,683	242	0	374	0	0	5,740	457	27	6,224
Other[5]	43,391	4,900	4,202	42,788	3,127	4,646	13,127	729	729	99,306	8,756	9,577	117,639
Total	**46,074**	**5,115**	**4,229**	**45,471**	**3,369**	**4,646**	**13,501**	**729**	**729**	**105,046**	**9,213**	**9,604**	**123,863**

Notes:
1. An airfield operation represents the single movement or individual portion of a flight in the airfield airspace environment, such as one landing, one take-off, or one transit of the airport traffic area.
   A sortie consists of a single aircraft from take-off through landing. A single sortie generates at least two airfield operations (take-off and landing).
2. Day time operation = 7 a.m. – 7 p.m. local time
   Evening time operations = 7 p.m. – 10 p.m. local time
   Night time operation = 10 p.m. – 7 a.m. local time
3. Each closed pattern consists of two airfield operations: a touch down immediately followed by a take-off; therefore, closed pattern *operations* are divided by 2 to calculate total number of *closed patterns*. These are additional to the initial take-off and final landing of each sortie at the airfield.
4. Current airfield operations from July 1, 2010 through June 30, 2011.
5. General, Commercial (including Air Taxi), and Transient aircraft (civilian and military).

Sources: Personal communications: Lough 2011, Davis 2011, Coffman Associates, Inc. 2012

2.4.2.2 March Air Reserve Base

There would be no change to airfield use at March ARB from the Preferred Alternative. Under Alternative #2, as with the Preferred Alternative, it is expected that three F-15 aircraft would replace three existing F-16 alert aircraft based at March ARB to serve the ACA mission.

2.4.3 Airspace Operations Associated with Alternative #2

Under Alternative #2, the airspace described in Section 2.3.3 for the Preferred Alternative would be used in the same way as described under that alternative. There would be no change to the number, duration, or type of operations conducted in those five airspace parcels from that described under that alternative. However, it is anticipated that there could be use of other

existing airspace in which the 120 FW F-15 aircraft currently fly, and thus there would be a one-for-one replacement in that airspace (144 FW aircraft utilizing airspace the 120 FW aircraft currently fly). A portion of the 120 FW training is currently conducted in the Nellis Range. In the event that Alternative #2 was selected, the additional six aircraft would continue to use the Nellis Range for the same number of training sorties currently flown by the 120 FW. For this reason, any additional airspace that could be used by the 144 FW flying the F-15 aircraft will not be discussed further in this EIS.

2.4.4 Construction Associated with Alternative #2

Construction associated with beddown of 24 F-15 aircraft at Fresno-Yosemite IAP would be the same as that described under the Preferred Alternative.

2.4.5 Personnel Changes Associated with Alternative #2

Under Alternative #2, the F-15 mission would add an additional 29 military positions to the authorized manning requirement (Table 2.4-2). The changes would include:

- An increase of 6 military positions to the Operations Group.
- An increase of 31 positions to the Maintenance Group.

Table 2.4-2. Comparison of Currently Authorized Personnel and Alternative #2

	Baseline Personnel	*Alternative #2 Personnel*	*Change (+/-)*
Full-time	327	364	+37
Traditional Guard	718	710	-8
Total Authorization	1,045	1,074	+29

Source: Personal communication, Tipton 2011

2.5 NO ACTION ALTERNATIVE

The CEQ regulation 40 CFR § 1502.14(d) specifically requires analysis of the "No Action" alternative in all NEPA documents. Under the No Action Alternative, the proposed aircraft conversion would not occur, and the 144 FW would not implement the components described above under either the Preferred Alternative or Alternative #2. There would be no change in based aircraft; use of the airfield at Fresno-Yosemite IAP; or use of SUA, construction, or personnel assigned to the 144 FW. Under the No Action Alternative, the 144 FW would eventually be without an aircraft or mission, as with the exception of the six alert aircraft (three at Fresno and three at March ARB), the F-16 aircraft will be relocated to the 162 FW during the 2012 calendar year. The 144 FW would continue to conduct their current mission using the existing 18 F-16 PAA until such time as the aircraft are relocated to the 162 FW. Following the relocation, the 144 FW would have no aircraft at Fresno-Yosemite IAP to meet their mission needs. The alert missions and associated aircraft at both Fresno-Yosemite IAP and March ARB

would remain under the No Action Alternative even if the other F-16 aircraft associated with the 144 FW were relocated to the 162 FW. The elimination of the 144 FW mission at Fresno-Yosemite IAP would not meet the identified needs of the ANG, the USAF, or the State of California; however, this alternative is carried forward for analysis in this EIS per CEQ regulations, and as a baseline from which to compare the potential impacts of the Proposed Action and alternatives.

2.6 COMPARISON OF ANTICIPATED IMPACTS AMONG ALTERNATIVES

Comparing and differentiating among alternatives comprises a fundamental premise of NEPA. A summary of the components of each alternative is presented in Table 2.6-1, which can then be used to compare the anticipated impacts of each alternative. A summary and comparison of the anticipated impacts associated with implementation of each alternative for this action is presented in Table 2.6-2.

Table 2.6-1. Summary of Alternatives

	Preferred Alternative	*Alternative #2*	*No Action Alternative*
Fresno-Yosemite IAP			
Aircraft Type	F-15	F-15	F-16 until transfer
Number of Aircraft (PAA)	18	24	18, until transfer of F-16s; then only 3 for ACA mission at both Fresno-Yosemite IAP and Detachment 1 at March ARB
Number of Operations Annually	4,680	6,224	Following transfer of F-16s, decrease to ACA mission only until new mission/aircraft identified
Construction	4 projects	Same 4 projects	No construction
Personnel	+22	+29	Unknown reduction over time until new mission/aircraft identified
March ARB			
Aircraft Type	F-15	F-15	F-16
Number of Aircraft	3	3	3
Number of Operations	1,060[1]	1,060[1]	1,060[1]
Construction	None	None	None
Personnel	No change	No change	No change

Notes: 1. This number is exactly what is being flown at March ARB today; however, it is higher than the previous number evaluated in previous noise studies. Detachment 1 flies 122 closed patterns annually at March ARB, which were not included in previous noise studies, thus it will be shown as an increase in the environmental consequences sections (Section 4.1.2.1 and 4.1.2.2).

ACA = Aerospace Control Alert; ARB = Air Reserve Base; IAP = International Airport; PAA = Primary Assigned Aircraft

Table 2.6-2. Summary of Impacts
(Page 1 of 8)

Preferred Alternative	*Alternative #2*	*No Action Alternative*
Noise		
Fresno-Yosemite IAP: Under this alternative, the number of operations conducted by the 144 FW would remain the same as those currently flown; however, as a result of conversion to the F-15 aircraft, the noise contours would expand slightly in all directions from the baseline contours. Overall, the number of acres contained within the CNEL 65 dB and greater exposure area would increase by approximately 815 acres, or 41 percent. Approximately 724 of these acres would be off the airport property. Roughly 3,304 persons would be affected by CNEL of 65 dB and above with 1,873 persons newly affected. There are no residences located within the 80+ dB noise contour, therefore there would be no potential hearing loss risk associated with these areas. The primary source of noise from the facility construction would be the equipment involved in construction activities. Construction noise would be intermittent and short-term in duration. Equipment used during the facility construction would contribute little to the general background noise levels around the airfield. Impacts to the noise environment would be adverse. Implementation of a revised Airport Part 150 Study by the FAA would establish mitigation measures that would minimize the impacts of the increase in noise. ***March ARB:*** Under this alternative, noise contours would retain the same basic shape as the baseline contours; however, the acreage contained within the 65 dB noise contour and greater would increase by 424 acres. The noise contours remain relatively unchanged except for the west side of the airfield, where there would be an increase of acreage above CNEL 65 dB approaching I-215 and to the east of the runway approaching Heacock Street. Land uses within the expanded 65 dB noise contour include industrial, public/quasi-public, and rural residential (although no homes are located within the area contained within the 65 dB contour). The 80+ dB noise contours do not go off March ARB, nor do they intersect any base housing; therefore, there would be no potential hearing loss risk associated with this proposal. There are no noise sensitive receptors located within the proposed noise contours for the Preferred Alternative.	***Fresno-Yosemite IAP:*** Under Alternative #2, there would be approximately a 33 percent increase in the number of operations conducted by the 144 FW at Fresno-Yosemite IAP. As a result, the noise contours would expand in all directions compared to the baseline contours. Overall, the number of acres contained within the CNEL 65 dB and greater exposure area would increase by approximately 1,221 acres, or 62 percent. Roughly 4,876 persons would be affected by CNEL of 65 dB and above with 3,455 persons newly affected. There are no residences located within the 80+ dB noise contour, therefore there would be no potential hearing loss risk associated with these areas. Construction noise would be the same as described for the Preferred Alternative. Impacts to the noise environment would be adverse. Implementation of a revised Airport Part 150 Study by the FAA would establish mitigation measures that would minimize the impacts of the increase in noise. ***March ARB:*** Impacts would be as described for the Preferred Alternative.	***Fresno-Yosemite IAP:*** Under this alternative, there would be a temporary reduction in the size of the noise contours at Fresno-Yosemite IAP until a new mission and aircraft could be based there. ***March ARB:*** Under this alternative, there would be no change in the noise environment at March ARB from baseline, as the F-16 alert aircraft would remain.

Table 2.6-2. Summary of Impacts
(Page 2 of 8)

Preferred Alternative	*Alternative #2*	*No Action Alternative*
Air Quality		
Fresno-Yosemite IAP: Annual emissions under the Preferred Alternative (including both construction and airfield operations) would be below the CAA major source thresholds for attainment pollutants, and would be below the General Conformity Rule *de minimis* thresholds for all pollutants except NO_x. The Final Conformity Determination ensures that the Preferred Alternative conforms to the SIP. ***March ARB:*** Under this alternative, emissions from operations would be below General Conformity Rule *de minimis* thresholds for all pollutants.	***Fresno-Yosemite IAP:*** Annual emissions under Alternative #2 (including both construction and airfield operations) would be below the CAA major source thresholds for attainment for all pollutants except NO_x and VOCs. ***March ARB:*** Impacts would be as described for the Preferred Alternative.	***Fresno-Yosemite IAP:*** Under the No Action Alternative, no change in emissions from baseline conditions would occur until the F-16 aircraft are transferred to the 162 FW. At that time, emissions would be reduced until such a time as the USAF identified a new mission/aircraft for the 144 FW. ***March ARB:*** Under this alternative, no change in emissions from baseline conditions would occur. There would therefore be no potential for adverse air quality impacts beyond existing conditions.
Land Use		
Fresno-Yosemite IAP: As a result of the Preferred Alternative, an additional 724 acres of land off-airport property would be exposed to CNEL of 65 dB or greater. Overall, there would be an estimated increase of 1,873 persons residing within the noise contours. To the west of the installation, additional industrial, residential, educational, and commercial land uses would be exposed to aircraft CNEL of 65 dB. To the south and east the additional land exposed would be primarily industrial and open space, with a small portion of residential area. Under the Preferred Alternative there would be three new schools within the noise contours of 65 dB and above. In addition, two additional churches would be impacted by the new noise contours. Proposed construction activities would be short-term and intermittent but may cause minor traffic and/or noise disruptions to local businesses as well as employees at the 144 FW installation. However, construction activities would be temporary and would occur during normal business hours. Furthermore, all of the construction activities would occur on the 144 FW installation and would not	***Fresno-Yosemite IAP:*** Under this alternative, approximately 1,221 acres of land off the airport property would be newly exposed to CNEL of 65 dB or greater. Overall, there would be an estimated increase of 3,445 persons residing within the noise contours. To the west of the installation, additional industrial, residential, educational, and commercial land uses would be exposed to aircraft CNEL between 65 dB and 75 dB. To the south and east the additional land exposed would be primarily industrial and open space, with a small portion of residential area. Under Alternative #2 there would be four new schools	***Fresno-Yosemite IAP:*** Under this alternative, there would be a temporary reduction in the size of the noise contours at Fresno-Yosemite IAP until a new mission and aircraft could be based there.

Table 2.6-2. Summary of Impacts
(Page 3 of 8)

Preferred Alternative	*Alternative #2*	*No Action Alternative*
Land Use (continued)		
introduce any new land uses. Impacts to land use would be adverse, particularly as a result of new residential areas within the noise contours. Implementation of a revised Airport Part 150 Study by the FAA would establish mitigation measures that would minimize the impacts to land use. ***March ARB:*** This alternative would generate an increase of 424 acres exposed to CNEL of 65 dB and greater, with 336 of these acres occurring off the installation. The land uses that are newly contained within these noise contours are within industrial areas; there is no residential area included in these contours.	exposed to aircraft CNEL of 65 dB or above. Also, three additional churches would be impacted by the new noise contours. Proposed construction activities would be as described for the Preferred Alternative. Impacts to land use would be adverse, particularly as a result of new residential areas within the noise contours. Implementation of a revised Airport Part 150 Study by the FAA would establish mitigation measures that would minimize the impacts to land use. ***March ARB:*** Impacts would be as described for the Preferred Alternative.	***March ARB:*** Under this alternative, there would be no change to baseline land use at March ARB.
Socioeconomics and Environmental Justice		
Fresno-Yosemite IAP: Of the roughly 3,304 persons that would be affected by CNEL between 65 and 70 dB, approximately 2,424 would be minority (73.4 percent). This is an increase of 2.2 percent of minorities affected over baseline conditions. The number of low-income persons affected by CNEL greater than 65 dB would be approximately 733 (22.2 percent of the total). Overall, the number of persons affected by CNEL of 65 dB and greater would increase under this alternative, and the percentage of minority and low-income persons affected would increase slightly. Economic activity associated with proposed construction activities at the 144 FW installation, such as employment and materials purchasing, would provide short-term economic benefits to the local economy. However, short-term beneficial impacts resulting from construction payrolls and materials purchased would be negligible on a regional scale. Under this alternative, the F-15 mission would add an additional 22 military positions. Total payroll associated with these personnel would amount to an estimated salary increase of $1,571,761 for full-time employees.	***Fresno-Yosemite IAP:*** Under Alternative #2, population contained within the noise contours at Fresno-Yosemite IAP would increase from baseline and the Preferred Alternative levels. Of the roughly 4,876 persons that would be affected by CNEL greater than 65 dB, approximately 3,581 would be minority (73.4 percent). This is an increase of 2.2 percent of minorities affected. The number of low-income persons affected by CNEL greater than 65 dB would be approximately 1,065 (21.8 percent). Economic activity associated with proposed construction activities at the 144 FW installation would	***Fresno-Yosemite IAP:*** As a result of the No Action Alternative, the total population that would be impacted by noise would decrease temporarily until a new mission/aircraft was based at the installation. This alternative would have a negative impact on the surrounding communities due to the loss of jobs for 144 FW personnel. The alert mission and associated aircraft at Fresno-Yosemite IAP would remain under the No Action Alternative. Impacts to socioeconomics from the No Action Alternative would be negative. ***March ARB:*** Under this alternative, there would be no change to baseline

Table 2.6-2. Summary of Impacts
(Page 4 of 8)

Preferred Alternative	*Alternative #2*	*No Action Alternative*
Socioeconomics and Environmental Justice (continued)		
March ARB: Under this alternative, no construction would occur on March ARB. Therefore, there would be no economic activity associated with proposed construction activities. In addition, there would be no change in personnel numbers for March ARB under this alternative. Therefore, there would be no impact to housing or population. The noise contours at March ARB would increase minimally; however, they would not contain any residential areas. As a result, there would be no disproportionate impacts to minority or low-income populations in the vicinity of March ARB.	be as described for the Preferred Alternative. Under this alternative, the F-15 mission would add an additional 29 military positions. Total payroll associated with these personnel would amount to an estimated salary increase of $2,071,867 for full-time employees. ***March ARB:*** Impacts would be as described for the Preferred Alternative.	socioeconomics at March ARB.
Safety		
Fresno-Yosemite IAP: Providing new and renovated facilities for the 144 FW that support operational requirements and are properly sited with adequate space and a modernized supporting infrastructure would generally enhance ground and flight safety during required operations, training, maintenance and support procedures, security functions, and other activities conducted by the 144 FW. AT/FP requirements have also been addressed to the extent practicable in all facility construction projects. The fire and crash response capability currently provided by the 144 FW at Fresno-Yosemite IAP is sufficient to meet all requirements. The aircraft conversion and mission change would not increase the number of daily operations flown by the 144 FW. Therefore, no adverse impacts to ground safety are anticipated at the airfield. Therefore, there would be no increase in the safety risk to aircrews and personnel due to the accident and mishap potential associated with aircraft operations. Under this alternative, the 144 FW would add a 4,365 SF addition to the existing munitions storage area. This would expand the current QD arcs slightly to the northeast and the southeast, and would remain within the installation boundary. All facilities would be sited to be in compliance with the proposed QD arcs and no unauthorized construction would occur within the proposed QD arcs. Impacts to safety under this alternative would be negligible.	***Fresno-Yosemite IAP:*** While operations would increase approximately 33 percent over the Preferred Alternative, impacts to safety would be expected to be similar to that described for the Preferred Alternative. ***March ARB:*** Impacts would be as described for the Preferred Alternative.	***Fresno-Yosemite IAP:*** Impacts to safety as a result of the No Action Alternative would be temporarily beneficial, due to a decrease in operations as well as personnel, which would result in less opportunity for safety issues until a new mission and/or aircraft was established at the installation. ***March ARB:*** Under this alternative, there would be no change to safety at March ARB as a result of the No Action Alternative.

Table 2.6-2. Summary of Impacts
(Page 5 of 8)

Preferred Alternative	*Alternative #2*	*No Action Alternative*
Safety (continued)		
March ARB: No construction would occur at March ARB under this alternative. The fire and crash response capability currently provided by the 144 FW at March ARB is sufficient to meet all requirements. No adverse impacts to ground safety are anticipated at the airfield. There would be a minimal increase in airfield operations at March ARB from those previously analyzed. No increase in the safety risk is expected due to the accident and mishap potential associated with aircraft operations. Impacts to safety would be negligible.		
Hazardous Materials and Wastes		
Fresno-Yosemite IAP: The type of hazardous materials needed for maintenance and operation of the F-15 would be expected to remain similar to those currently used for maintenance and operation of the F-16 fleet; however, the proposed F-15 aircraft would no longer require the use of hydrazine, a highly toxic and unstable compound. Since the F-15 aircraft is a dual engine aircraft (compared with the single engine F-16 aircraft), the throughput of petroleum substances (e.g., fuels, oils) used during operations would be expected to increase from what is currently used to maintain the F-16 fleet. Additionally, it is expected that short-term increases would be realized in terms of the quantity of fuel stored and used during construction activities. None of the proposed construction projects would occur on or in the vicinity of the existing ERP sites within the 144 FW installation. The 144 FW would continue to operate within its small quantity generator hazardous waste permit conditions. Impacts from hazardous materials and wastes would be negligible under this alternative. ***March ARB:*** This alternative does not include any ground disturbance through construction at March ARB, and the there is no change to the proposed number of operations or type of hazardous materials and wastes generated or stored at March ARB. Further, all scheduled maintenance on the alert aircraft at March ARB is conducted at Fresno-Yosemite IAP. Impacts from hazardous materials and wastes would be negligible under this alternative.	***Fresno-Yosemite IAP:*** While operations would increase approximately 33 percent over the Preferred Alternative, impacts from hazardous materials and wastes would be expected to be similar to that described for the Preferred Alternative. There would be additional deliveries of fuels and oils, but this would not be expected to result in any negative impacts. ***March ARB:*** Impacts would be as described for the Preferred Alternative.	***Fresno-Yosemite IAP:*** Baseline hazardous materials and waste under the No Action Alternative would experience a substantial reduction in the type and quantity of hazardous materials and associated hazardous waste streams associated with the loss of a flying mission. This reduction in hazardous waste streams would be temporary in nature until the flying mission was reinstated by the USAF. As the proposed construction would not occur, there would be no temporary increase in hazardous materials and wastes associated with these projects. F-16 aircraft at Fresno-Yosemite IAP would remain even if the other F-16 aircraft associated with the 144 FW were relocated to the 162 FW. ***March ARB:*** There would be no change to hazardous materials and wastes at March ARB as a result of the No Action Alternative.

Table 2.6-2. Summary of Impacts
(Page 6 of 8)

Preferred Alternative	*Alternative #2*	*No Action Alternative*
Infrastructure		
Fresno-Yosemite IAP: Demand for electricity and natural gas would be expected to increase slightly as a result of the increase in personnel (22), and the building space and facilities to be constructed would require additional electricity. In addition, wastewater, solid waste, demand for potable water, and traffic would temporarily increase during construction, and would increase slightly in the long-term due to increase in personnel. The proposed construction and demolition activities could temporarily affect the quality of stormwater runoff through potential increases in soil erosion. BMPs would be implemented during construction and demolition to minimize runoff. Any new facilities and additions associated with the Proposed Action would be implemented with more energy efficient design standards and utility systems than are currently in place. In addition, construction projects would incorporate LEED and sustainable development concepts to achieve optimum resource efficiency, sustainability, and energy conservation. In general, impacts to infrastructure would be minimal as a result of this alternative. ***March ARB:*** This alternative does not include any construction at March ARB, and there is no change to the proposed number of authorized personnel at March ARB. Therefore, there would be no impacts to infrastructure at March ARB as a result of the Preferred Alternative.	***Fresno-Yosemite IAP:*** While the increase in personnel would be slightly higher under this alternative (29 versus 22) impacts to infrastructure would be expected to be similar to that described for the Preferred Alternative. In general, impacts to infrastructure would be minimal as a result of this alternative. ***March ARB:*** Impacts would be as described for the Preferred Alternative.	***Fresno-Yosemite IAP:*** Under this alternative, a decrease in population would in turn decrease demand for utilities, including the consumption of electricity, natural gas, and potable water and the generation of wastewater and solid waste. Traffic within the installation and surrounding community would also decrease, until a new mission was identified. Therefore, no enduring impacts to infrastructure and transportation would occur as a result of implementation of the No Action Alternative. ***March ARB:*** Impacts are as described for the Preferred Alternative and Alternative #2.
Earth Resources		
Fresno-Yosemite IAP: While proposed construction would require some minor modification of terrain by cut and fill techniques and other minor grading, no major topographic or geologic features would be affected as a result of implementation of these activities. There are no limitations associated with the three soils types found within the project area for the type of construction activities proposed. Under this alternative, there would be approximately 2.2 acres of surface disturbance with 1.9 acres of net new impervious surface as a result of proposed new construction. To minimize potential impacts associated with erosion, runoff, and sedimentation, BMPs as described in the 144 FW SWPPP would be implemented during and following the construction period. Impacts to earth resources would be minor. ***March ARB:*** There is no proposed surface disturbance/construction at March ARB. There would be no impacts to earth resources.	***Fresno-Yosemite IAP:*** Impacts would be similar to those described under the Preferred Alternative. ***March ARB:*** Impacts would be as described for the Preferred Alternative.	***Fresno-Yosemite IAP:*** Under this alternative, baseline earth resources would remain unchanged. Therefore, no significant impacts to earth resources would occur as a result of implementation of this alternative. ***March ARB:*** Impacts are as described for the Preferred Alternative and Alternative #2.

Table 2.6-2. Summary of Impacts
(Page 7 of 8)

Preferred Alternative	*Alternative #2*	*No Action Alternative*
Water Resources		
Fresno-Yosemite IAP: Impacts to water resources as a result of this alternative would be minimal. There would be approximately 1.9 acres of net new impervious surface from the proposed facility construction and demolition. This could result in localized increases in surface runoff and total suspended particulates to nearby surface waters. However, any increase in surface water runoff as a result of the proposed construction would be attenuated through the use of temporary and/or permanent drainage management features such as use of bioretention, filter strips, vegetated buffers, grassed swales, infiltration trenches, water harvesting, and other applicable BMPs. To minimize potential impacts associated with erosion, runoff, and sedimentation, BMPs as described in the 144 FW SWPPP would be implemented during and following the construction period. All proposed construction is outside the 100-year floodplain. Impacts to water resources would be negligible. ***March ARB:*** There is no proposed surface disturbance/construction at March ARB. There would be no impacts to water resources.	***Fresno-Yosemite IAP:*** Impacts would be similar to those described under the Preferred Alternative. ***March ARB:*** Impacts would be as described for the Preferred Alternative.	***Fresno-Yosemite IAP:*** Under this alternative, baseline water resources would remain unchanged. Therefore, no significant impacts to water resources would occur as a result of implementation of this alternative. ***March ARB:*** Impacts are as described for the Preferred Alternative and Alternative #2.
Biological Resources		
Fresno-Yosemite IAP: Noise levels are expected to increase from baseline with the conversion to the F-15 aircraft. However, these noise levels from operations and construction are not expected to impact wildlife in the area because they are likely accustomed to elevated noise levels associated with current aircraft and military operations. The opportunity for bird-aircraft strikes to occur, including those with migratory birds would remain the same as baseline. No threatened and endangered or special status species are currently known to reside on Fresno-Yosemite IAP or within the land area under the projected noise contours. Construction-related impacts to the vegetation at the installation would be minor due to the lack of sensitive vegetation in the project area. There are no wetland areas that occur within 144 FW installation. Impacts to biological resources would be minor. ***March ARB:*** Noise levels are expected to increase slightly from baseline with the conversion to the F-15 aircraft; however, these noise levels from operations are not expected to impact wildlife in the area because they are likely accustomed to elevated noise levels associated with aircraft and military	***Fresno-Yosemite IAP:*** Impacts would be similar to those described under the Preferred Alternative. ***March ARB:*** Impacts would be as described for the Preferred Alternative.	***Fresno-Yosemite IAP:*** There would be negligible impacts to biological resources as a result of this alternative. Wildlife found at the airport is well-adjusted to the noisy, industrial environment. ***March ARB:*** Impacts are as described for the Preferred Alternative and Alternative #2.

Table 2.6-2. Summary of Impacts
(Page 8 of 8)

Preferred Alternative	*Alternative #2*	*No Action Alternative*
Biological Resources (continued)		
operations. The opportunity for bird-aircraft strikes to occur, including those with migratory birds would remain the same as baseline. No impacts to any federally or state threatened, endangered, or special status species is expected.		
Cultural Resources		
Fresno-Yosemite IAP: As a result of the 2010 Integrated Cultural Resources Management Plan (144 FW 2010a), the 144 FW installation is considered to have no to low probability of containing archaeological resources. In the unlikely event that archaeological or human remains were identified during proposed construction activities, the 144 FW would immediately cease all activities in the area of the discovery and contact the 144 FW Environmental Manager who would contact a qualified archaeologist to evaluate the discovery. No architectural resources have been identified to date at the 144 FW. Under the Preferred Alternative, none of the buildings proposed for demolition (Building 160) or addition (Buildings 121 and 2640) have been reviewed for NRHP eligibility as they have been too recently constructed, and they were not recommended for survey or evaluation in the 2010 Integrated Cultural Resources Management Plan. There would be no impacts to cultural resources as a result of implementation of this alternative. ***March ARB:*** There is no proposed surface disturbance/construction at March ARB. The change in noise contours is nominal and does not contain any sensitive areas. There would be no impacts to cultural resources.	***Fresno-Yosemite IAP:*** Impacts would be similar to those described under the Preferred Alternative. ***March ARB:*** Impacts would be as described for the Preferred Alternative.	***Fresno-Yosemite IAP:*** Under this alternative, baseline cultural resources would remain unchanged. ***March ARB:*** Impacts are as described for the Preferred Alternative and Alternative #2.

144 FW = 144th Fighter Wing; 162 FW = 162d Fighter Wing; ARB = Air Reserve Base; AT/FP = Anti-Terrorism/Force Protection; BMP = Best Management Practice; CAA = Clean Air Act; CNEL = Community Noise Equivalent Level; dB = decibel; ERP = Environmental Restoration Program; FAA = Federal Aviation Administration; I-215 = Interstate 215; IAP = International Airport; LEED = Leadership in Energy and Environmental Design; NO_x = oxides of nitrogen; NRHP = National Register of Historic Places; QD = quantity-distance; SF = square foot; SIP = State Implementation Plan; SWPPP = Stormwater Pollution Prevention Plan; USAF = United States Air Force; VOC = volatile organic compound

CHAPTER 3
AFFECTED ENVIRONMENT

This section describes the natural and human environment that would be affected by implementation of the various alternatives described in Chapter 2. In describing the affected environment, a framework for understanding the potential direct, indirect, and cumulative effects of each alternative, including the No Action Alternative is provided.

As directed by guidelines contained in NEPA, CEQ regulations, and 32 CFR 989, *Environmental Impact Analysis Process*, the description of the affected environment focuses only on those resource areas potentially subject to impacts and should be commensurate with the anticipated level of environmental impact. A number of resources discussed below would not be impacted by implementation of the alternatives; therefore, they will not be analyzed further in this EIS.

- **Airspace** – As described in Chapter 2, the 144 FW flies approximately 2,600 annual sortie operations in SUA, at both high altitude as well as low altitude air-to-air training, with the largest majority in the Warning Areas overwater and in the Restricted Area at the China Lake Complex. There would be no expected change to the frequency of use, duration of use, types of aircraft flown in the SUA, or number of operations conducted in any of the SUA used; therefore, this resource topic will not be discussed further in this EIS.

- **Coastal Resources** – Fresno-Yosemite IAP is located in an inland area not subject to coastal laws or regulations. Therefore, no coastal resources would be impacted by the Proposed Action.

- **Secondary (Induced)** – The Proposed Action would not result in a change to operational characteristics of the airport.

- **Light Emission and Visual Resources** – The Proposed Action would not include components that would affect light emission or visual resources.

- **Department of Transportation Section 4(f)** – Several parks and recreational areas are located in the airport vicinity; however, none would be impacted by the Proposed Action.

- **Farmland** – There are no prime farmlands on the 144 FW property, and all construction would occur on previously disturbed areas. There would be no potential impact to prime farmlands.

- **Wild and Scenic Rivers** – The closest Wild and Scenic River to Fresno-Yosemite IAP is the Kings River, located approximately 42 miles to the east; it would not be directly or indirectly impacted by the Proposed Action.

The affected environment is described for 11 resource topics: Noise, Air Quality, Land Use, Socioeconomics and Environmental Justice, Safety, Solid and Hazardous Materials and Wastes, Infrastructure, Earth Resources, Water Resources, Biological Resources, and Cultural Resources. The sections for each resource topic begin with an introduction that defines the resources addressed in the section, summarizes applicable laws and regulations, defines key terms as necessary, and describes the region of influence (ROI) within which the effects from implementation of the various alternatives are anticipated to occur. The ROI varies from resource to resource, but in general, effects from the proposed activities are expected to be concentrated in Fresno County, and to a minor extent, Riverside County.

3.1 NOISE

3.1.1 Definition of Resource

Noise is considered to be unwanted sound that interferes with normal activities or otherwise diminishes the quality of the environment. It may be intermittent or continuous, steady or impulsive, stationary or transient. Stationary sources are normally related to specific land uses (e.g., housing tracts or industrial plants). Transient noise sources move through the environment, either along relatively established paths (e.g., highways, railroads, and aircraft flight tracks around airports), or randomly. There is wide diversity in responses to noise that not only vary according to the type of noise and the characteristics of the sound source, but also according to the sensitivity and expectations of the receptor, the time of day, and the distance between the noise source (e.g., an aircraft) and the receptor (e.g., a person or animal). The duration of a noise event, and the number of times noise events occur, are also important considerations in assessing noise impacts.

The physical characteristics of noise, or sound, include its intensity, frequency, and duration. Sound is created by acoustic energy, which produces minute pressure waves that travel through a medium, like air, and are sensed by the ear drum. This may be likened to the ripples in water that would be produced when a stone is dropped into it. As the acoustic energy increases, the intensity or amplitude of these pressure waves increase, and the ear senses louder noise.

The unit used to measure the intensity of sound is the decibel (dB). Sound intensity varies widely (from a soft whisper to a jet engine) and is measured on a logarithmic scale to accommodate this wide range. The logarithm, and its use, is nothing more than a mathematical tool that simplifies dealing with very large and very small numbers. For example, the logarithm

of the number 1,000,000 is 6, and the logarithm of the number 0.000001 is -6 (minus 6). As more zeros are added before or after the decimal point, converting these numbers to their logarithms greatly simplifies calculations that use these numbers.

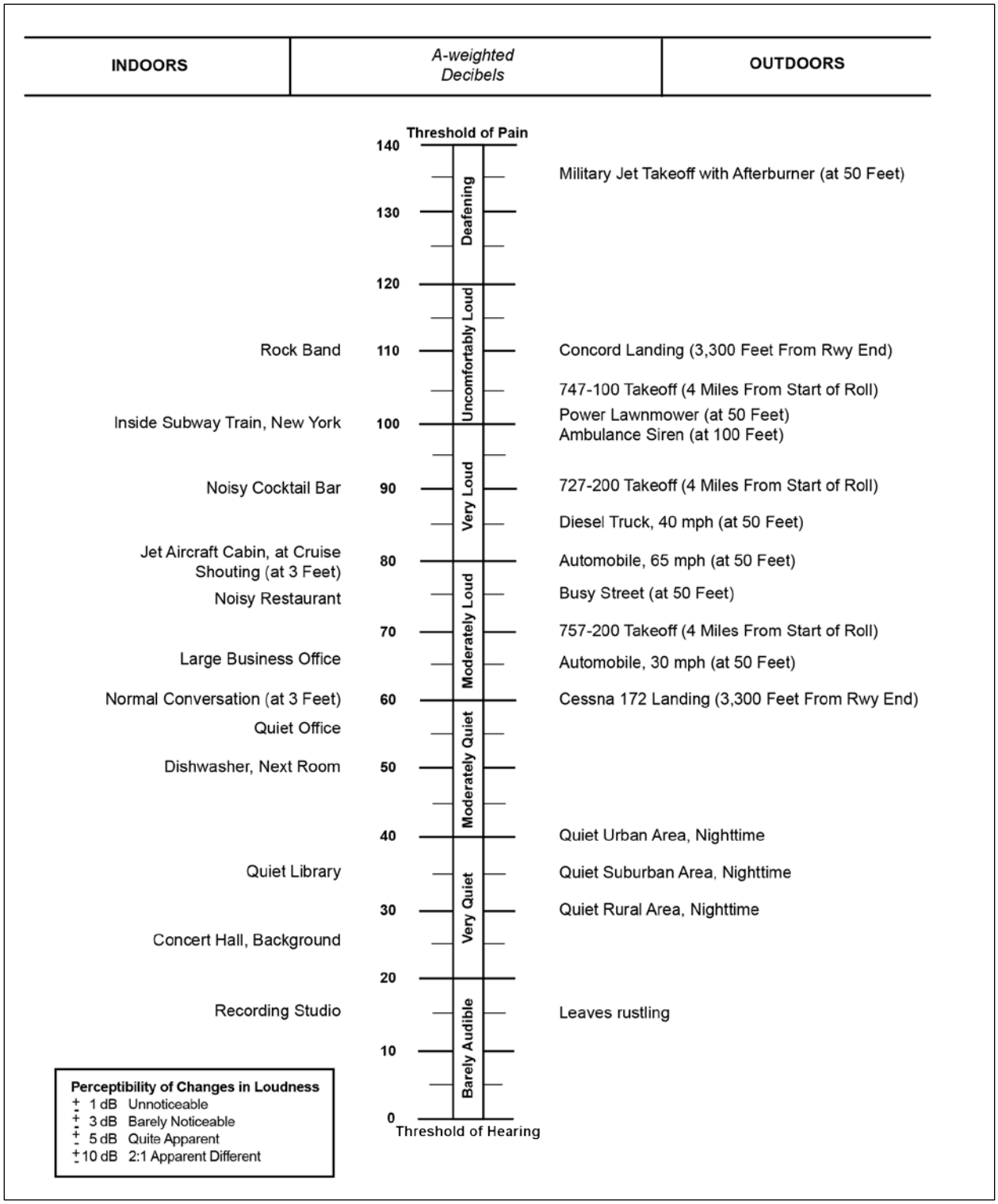
The frequency of sound is measured in cycles per second, or hertz (Hz). This measurement reflects the number of times per second the air vibrates from the acoustic energy. Low frequency sounds are heard as rumbles or roars, and high frequency sounds are heard as screeches. Sound measurement is further refined through the use of "A-weighting." The normal human ear can detect sounds that range in frequency from about 20 Hz to 15,000 Hz. However, all sounds throughout this range are not heard equally well. Therefore, through internal electronic circuitry, some sound meters are calibrated to emphasize frequencies in the 1,000 to 4,000 Hz range. The human ear is most sensitive to frequencies in this range, and sounds measured with these instruments are termed "A-weighted," and are shown in terms of A-weighted decibels (dBA). Sound levels that are measured using A-weighting are often denoted by the unit dBA or dB(A) rather than dB. When the use of A-weighting is understood, the adjective "A-weighted" is often omitted and the measurements are expressed as dB. In this report dB units refer to A-weighted sound levels.

As a basis for comparison when noise levels are considered, it is useful to note that at distances of about 3 feet, typical kitchen appliances range from about 83 to 88 dB, and rock bands approach 110 dB. Figure 3.1-1 depicts typical A-weighted sound pressure levels for various common sources. As shown in the figure, a normal conversation from about 3 feet would typically be at approximately 60 dB.

The ROI for the Proposed Action includes Fresno-Yosemite IAP and its immediate vicinity, along with March ARB and its immediate vicinity.

3.1.1.1 Noise Metrics

A variety of metrics may be used to assess the impacts of noise. Depending on the specific situation, appropriate analysis may include single event or averaged metrics. Single event metrics are used to assess the potential impacts of noise on structures and animals, and are sometimes used in the assessment of human effects. Sound exposure level (SEL), a single event metric, is commonly used to evaluate sleep disturbance. Averaged noise metrics are useful in characterizing the overall noise environment and are primarily used to analyze community (population) exposure to noise. Averaged noise exposure is expressed as the Day-Night Average Sound Level (DNL) metric. The USEPA selected DNL as the uniform descriptor of averaged noise exposure. Subsequently, federal agencies, including the DoD, adopted DNL for expressing averaged sound. Appendix B provides more detailed information regarding noise and the analysis of impacts from changes to the noise environment.



Source: State of California Department of Transportation 2002

Figure 3.1-1. Typical Decibel Level of Common Sounds

Single Event Sound Metrics

Although the highest dB level measured during an event (i.e., maximum sound level or L_{max}) is the most easily understood descriptor for a noise event, alone it provides little information that can be used comparatively for noise events. Specifically, it provides no information concerning either the duration of the event or the amount of sound energy. Thus, SEL, which is a measure of the physical energy of the noise event and accounts for both intensity and duration, is used for single event noise analysis. Subjective tests indicate that human response to noise is a function not only of the maximum level of the event, but also of the duration of the event and its variation with respect to time of the event during the day. Evidence indicates that two noise events with equal sound energy will produce the same response. For example, a noise at a constant level of 85 dB lasting for 10 seconds would be judged to be equally as annoying as a noise event at a constant level of 82 dB and duration of 20 seconds (i.e., 3 dB decrease equals one half the sound energy but lasting for twice the time period). This is known as the "equal energy principle." The SEL value represents the sound energy equal to the event under consideration. By definition, SEL values are referenced to a duration of 1 second and should not be confused with either the average or maximum noise levels associated with a specific event. Table 3.1-1 provides SEL for F-16 aircraft at a slant distance of 1,640 feet from the aircraft. The L_{max} would typically be 5 to 10 dB below the SEL value for aircraft overflights.

Table 3.1-1. Sample Aircraft SELs for Fresno-Yosemite IAP Aircraft at 1,300 Feet Overhead (Departure End of Runway)

Aircraft Type	*Sound Exposure (SEL) (dB)*
F-16	112.7
F-15	117.0
F-18	117.8

Note: 300 Knots Indicated Airspeed, directly overhead, afterburner.
dB = decibel; SEL = Sound Exposure Level

The frequency, sound level, and duration of aircraft overflight noise events depend on variables including aircraft type and model (engine type), aircraft configuration (i.e., flaps, landing gear, etc.), engine power setting, aircraft speed, distance between the observer and the aircraft flight track, temperature, humidity, and altitude. Therefore, extensive noise data are collected for various types of aircraft/engines at different power settings and phases of flight. This database of aircraft noise provides a basis for calculation of average individual-event sound descriptors for specific aircraft operations at any location under varying meteorological conditions. The reference values are adjusted to any location by applying appropriate corrections for the variables.

Averaged Noise Metrics

Single event analysis has many shortcomings in describing the overall noise environment. DNL and Community Noise Equivalent Level (CNEL) are composite metrics that account for all noise events in a 24-hour period. In order to account for increased human sensitivity to noise at night, a 10 dB penalty is applied to nighttime events (10 p.m. to 7 a.m. time period). A variant of the DNL, the CNEL includes a 5 dB penalty to noise events that occurs during the 7 p.m. to 10 p.m. time period, and a 10 dB penalty to noise that occurs during the 10 p.m. to 7 a.m. time period and is used in California. The notations DNL and L_{dn} are both used for Day-Night Average Sound Level and are equivalent. This "noise penalty" is an effort to account for increased human sensitivity to evening and nighttime noise events. The summing of sound during a 24-hour period does not ignore the louder single events; it actually tends to emphasize both the sound level and number of those events. The logarithmic nature of the dB unit causes sound levels of the loudest events to control the 24-hour average.

DNL is the accepted unit for quantifying annoyance to humans from general environmental noise, including aircraft noise. The Federal Interagency Committee on Urban Noise (FICUN) developed land use compatibility guidelines for noise exposure areas (FICUN 1980). Based upon these FICUN guidelines, the FAA developed recommended land uses in aircraft noise exposure areas. The USAF and FAA use DNL and CNEL as the method to estimate the amount of exposure to aircraft noise and predict impacts. Land use compatibility and incompatibility are determined by comparing the predicted DNL level at a site with the recommended land uses (Appendix B).

3.1.1.2 Noise Modeling

There are a variety of tools available to model noise at and around airfields. NOISEMAP is a computer program used to model noise exposure in the vicinity of military airfields due to aircraft flights and engine run-up activities. Noise contours generated by NOISEMAP are used in support of the USAF Air Installation Compatible Use Zone (AICUZ) program and NEPA documentation. The Air Force Research Laboratory (AFRL/RHCB) oversees the development and maintenance of NOISEMAP and its related programs. The model generates noise contours based on numerous input data that are used to evaluate noise in the vicinity of airfields where military activity occurs. BASEOPS is a graphical user interface for the NOISEMAP suite of aircraft noise models used for military aircraft. The FAA has approved the use of this model for establishing noise exposure for military airfields for NEPA documents. Part 150 of the Federal Aviation Regulations, *Airport Noise Compatibility Planning*, sets forth standards for airport operators to use in documenting noise exposure in the airport environs and establishing programs to minimize noise-related land use incompatibilities. The FAA uses the Integrated Noise Model (INM), a computer model that evaluates aircraft noise impacts in the vicinity of commercial airports. The 144 FW, as a tenant on the Fresno-Yosemite IAP, complies with the FAA's Part

150 noise compatibility program using INM for noise modeling. Since there are differences in the two modeling profiles and formats, information from BASEOPS files are integrated with the INM modeling. A 2011 noise study conducted by the Fresno-Yosemite IAP was used as the baseline condition for noise in the vicinity of the airport (Coffman Associates, Inc. 2012).

The potential for noise to affect physiological health, such as the cardiovascular system, has been speculated; however, no unequivocal evidence exists to support such claims (Harris 1997). Conclusions drawn from a review of health effect studies involving military low-altitude flight noise with its unusually high maximum levels and rapid rise in sound level have shown no increase in cardiovascular disease (Schwartze and Thompson 1993). Additional claims that have not been supported include flyover noise producing increased mortality rates and increases in cardiovascular death, aggravation of post-traumatic stress syndrome, increased stress, increase in admissions to mental hospitals, and adverse effects on pregnant women and the unborn fetus (Harris 1997).

Physiological effects in children exposed to aircraft noise and the potential for health effects have also been the focus of limited investigation. Studies in the literature include examination of blood pressure levels, hormonal secretions, and hearing loss. As a measure of stress response to aircraft noise, researchers have looked at blood pressure readings to monitor children's health. Results have indicated that there were no differences between the aircraft-noise-exposed children and the control groups (Haines *et al.* 2001a and 2001b).

3.1.1.3 Potential Hearing Loss

Noise-related hearing loss risk has been studied extensively. Findings of studies and resulting policies and regulations are discussed briefly below. As per DoD policy memorandum (2009) populations exposed to noise greater than DNL 80 dB are at the greatest risk of potential hearing loss (Undersecretary of Defense for Acquisition Technology and Logistics 2009). The DoD policy directs that hearing loss risk should be assessed using the methodology described in USEPA Report No. 550/9-82-105, *Guidelines for Noise Impact Analysis* (USEPA 1982). USEPA's *Guidelines for Noise Impact Analysis* quantify hearing loss risk in terms of Noise-Induced Permanent Threshold Shift (NIPTS), a quantity that defines the permanent change in the threshold level below which a sound cannot be heard. NIPTS is stated in terms of the average threshold shift at several frequencies that can be expected from daily exposure to noise over a normal working lifetime of 40 years, with exposure lasting 8 hours per day for 5 days per week.

The actual value of NIPTS for any given person depends on that individual's physical sensitivity to noise. Over a 40-year working lifetime, some people will experience more loss of hearing than others. The actual noise exposure for any person living in an area subject to DNL 80 dB or greater is determined by the length of time that a person is outdoors and directly exposed to the

noise. For example, noise exposure within an 80 dB noise contour near an airfield would be affected by whether a person was at home during the daytime hours when most flying occurs. Many people would be inside their homes and would, therefore, be exposed to lower noise levels due to noise attenuation provided by the house structure.

Workplace Noise

In 1972, the National Institute for Occupational Safety and Health (NIOSH) published a criteria document with a recommended exposure limit of 85 dB as an 8-hour time-weighted average. This exposure limit was reevaluated in 1998 when NIOSH made recommendations that went beyond conserving hearing by focusing on the prevention of occupational hearing loss (NIOSH 1998). Following the reevaluation using a new risk assessment technique, NIOSH published another criteria document in 1998 which reaffirmed the 85 dB recommended exposure limit (NIOSH 1998). Active-duty and reserve components of the USAF (including the ANG), as well as civilian employees and contracted personnel working on USAF bases and ANG installations must comply with Occupational Safety and Health Administration (OSHA) regulations (29 CFR § 1910.95 *Occupational Noise Exposure*), DoD Instruction 6055.12, *Hearing Conservation Program*; Air Force Occupational Safety and Health (AFOSH) Standard 48-20 (June 2006), and *Occupational Noise and Hearing Conservation Program* (including material derived from the International Standards Organization 1999.2 *Acoustics-Determination of Occupational Noise Exposure and Estimation of Noise Induced Impairment*). Per AFOSH Standard 48-20, the Hearing Conservation Program is designed to protect workers from the harmful effects of hazardous noise by identifying all areas where workers are exposed to hazardous noise. The following are the primary components of the program:

1. Identify noise hazardous areas or sources and ensure these areas are clearly marked.

2. Use engineering controls as the primary means of eliminating personnel exposure to potentially hazardous noise. All practical design approaches to reduce noise levels to below hazardous levels by engineering principles shall be explored. Priorities for noise control resources shall be assigned based on the applicable risk assessment code. Where engineering controls are undertaken, the design objective shall be to reduce steady-state levels to below 85 dB, regardless of personnel exposure time, and to reduce impulse noise levels to below 140 dB peak sound pressure level.

3. Ensure workers with an occupational exposure to hazardous noise complete an initial/reference audiogram within 30 days from the date of the workers' initial exposure to hazardous noise.

4. Ensure new equipment being considered for purchase has the lowest sound emission levels that are technologically and economically possible and compatible with

performance and environmental requirements. 42 USC Section 4914, *Public Health and Welfare, Noise Control, Development of Low-Noise Emission Products*, applies.

5. Education and training regarding potentially noise hazardous areas and sources, use and care of hearing protective devices, the effects of noise on hearing, and the Hearing Conservation Program.

3.1.2 Existing Conditions

3.1.2.1 Fresno-Yosemite International Airport

The Fresno-Yosemite IAP is located to the northeast of the City of Fresno, California with two operational runways, Runway 11L/29R and Runway 11R/29L. Runway 11L/29R is the primary runway and is 9,227 feet long and 150 feet wide. Runway 29R has a displaced landing threshold of 312 feet. Runway 11R/29L is 7,206 feet long and 100 feet wide. Runway 11R has a displaced landing threshold of 1,448 feet. The published airport elevation is 336 feet above mean sea level (MSL).

The baseline noise contours were based on a 2011 noise study conducted for the Fresno-Yosemite IAP using the INM database, which contains standard noise and performance data for more than 200 different aircraft types, most of which are civilian aircraft. The program automatically accesses the applicable noise and performance data for departure and approach operations by those aircraft. To supplement the INM database, modifications were applied to the arrival and departure profiles for the F-16 aircraft based on the noise abatement procedures for tactical military aircraft and have been approved by the FAA as non-standard flight profiles (Coffman Associates, Inc. 2012).

Baseline noise conditions are based on the airfield operations shown in Table 2.3-1. Approximately 12.82 average daily F-16 airfield operations were modeled under baseline conditions along with other transient military aircraft (including the F-18) and general and commercial aviation operations. These current operations and the resultant baseline noise contours are based on airfield operations noise modeling conducted for the Fresno-Yosemite IAP (Coffman Associates, Inc. 2012). Flight tracks and profiles for the F-16 aircraft are provided in Appendix B. Figure 3.1-2 shows the baseline CNEL noise contours for airfield operations at Fresno-Yosemite IAP. Noise contours developed for the baseline conditions at Fresno-Yosemite IAP contain 1,966 acres within the 65 dB and greater noise contours (Figure 3.1-2). The acreage within each noise contour that falls both on and off Fresno-Yosemite IAP is shown in Table 3.1-2. Based on data from the City of Fresno, it is estimated that 240 homes are currently located within the 65 dB noise contour (County of Fresno 2012).

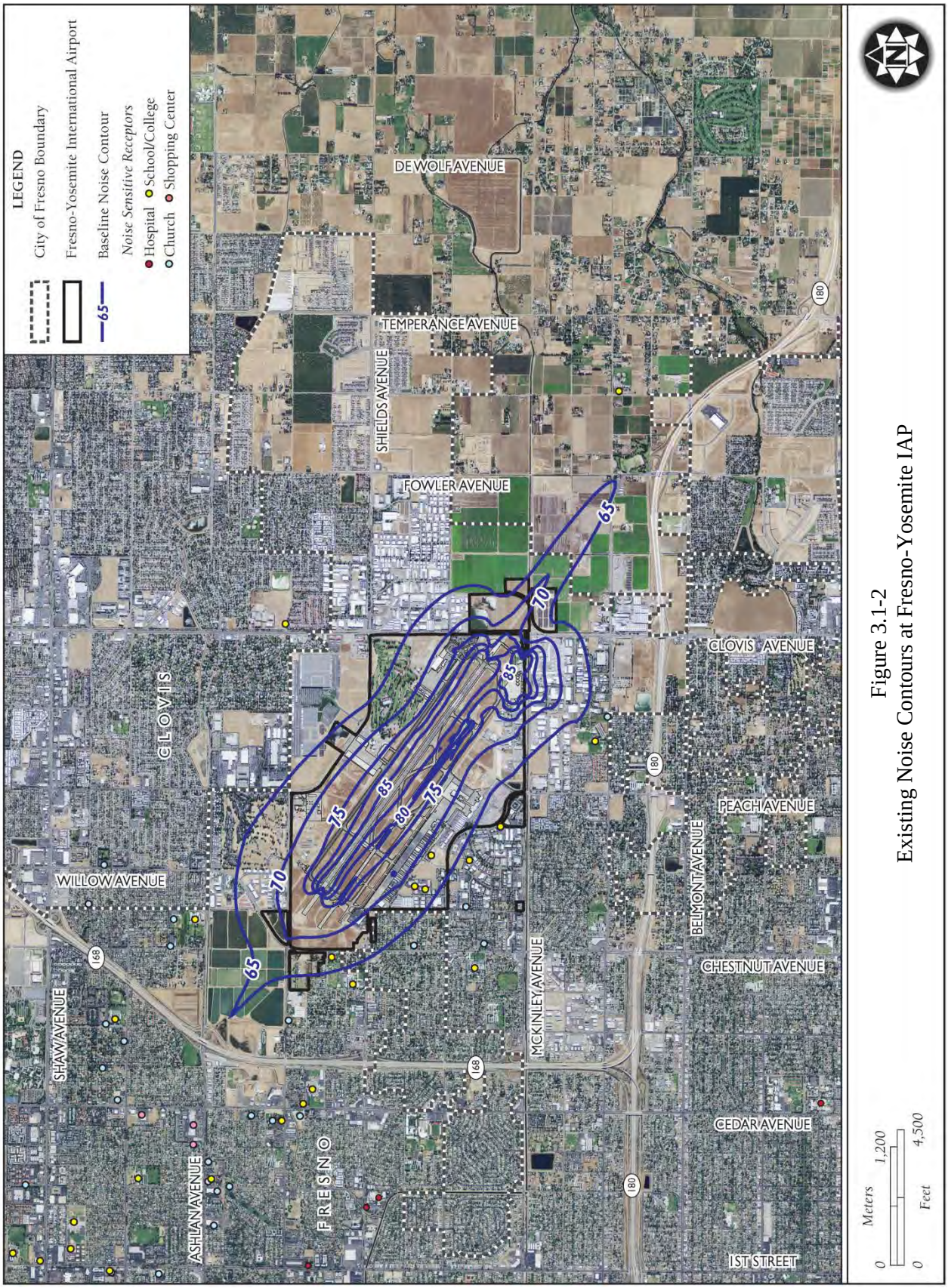


Figure 3.1-2
Existing Noise Contours at Fresno-Yosemite IAP

Table 3.1-2. Land Area Affected by CNEL Greater than 65 dB, Fresno-Yosemite IAP

Noise Level (dB CNEL)	*On-Airport (acres)*	*Off-Airport (acres)*	*Total (acres)*
65-70	418	559	977
70-75	405	60	465
75-80	205	15	220
80-85	145	8	153
Greater than 85	147	4	151
Total	**1,320**	**646**	**1,966**

CNEL = Community Noise Equivalent Level; dB = decibel

Table 3.1-3 shows baseline CNEL for 13 representative sensitive receptors. Five representative sensitive receptors are currently exposed to CNEL of 65 dB or greater (Addicott School, San Joaquin Valley College – Fresno Aviation, San Joaquin Valley College, Airways Golf Course, and Vale National College).

Table 3.1-3. Estimated CNEL for Representative Noise-Sensitive Receptors Under Baseline at Fresno-Yosemite IAP

Representative Noise-Sensitive Receptors	*CNEL (dB)*
Scandinavian Middle School	62.8
Addicott School	67.1
Alliant International University	62.3
San Joaquin Valley College – Fresno Aviation	68.4
San Joaquin Valley College	67.8
Hanks Par Three Golf Course	64.1
Airways Golf Course	68.3
East Princeton Baptist Church	63.4
Fresno Adventist Academy	61.1
Fresno Christian Growth Center	61.8
Faith Baptist Church	62.0
Phillips Junior College Fresno Campus	63.7
Vale National College	66.4

CNEL = Community Noise Equivalent Level; dB = decibel

Noise annoyance is defined by the USEPA as any negative subjective reaction to noise by an individual or group. Table 3.1-4 presents the results of over a dozen studies on the relationship between noise and annoyance levels. This relationship was suggested by Schultz (1978) and was reevaluated (Fidell *et al.* 1988) for use in describing the reaction of people to environmental noise. These data provide a perspective on the level of annoyance that might be anticipated at any given DNL. For example, 12 to 22 percent of people exposed on a long-term basis to DNL of 65 to 70 dB are expected to be highly annoyed by noise events. The study results summarized in this table are based on outdoor noise levels.

Table 3.1-4. Theoretical Percentage of Population Highly Annoyed by Noise Exposure

DNL Intervals in dB	*Percentage of Persons Highly Annoyed*
<65	<12
65-70	12-22
70-75	22-37
75-80	37-54
>80	>61

Note: Noise impacts to individuals vary as do individual reaction to noise. This is a general prediction of the Percent community highly annoyed based on environmental noise surveys conducted around the world.
dB = decibel; DNL = Day-Night Average Sound Level
Source: Fidell *et al.* 1988

3.1.2.2 Fresno-Yosemite International Airport Noise Abatement Procedures

Current departure procedures for CA ANG aircraft on Runway 29 require the aircraft to maintain runway heading until reaching 10 miles out from the airport, safety permitting. This straight-out departure procedure provides for maximum climb while using minimum thrust in order to reduce the overall land area exposed to departure noise from CA ANG aircraft. As originally approved, this measure calls for the aircraft to climb straight-out when departing Runway 29R until clearing 4,000 feet MSL. The approved 4,000-foot altitude is predicated on the Fresno Class-C airspace configuration that has an upper limit of 4,400 feet. The straight-out climb to 10,000 feet is specified for the 144 FW F-16 fighters more familiar with local airspace and local air traffic control procedures. Transient military aircraft are to depart Runway 29 on runway heading and climb to 4,000 feet MSL until 10 miles out from the airport (IFR or VFR) safety permitting. The established departure procedure for Runway 11 for both transient and local military CA ANG is to climb to 10,000 feet MSL until 5 miles out from the airport (IFR or VFR), safety permitting.

3.1.2.3 March Air Reserve Base

For brief periods on some days, aircraft noise dominates the noise environment in the vicinity of March ARB. Several types of based, transient, contract, and civilian aircraft operate at March ARB. The airfield features two active runways, Runway 14/32, which is 13,300 feet long and 200 feet wide, and Runway 12/30, which is 3,059 feet long and 100 feet wide.

There are currently approximately 54,000 annual operations, of which the F-16 typically flies about 1,060 (March ARB 2010) (Table 2.3-2). The majority of military aircraft operations are conducted by KC-135R “Stratotanker” and C-17 “Globemaster III” aircraft. Aircraft typically utilize take-off and landing configurations during initial ascent from and final descent to the runway. After verification for accuracy, the aircraft operational data were input into the noise model. The USAF’s NOISEMAP was used to model baseline aircraft operations.

The noise contours were plotted on an area map in 5 dB increments from CNEL 65 dB to CNEL 85 dB (Figure 3.1-3). No noise sensitive receptors are located within the baseline noise contours. Table 3.1-5 shows the number of acres of land exposed to CNEL of 65 dB and greater both on and off March ARB.

Table 3.1-5. Land Area Affected by CNEL Greater than 65 dB, March ARB

Noise Level (dB CNEL)	*On Base (acres)*	*Off Base (acres)*	*Total (acres)*
65-70	331	1,076	1,407
70-75	508	207	715
75-80	271	15	286
80-85	216	0	216
Greater than 85	15	0	15
Total	**1,341**	**1,298**	**2,639**

CNEL = Community Noise Equivalent Level; dB = decibel
Source: March ARB 2010

Unless special noise attenuation measures are incorporated, residential land uses are not considered to be compatible with noise levels exceeding DNL 65 dB, which is approximately equivalent to CNEL 65 dB. Residential developments exposed to noise levels exceeding CNEL 65 dB are located north of the installation along Alessandro Boulevard and are also interspersed among agricultural fields to the south of the installation (March ARB 2005a).

It should be noted that some additional noise results from day-to-day activities associated with operations, maintenance, and the industrial functions associated with the operation of March ARB. These noise sources include the operation of ground-support equipment, and other transportation noise from vehicular traffic; however, this noise is generally localized in industrial areas on or near the Base. Noise resulting from aircraft operations may dominate the noise environment for brief times on some days in the vicinity of the Base.

3.2 AIR QUALITY

3.2.1 Definition of Resource

Ambient air quality refers to the atmospheric concentration of a specific compound that occurs at a particular geographic location. The ambient air quality levels measured at a particular location are determined by the interactions of emissions, meteorology, and chemistry. When discussing air quality, it is important to consider the types, amounts, and locations of pollutants emitted into the atmosphere. Meteorological factors that affect air quality include wind and precipitation patterns that can affect the distribution, dilution, and removal of pollutant emissions from the atmosphere. Furthermore, chemical reactions in the atmosphere can transform pollutant emissions into other chemical substances. Ambient air quality data are generally reported as a mass per unit volume (e.g., micrograms per cubic meter [$\mu g/m^3$]of air) or as a volume fraction (e.g., parts per million [ppm] by volume).

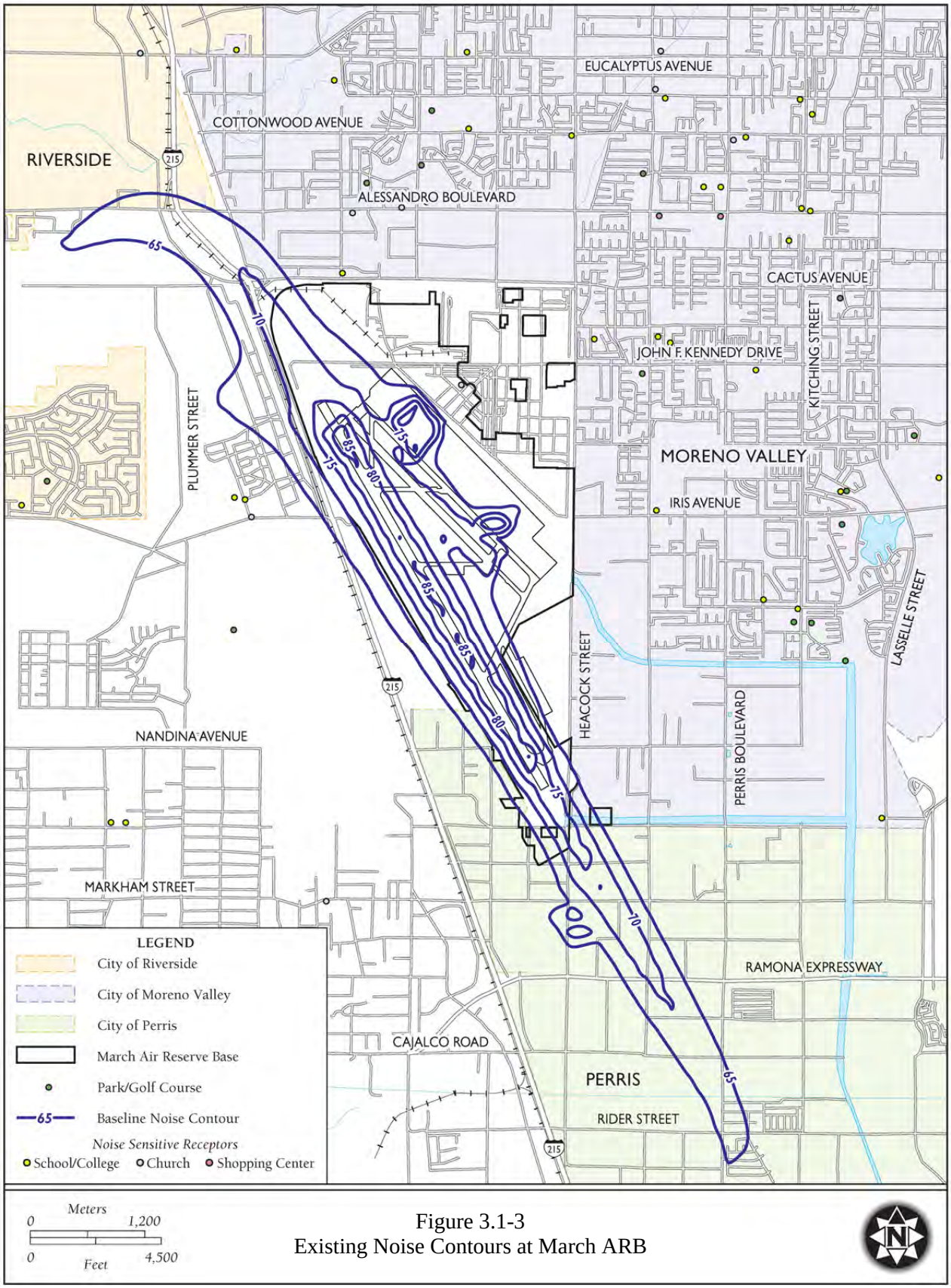


Figure 3.1-3
Existing Noise Contours at March ARB

Air quality is defined by ambient air concentrations of specific pollutants determined by the USEPA to be of concern with respect to the health and welfare of the general public. Pollutant emissions typically refer to the amount of pollutants or pollutant precursors introduced into the atmosphere by a source or group of sources. Pollutant emissions contribute to the ambient air concentrations of criteria pollutants, either by directly affecting the pollutant concentrations measured in the ambient air or by interacting in the atmosphere to form criteria pollutants. Primary pollutants, such as CO, SO_2, Pb, and some particulates, are emitted directly into the atmosphere from emission sources.

Secondary pollutants, such as O_3, NO_2, and some particulates, are formed through atmospheric chemical reactions that are influenced by meteorology, ultraviolet light, and other atmospheric processes. Suspended PM_{10} and $PM_{2.5}$ are generated as primary pollutants by various mechanical processes (for example, abrasion, erosion, mixing, or atomization) or combustion processes. However, PM_{10} and $PM_{2.5}$ can also be formed as secondary pollutants through chemical reactions or by gaseous pollutants that condense into fine aerosols. In general, emissions that are considered "precursors" to secondary pollutants in the atmosphere (such as volatile organic compounds [VOCs] and oxides of nitrogen [NO_x], which are considered precursors for O_3), are the pollutants for which emissions are evaluated to control the level of O_3 in the ambient air.

The ROI for this discussion can vary according to pollutant. For pollutants that do not undergo a chemical reaction after being emitted from a source (i.e., direct emissions), the ROI is generally restricted to a region in the immediate vicinity of the installation. These pollutants include CO, SO_2, and directly-emitted PM_{10} and $PM_{2.5}$. For pollutants that undergo chemical reactions and interact within the atmosphere to form secondary pollutants, such as O_3 and its precursors NO_x and VOCs, and precursors of PM_{10} and $PM_{2.5}$, the ROI is a larger regional area. The chemical transformations and interactions that create O_3 and secondary PM_{10} and $PM_{2.5}$ can take hours to occur; therefore, the precursor pollutants may be emitted some distance from the impact area depending on weather conditions.

Mixing height is another factor used in defining the ROI for various pollutants. The mixing height is the upper vertical limit of the volume of air in which emissions may affect air quality. Emissions released *above* the mixing height are typically restricted from affecting ground-level ambient air quality in the region, while emissions of pollutants released *below* the mixing height may affect ground-level concentrations. The portion of the atmosphere that is completely mixed begins at ground level and may extend up to heights of a few thousand feet. Mixing height varies from region to region based on daily temperature changes, amount of sunlight, and other climatic factors. The USEPA has defined a default mixing height as 3,000 feet AGL; however, a more refined mixing height may be used based on regional parameters.

The Proposed Action occurs at the Fresno-Yosemite IAP in Fresno, California, and at the March ARB in Riverside, California. Therefore, the ROI includes the San Joaquin Valley Air Basin and the South Coast Air Basin. The San Joaquin Valley Air Basin encompasses eight counties in California's Central Valley: San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare, and the San Joaquin Valley Air Basin portion of Kern County. The South Coast Air Basin encompasses Los Angeles and Orange counties and the western portion of Riverside and San Bernardino counties. The USEPA has classified the San Joaquin Valley Air Basin as an extreme nonattainment area for the federal eight-hour O_3 standard, a nonattainment area for the federal $PM_{2.5}$ standard, and a maintenance area for the federal PM_{10} standard. The San Joaquin Valley Air Basin is also classified as a nonattainment area for the California state O_3, PM_{10}, and the 1997 and 2006 $PM_{2.5}$ standards. The USEPA has classified the South Coast Air Basin as an extreme nonattainment area for the federal eight-hour O_3 standard, and a nonattainment area for both the federal $PM_{2.5}$ and PM_{10} standards; however, the air basin has recently attained the PM_{10} standard and has applied for redesignation as a maintenance area to the USEPA. The South Coast Air Basin is also classified as a nonattainment area for the California state O_3, PM_{10}, and $PM_{2.5}$ standards.

3.2.2 Existing Conditions

3.2.2.1 Regulatory Setting

As part of the CAA, the USEPA has established criteria for seven major pollutants of concern, called "criteria pollutants." These criteria pollutants include CO, SO_2, NO_2, O_3, PM_{10}, $PM_{2.5}$, and Pb. The criteria set for these pollutants, the NAAQS, represent maximum levels of background pollution that are considered safe, with an adequate margin of safety to protect the public health and welfare. Based on measured ambient criteria pollutant data, the USEPA designates areas in the U.S. as having air quality better than (attainment) or worse than (nonattainment) the NAAQS.

The CAA also established a national goal of preventing degradation or impairment in federally designated Class I areas. Class I areas are defined as those areas where any appreciable degradation in air quality or associated visibility impairment is considered significant. As part of the Prevention of Significant Deterioration (PSD) Program, Congress assigned mandatory Class I status to all national parks, national wilderness areas (excluding wilderness study areas or wild and scenic rivers), and memorial parks greater than 5,000 acres. In Class I areas, visibility impairment is defined as atmospheric discoloration (such as from an industrial smokestack), and a reduction in regional visual range. Visibility impairment or haze results from smoke, dust, moisture, and vapor suspended in the air. Very small particles are either formed from gases (sulfates, nitrates) or are emitted directly into the atmosphere from sources like electric utilities, industrial processes, and vehicle emissions. Stationary sources are regulated under the PSD

Program, and the PSD permitting process requires a review of impacts to all Class I areas within 62 miles (100 kilometers) of any proposed major stationary source. Mobile sources, including aircraft and associated operations such as those occurring at ANG installations, are not subject to the requirements of PSD.

In addition to criteria pollutants, the USEPA has defined 187 substances as hazardous air pollutants (HAPs). HAPS are substances that have been determined to present some level of acute or chronic health risk (cancer or non-cancer) to the general public. These pollutants may be emitted in trace amounts from various types of sources, including combustion sources. HAPs are regulated for specific source categories under the USEPA's National Emission Standards for Hazardous Air Pollutants regulations.

GHGs are also regulated under the Federal CAA. The USEPA defines greenhouse gases as any of the following compounds: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and fluorinated gases such as hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. GHGs have varying global warming potential (GWP). The reference gas for GWP is CO_2; therefore, CO_2 has a GWP of 1. The other main greenhouse gases that have been attributed to human activity include CH_4, which has a GWP of 21, and N_2O, which has a GWP of 310. Carbon dioxide equivalent (CO_2e) emissions are defined as the amount of CO_2 that would have the same GWP, when measured over a specified timescale (generally, 100 years). CO_2e emissions are calculated by multiplying the mass emissions by the GWP.

The potential effects of GHG emissions from the Proposed Action are by nature global. Given the global nature of climate change and the current state of the science, it is not useful at this time to attempt to link the emissions quantified for local actions to any specific climatological change or resulting environmental impact. Nonetheless, the GHG emissions from the project alternatives have been quantified to the extent feasible in this EIS for information and comparison purposes.

Individual states are delegated the responsibility to regulate air quality in order to achieve or maintain air quality in attainment with these standards. The California Air Resources Board (CARB) enforces air pollution regulations and sets guidelines to attain and maintain the NAAQS and California Ambient Air Quality Standards (CAAQS) within the state of California. These guidelines are found in the California SIP.

The California CAA of 1988, as amended in 1992, outlines a program to attain the CAAQS for O_3, NO_2, SO_2, particulate matter, and CO by the earliest practical date. Some of the CAAQS are more stringent than the NAAQS, which translates into more emissions reductions generally within the region being required to show that it has attained an applicable CAAQS than will be required to show its attainment of the comparable NAAQS. The CARB delegates the authority

to regulate stationary source emissions to local air quality management districts. The CARB requires these agencies to develop their own strategies for achieving compliance with the NAAQS and CAAQS, but maintains regulatory authority over these strategies, as well as all mobile source emissions throughout the state. The San Joaquin Valley Air Pollution Control District is the local agency responsible for enforcement of air quality regulations in the Fresno Area. The South Coast Air Quality Management District is the local agency responsible for enforcement of air quality regulations in the March ARB area. The NAAQS and CAAQS are summarized in Table 3.2-1.

Section 176(c) of the CAA, as articulated in the USEPA General Conformity Rule, states that a federal agency cannot issue a permit for or support an activity unless the agency determines that it will conform to the most recent USEPA-approved SIP. This means that projects using federal funds or requiring federal approval must not: 1) cause or contribute to any new violation of a NAAQS, 2) increase the frequency or severity of any existing violation, or 3) delay the timely attainment of any standard, interim emission reduction, or other milestone. In the San Joaquin Valley, San Joaquin Valley Air Pollution Control District Rule 9110 implements the USEPA's General Conformity Rule. On March 1, 2012, USEPA published its approval of the San Joaquin Valley Unified Air Pollution Control District portion of the California SIP. The SIP establishes 2007 as the base inventory year. In the South Coast Air Basin, South Coast Air Quality Management District Rule 1901 implements the Rule. On March 1, 2012, USEPA also published its approval of the South Coast Air Quality Management District portion of the California SIP, which is contained in the *Final 2007 Air Quality Management Plan* (South Coast Air Quality Management District 2007).

Within the San Joaquin Valley, if net annual emissions of VOCs or NO_x increase by less than 10 tons each and $PM_{2.5}$ emissions increase by less than 100 tons, a CAA conformity determination is not required. Within the South Coast Air Basin, if net annual emissions of VOCs or NO_x increase by less than 10 tons each, and if CO, PM_{10}, and $PM_{2.5}$ emissions increase by less than 100 tons each, a CAA conformity determination is not required. If emissions of one or more of these compounds exceed a *de minimis* threshold, the USAF must demonstrate conformity under one of the methods prescribed by the General Conformity Rule.

3.2.2.2 Climate and Meteorology

The San Joaquin Valley has a Mediterranean climate that is generally hot and dry during the summer, and cool and damp in winter, when frequent ground fog known regionally as "tule fog" can occur. Mid-autumn to mid-spring comprises the rainy season, although during the late summer southeasterly winds aloft can bring thunderstorms of a tropical origin. Frost occurs at times in the winter months, but snow is extremely rare.

Table 3.2-1. Ambient Air Quality Standards

Pollutant	*Averaging Time*	NATIONAL STANDARDS [a]		CALIFORNIA STANDARDS
		Primary [b,c]	*Secondary* [b,d]	
O_3	8-hour	0.075 ppm (147 µg/m^3)	Same as primary	0.070 ppm (137 µg/m^3)
	1-hour	—	—	0.09 ppm (180 µg/m^3)
CO	8-hour	9 ppm (10 mg/m^3)	—	9.0 ppm (10 mg/m^3)
	1-hour	35 ppm (40 mg/m^3)	—	20 ppm (23 mg/m^3)
NO_2	Annual	0.053 ppm (100 µg/m^3)	Same as primary	0.030 ppm (57 µg/m^3)
	1-hour	0.100 ppm (188 µg/m^3)	—	0.18 ppm (339 µg/m^3)
SO_2	24-hour	—	—	0.04 ppm (105 µg/m^3)
	3-hour	—	0.5 ppm (1,300 µg/m^3)	—
	1-hour	0.075 ppm (196 µg/m^3)	—	0.25 ppm (655 µg/m^3)
PM_{10}	Annual	150 µg/m^3	Same as primary	20 µg/m^3
	24-hour	—	Same as primary	50 µg/m^3
$PM_{2.5}$	Annual	15 µg/m^3	Same as primary	12 µg/m^3
	24-hour	35 µg/m^3	Same as primary	—
Pb	Rolling 3-month period	0.15 µg/m^3	Same as primary	—
	30-Day Average	—	—	1.5 µg/m^3
Sulfates	24 hours	—	—	25 µg/m^3
Hydrogen Sulfide	1 hour	—	—	0.03 ppm (42 µg/m^3)
Vinyl Chloride	24 hours	—	—	0.010 ppm (26 µg/m^3)

Notes:
a Standards other than the 1-hour ozone, 24-hour PM_{10}, 24-hour $PM_{2.5}$, and those based on annual averages are not to be exceeded more than once a year. The 8-hour ozone national standard has replaced the 1-hour ozone national standard.
b Concentrations are expressed first in units in which they were promulgated. Equivalent units given in parenthesis.
c Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health. Each state must attain the primary standards no later than 3 years after that state's implementation plan is approved by the USEPA.
d Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.

Sources: CARB 2012, USEPA 2012.
µg/m^3 = micrograms per cubic meter; CO = carbon monoxide; mg/m^3 = milligrams per cubic meter; NO_2 = nitrogen dioxide; O_3 = ozone; Pb = lead; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; PM_{10} = particulate matter less than or equal to 10 microns in diameter; ppm = parts per million; SO_2 = sulfur dioxide

Mean annual temperatures vary from an average maximum temperature of 76.5 degrees Fahrenheit (°F) to an average minimum temperature of 50.4°F with a yearly average of 63.4°F. The warmest month is July, with an average maximum temperature of 98.3°F; the coldest month is December, with an average minimum temperature of 37.3°F. Summer heat waves can bring temperatures as high as 113°F in the Fresno area. The lowest minimum temperature recorded was 18°F.

In Fresno, average annual precipitation (1948–2010) was 10.99 inches. The majority of precipitation occurs in the winter months, from November through March (Western Regional Climate Center 2011).

The climate of the March ARB area is characterized as Mediterranean to semi-arid. The climate in the region varies according to elevation and distance from the Pacific Ocean. The weather generally consists of warm to hot, dry, summers and mild winters. Annual average temperatures in the Riverside area range from an average minimum temperature of 50.5ºF to an average maximum temperature of 79.0ºF, with a yearly average of 64ºF. December is the coldest month, with average minimum temperatures of 41.3°F. August is the hottest month in the area, with average maximum temperatures reaching 94.4°F (Western Regional Climate Center 2011).

In Riverside, average annual precipitation (1948–2010) was 10.09 inches. The majority of precipitation occurs in the winter months, from November through March (Western Regional Climate Center 2011).

3.2.2.3 Regional and Local Air Pollutant Sources

The 144 FW is located at the Fresno-Yosemite IAP, which is a developed area, with numerous air emission sources. The majority of emissions from permitted stationary sources in the San Joaquin Valley Air Basin are from fuel combustion and petroleum production and marketing. Emissions from on-road vehicles contribute the largest share to the regional emission inventory. This category includes the contribution of on- and off-installation use of private and government vehicles associated with military and civilian personnel at Fresno-Yosemite IAP. Aircraft emissions also contribute to the mobile source inventory. Area source emissions include emissions from off-highway vehicles, solvent and coating use, waste disposal and recycling, and combustion of fossil fuels for industrial, commercial, and residential uses. Fugitive dust comprises the main source of direct PM_{10} and $PM_{2.5}$ emissions.

The region surrounding the March ARB is also developed. The majority of emissions from permitted stationary sources in the South Coast Air Basin fuel combustion, industrial processes, and petroleum production and marketing. As in the San Joaquin Valley Air Basin, emissions from on-road vehicles contribute the largest share to the regional emission inventory. Area

source emissions include emissions from solvent and coating use, construction, and combustion of fossil fuels. Fugitive dust comprises the main source of direct PM_{10} and $PM_{2.5}$ emissions.

The USEPA recently promulgated a more stringent standard for lead, and has redesigned its monitoring program to address lead and identified airports for monitoring because aviation gas used in piston aircraft still contains lead. To date, 16 areas have been designated as nonattainment for the 2008 lead standard, including the Los Angeles County portion of the South Coast Air Basin. The project areas are considered attainment/unclassified for lead, and lead is not used in aviation fuel used in the F-15 or F-16 aircraft.

Table 3.2-2 summarizes the regional emissions (stationary and mobile) of criteria pollutants and precursor emissions for the affected areas.

Table 3.2-2. Regional Emissions for Fresno and Riverside, California

	EMISSIONS, TONS/DAY					
	CO	*VOCs*	*NO_x*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*
Regional Emissions - Fresno						
Stationary Sources	41.7	84.1	79.5	20.6	25.4	17.7
Area-Wide Source	267.9	151.6	17.7	1.1	254.2	67.8
Mobile Sources	962.7	125.1	426.5	1.9	22.3	18.8
Total San Joaquin Valley Air Basin	**1,272.3**	**360.8**	**523.7**	**23.6**	**301.9**	**104.3**
Regional Emissions - Riverside						
Stationary Sources	46.8	109.1	55.9	18.1	24.5	15.4
Area-Wide Source	112.3	144.1	23.1	0.9	219.5	53.1
Mobile Sources	2,790.8	322.9	663.2	20.1	42.5	33.4
Total South Coast Air Basin	**2,949.9**	**576.1**	**742.2**	**39.1**	**286.5**	**101.9**

CO = carbon monoxide; NO_x = oxides of nitrogen; PM_{10} = particulate matter less than or equal to 10 microns in diameter; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; SO_2 = sulfur dioxide; VOC = volatile organic compound
Source: CARB 2010

3.2.2.4 Baseline Air Quality

Representative background air monitoring data for the 144 FW for the period 2006-2010 are shown in Table 3.2-3. The closest monitoring station to the Fresno-Yosemite IAP is located on 1st Street and monitors all criteria pollutants except Pb. The closest monitoring station to March ARB is located in Riverside.

As shown in Table 3.2-3, numerous O_3 exceedances have been measured in Fresno during the recent five-year period. The area is designated an extreme nonattainment area for O_3. Exceedances of the federal $PM_{2.5}$ standard and the state PM_{10} standard were recorded in Fresno as well. Also shown in Table 3.2-4, there were exceedances of the federal O_3 standard, the federal $PM_{2.5}$ standard, and the state PM_{10} standard in Riverside.

Table 3.2-3. Ambient Air Monitoring Data for Fresno, California

Air Quality Indicator	*2006*	*2007*	*2008*	*2009*	*2010*
Fresno					
Ozone (O_3)					
Peak 1-hour value (ppm)	0.138	0.119	0.157	0.121	0.127
Days above state standard (0.09 ppm)	45	14	44	36	16
Peak 8-hour value (ppm)	0.113	0.101	0.132	0.104	0.107
Fourth high 8-hour value (ppm)	0.101	0.094	0.108	0.100	0.098
Days above federal standard (0.075 ppm)[1,2]	69	37	62	51	26
Days above state standard (0.070 ppm)	85	62	86	73	51
Particulate matter less than or equal to 2.5 microns in diameter ($PM_{2.5}$)					
Peak 24-hour value (federal) ($\mu g/m^3$) [4]	71.0	103.8	79.5	82.3	58.3
Peak 24-hour value (state) ($\mu g/m^3$) [4]	88.1	103.8	93.0	82.3	62.0
Days above federal standard (35 $\mu g/m^3$) [3,4]	34	64	50	35	21
Annual Average value (federal) ($\mu g/m^3$) [4]	16.7	18.8	17.3	15.1	13.0
Annual Average value (state) ($\mu g/m^3$) [4]	21.2	22.3	21.2	15.1	16.5
Particulate matter less than or equal to 10 microns in diameter (PM_{10})					
Peak 24-hour value (federal) ($\mu g/m^3$) [4]	117.0	107.0	77.7	71.9	88.6
Peak 24-hour value (state) ($\mu g/m^3$) [4]	122.0	102.0	78.3	75.3	85.6
Days above federal standard (150 $\mu g/m^3$)	0	0	0	0	0
Days above state standard (50 $\mu g/m^3$)	13	9	15	8	5
Annual Average value (federal) ($\mu g/m^3$) [4]	37.7	32.0	34.4	30.7	25.8
Annual Average value (state) ($\mu g/m^3$) [4]	38.1	32.4	35.1	30.9	25.9
Carbon Monoxide (CO)					
Peak 1-hour value (ppm)	4.0	3.4	3.1	NA	NA
Days above federal and state standard (9 ppm)	0	0	0	NA	NA
Peak 8-hour value (ppm)	3.20	2.60	2.34	2.07	1.41
Days above federal standard (35 ppm)	0	0	0	0	0
Days above state standard (20 ppm)	0	0	0	0	0
Nitrogen Dioxide (NO_2)					
Peak 1-hour value (ppm)	0.086	0.076	0.070	0.068	0.077
Days above federal standard (0.100 ppm)	0	0	0	0	0
Days above state standard (0.18 ppm)	0	0	0	0	0
Annual Average value (ppm)	0.017	0.017	0.016	0.014	0.012
Sulfur Dioxide (SO_2)					
Peak 1-hour value (ppm)	NA	0.24	0.06	NA	NA
Days above federal standard (0.075 ppm) [5]	NA	NA	NA	NA	NA
Peak 24-hour value (ppm)	NA	0.007	0.003	0.005	0.004
Days above state standard (0.04 ppm)	NA	0	0	0	0
Annual Average value (ppm)	NA	NA	0.001	0.001	NA

Notes: [1] The federal 8-hour O_3 standard was revised downward in 2008 to 0.075 ppm.

[2] The federal 8-hour O_3 standard was previously defined as 0.08 ppm (1 significant digit). Measurements were rounded up or down to determine compliance with the standard; therefore a measurement of 0.084 ppm is rounded to 0.08 ppm. The 8-hour O_3 ambient air quality standards are met at an ambient air quality monitoring site when the average of the annual fourth-highest daily maximum 8-hour average O_3 concentration is less than or equal to the standard.

[3] The federal $PM_{2.5}$ standard was revised downward in 2007 to 35 $\mu g/m^3$. For $PM_{2.5}$, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard.

[4] State and federal statistics may differ for the following reasons: (1) State statistics are based on California approved samplers, whereas national statistics are based on samplers using federal reference or equivalent methods. State and federal statistics may therefore be based on different samplers. (2) State criteria for ensuring that data are sufficiently complete for calculating valid annual averages are more stringent than the national criteria.

[5] The federal 1-hour SO_2 standard was adopted in 2010.

$\mu g/m^3$ = micrograms per cubic meter; NA = data not available; ppm = parts per million

Sources: CARB 2011, USEPA 2011

Table 3.2-4. Ambient Air Monitoring Data for Riverside, California

Air Quality Indicator	*2006*	*2007*	*2008*	*2009*	*2010*
Riverside					
Ozone (O_3)					
Peak 1-hour value (ppm)	0.151	0.131	0.146	0.116	0.076
Days above state standard (0.09 ppm)	45	31	54	25	0
Peak 8-hour value (ppm)	0.117	0.111	0.116	0.100	0.067
Fourth high 8-hour value (ppm)	0.112	0.098	0.111	0.089	0.059
Days above federal standard (0.075 ppm)(1,2)	57	46	64	36	0
Days above state standard (0.070 ppm)	75	69	89	57	0
Particulate matter less than or equal to 2.5 microns in diameter ($PM_{2.5}$)					
Peak 24-hour value (federal) ($\mu g/m^3$) (4)	68.4	75.6	57.6	54.4	NA
Peak 24-hour value (state) ($\mu g/m^3$) (4)	68.4	75.6	57.6	54.4	NA
Days above federal standard (35 $\mu g/m^3$) (3,4)	32	33	14	13	NA
Annual Average value (federal) ($\mu g/m^3$) (4)	19.0	18.9	16.3	15.2	NA
Annual Average value (state) ($\mu g/m^3$) (4)	NA	19.8	NA	17.1	NA
Particulate matter less than or equal to 10 microns in diameter (PM_{10})					
Peak 24-hour value (federal) ($\mu g/m^3$) (4)	109	559	115	77	50.5
Peak 24-hour value (state) ($\mu g/m^3$) (4)	106	540	108	75	NA
Days above federal standard (150 $\mu g/m^3$)	0	1	0	0	NA
Days above state standard (50 $\mu g/m^3$)	69	65	46	30	NA
Annual Average value (federal) ($\mu g/m^3$) (4)	55.1	59.5	46.5	42.5	24.9
Annual Average value (state) ($\mu g/m^3$) (4)	52.7	57.0	44.8	41.1	NA
Carbon Monoxide (CO)					
Peak 1-hour value (ppm)	2.7	3.8	2.7	NA	NA
Days above federal and state standard (9 ppm)				NA	NA
Peak 8-hour value (ppm)	2.29	2.93	1.86	1.85	1.20
Days above federal standard (35 ppm)	0	0	0	0	0
Days above state standard (20 ppm)	0	0	0	0	0
Nitrogen Dioxide (NO_2)					
Peak 1-hour value (ppm)	0.076	0.072	0.092	0.078	0.052
Days above federal standard (0.100 ppm)	0	0	0	0	0
Days above state standard (0.18 ppm)	0	0	0	0	0
Annual Average value (ppm)	0.020	0.020	0.019	0.017	NA
Sulfur Dioxide (SO_2)					
Peak 1-hour value (ppm)	0.012	0.016	0.011	NA	NA
Days above federal standard (0.075 ppm) (5)	0	0	0	NA	NA
Peak 24-hour value (ppm)	0.003	0.004	0.003	0.003	0.002
Days above state standard (0.04 ppm)	0	0	0	0	0
Annual Average value (ppm)	0.001	NA	0.000	0.001	NA

Notes: (1) The federal 8-hour O_3 standard was revised downward in 2008 to 0.075 ppm.

(2) The federal 8-hour O_3 standard was previously defined as 0.08 ppm (1 significant digit). Measurements were rounded up or down to determine compliance with the standard; therefore a measurement of 0.084 ppm is rounded to 0.08 ppm. The 8-hour O_3 ambient air quality standards are met at an ambient air quality monitoring site when the average of the annual fourth-highest daily maximum 8-hour average O_3 concentration is less than or equal to the standard.

(3) The federal $PM_{2.5}$ standard was revised downward in 2007 to 35 $\mu g/m^3$. For $PM_{2.5}$, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard.

(4) State and federal statistics may differ for the following reasons: (1) State statistics are based on California approved samplers, whereas national statistics are based on samplers using federal reference or equivalent methods. State and federal statistics may therefore be based on different samplers. (2) State criteria for ensuring that data are sufficiently complete for calculating valid annual averages are more stringent than the national criteria.

(5) The federal 1-hour SO_2 standard was adopted in 2010.

$\mu g/m^3$ = micrograms per cubic meter; NA = data not available; ppm = parts per million

Sources: CARB 2011, USEPA 2011

3.2.2.5 144th Fighter Wing Emissions

Fresno-Yosemite IAP. Emissions associated with F-16 operations at the 144 FW at Fresno-Yosemite IAP include emissions of VOCs and NO_x, both of which are precursors to O_3, as well as CO, SO_2, $PM_{2.5}$, and PM_{10}. Emissions of lead are not addressed because the affected areas contain no significant sources of this criteria pollutant, and 144 FW operations would not result in substantial emissions of lead.

Emissions for the 144 FW have been quantified in the *Final 2007 Air Emissions Inventory* (144 FW 2009a). The inventory evaluated the emissions from the 144 FW to determine its status under the Title V Federal Operating Permits program. Based on the major source thresholds for the area, the major source thresholds are 100 tons per year (tpy) of CO, PM_{10}, $PM_{2.5}$, and SO_x; 10 tpy of O_3 precursors NO_x and VOCs; and 10 tpy of any single HAP or 25 tpy of any combination of HAPs. The 144 FW does not currently hold a Federal Operating Permit as its emissions are below the major source threshold. According to the Air Emissions Inventory, potential NO_x emissions may be above the Title V threshold due to engine testing in the test cell; however, the installation has the option of limiting emissions through a permit condition restricting fuel use in the test cell such that the facility remains below the Title V emission threshold for NO_x.

In 2007, the 144 FW held 16 operating permits. The permitted sources include the 144 FW's engine test cell, diesel emergency generators, degreasers, abrasive blasting unit, and spray paint booth. Emissions also arise from area sources such as chemical usage, small arms firing, and abrasive blasting.

Mobile source emissions include emissions from aircraft operations (take-offs and landings), aerospace ground equipment (AGE), ground vehicle operations, and maintenance aircraft operations performed with the engines still mounted on the aircraft (engine run-ups and trim checks). Emissions from aircraft take-off and landing operations, as well as other aircraft operations at the installation, considered all based and transient aircraft. Aircraft emissions were calculated for all flight activities below the default mixing height (3,000 feet AGL). Baseline emissions also include stationary sources, and emissions associated with vehicle trips associated with existing personnel and dependents. These emissions, combined with those from the other mobile sources, account for the majority of the emissions from the installation.

To provide a baseline for evaluating the net emissions increases/decreases associated with the Proposed Action, emissions from the F-16 aircraft operations, aircraft refueling, F-16 engine testing, F-16-related AGE, and privately-owned vehicles (POVs) associated with F-16 flight operations were evaluated. Emissions from the F-16 aircraft operations were calculated based on number of operations identified as baseline in the noise analysis in Section 3.1.2, and utilized site specific flight profiles to calculate aircraft operations below a default mixing height of 3,000 feet AGL. A discussion of the methodology for quantifying emissions is provided in Appendix C.

Emissions for the baseline emissions associated with baseline operations of the F-16 aircraft are provided in Table 3.2-5.

Table 3.2-5. 144 FW F-16 Baseline Emissions (Fresno-Yosemite IAP)

	EMISSIONS, TONS/YEAR						
Emission Source	*CO*	*NO_x*	*VOCs*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*	*CO_2e*
F-16 Baseline Aircraft Operations	23.631	10.401	6.500	1.364	2.271	2.248	23,385
Refueling	-	-	0.007	-	-	-	
Engine Testing	1.684	0.220	0.379	0.057	0.098	0.097	149
Aircraft Ground Equipment	7.594	11.483	3.698	0.135	1.088	1.078	337
Privately-Owned Vehicles	3.858	0.353	0.120	0.005	0.056	0.032	621
Total Baseline Emissions	**36.77**	**22.46**	**10.70**	**1.56**	**3.51**	**3.45**	**24,493**

CO = carbon monoxide; CO_2e = carbon dioxide equivalent; NO_x = oxides of nitrogen; PM_{10} = particulate matter less than or equal to 10 microns in diameter; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; SO_2 = sulfur dioxide; VOC = volatile organic compound

March Air Reserve Base. Emissions associated with F-16 operations of the 144 FW at March ARB include emissions of VOCs and NO_x, both of which are precursors to O_3, as well as CO, SO_2, $PM_{2.5}$, and PM_{10}. Emissions of lead are not addressed because the affected areas contain no significant sources of this criteria pollutant, and 144 FW operations would not result in substantial emissions of lead.

Emissions for the 144 FW have been quantified in the *March Air Reserve Base 2009 Air Emissions Inventory Report* (AFCEE 2011). The inventory evaluated the emissions from March ARB to address the requirements of federal, state, and local air quality regulations. Based on the major source thresholds for the area, the major source thresholds are 100 tpy of CO, $PM_{2.5}$, and SO_x; 70 tpy of PM_{10}; 10 tpy of O_3 precursors NO_x and VOCs; and 10 tpy of any single HAP or 25 tpy of any combination of HAPs. March ARB currently holds an operating permit that includes 61 individual permitted sources.

Mobile source emissions include emissions from aircraft operations (take-offs and landings), AGE, ground vehicle operations, and maintenance aircraft operations performed with the engines still mounted on the aircraft (engine run-ups and trim checks). Because engine run-ups were not evaluated separately in the Inventory, it was assumed that the emissions from this operation were included in the total operational emission estimates. Emissions from aircraft take-off and landing operations, as well as other aircraft operations at the Base, considered all based and transient aircraft. Aircraft emissions were calculated for all flight activities below the default mixing height (3,000 feet AGL). Baseline emissions also include stationary sources, and emissions associated with vehicle trips associated with existing personnel and dependents. These emissions, combined with those from the other mobile sources, account for the majority of the emissions from the Base.

To provide a baseline for evaluating the net emissions increases/decreases associated with the Proposed Action, emissions from the F-16 aircraft operations, F-16 engine testing, F-16-related AGE, and POVs associated with F-16 flight operations were evaluated. Emissions from the F-16

aircraft operations were calculated based on number of operations identified as baseline in the noise analysis in this EIS, and utilized site-specific flight profiles to calculate aircraft operations below a default mixing height of 3,000 feet AGL. Emissions for the baseline emissions associated with current operations of the F-16 aircraft are provided in Table 3.2-6.

Table 3.2-6. 144 FW F-16 Baseline Emissions (March ARB)

	EMISSIONS, TONS/YEAR						
Emission Source	*CO*	*NO_x*	*VOCs*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*	*CO_2e*
F-16 Baseline Aircraft Operations	5.669	5.006	1.743	0.481	0.735	0.728	5,204
Refueling	-	-	0.002	-	-	-	-
Aircraft Ground Equipment	0.524	0.723	0.045	0.010	0.022	0.022	26
Privately-Owned Vehicles	7.886	0.725	0.213	0.012	0.131	0.073	1,404
Total Baseline Emissions	**14.08**	**6.45**	**2.00**	**0.50**	**0.89**	**0.82**	**6,634**

CO = carbon monoxide; CO_2e = carbon dioxide equivalent; NO_x = oxides of nitrogen; PM_{10} = particulate matter less than or equal to 10 microns in diameter; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; SO_2 = sulfur dioxide; VOC = volatile organic compound

3.3 LAND USE

3.3.1 Definition of the Resource

Land use comprises the natural conditions and/or human-modified activities occurring at a particular location. Human-modified land use categories include residential, commercial, industrial, transportation, communications and utilities, agricultural, institutional, recreational, and other developed use areas. Management plans and zoning regulations determine the type and extent of land use allowable in specific areas and are often intended to protect specially designated or environmentally sensitive areas and sensitive noise receptors.

Several siting criteria have been established specific to land development and use at commercial and military airfields. For example, Runway Protection Zones (RPZs), which address height restrictions, development density, and land use in and around civilian airports, are enforced to reduce the potential for aircraft-related hazards.

The ROI for land use is the area including and immediately surrounding the 144 FW installation at the Fresno-Yosemite IAP. In addition, the ROI associated with March ARB is Riverside County and the bordering cities of Riverside, Perris, and Moreno Valley. The ROI does not include the land underneath the SUA proposed for use since no ground disturbance would occur in these areas and the Proposed Action would not generate changes in noise, frequency of use, duration of use, or number of operations at these locations.

3.3.2 Existing Conditions

3.3.2.1 Fresno-Yosemite International Airport

The 144 FW installation is located at Fresno-Yosemite IAP, approximately 5 miles east of downtown Fresno, in Fresno County, California. Fresno-Yosemite IAP is a commercial service

airport owned and operated by the City of Fresno. The 144 FW currently operates on 110.5 acres of airport property. The installation contains facilities and infrastructure developed to support the administrative, maintenance, and operational functions associated with the 144 FW mission. The main portion of the 144 FW installation is situated along the southern portion of the airfield, and a 25.5-acre, detached parcel serves as the unit's munitions storage area that is located along the northeast portion of the airfield.

Land use immediately adjacent to Fresno-Yosemite IAP includes industrial/commercial uses to the boundary on the south, east, and west. There are areas of residential land use to the west of the airport. Some agricultural lands occur to the southeast, while open space is located within the Runway Protection Zones to the north and south as well as a large portion to the southeast (Fresno-Yosemite IAP 2006, 2011a). Within the baseline noise contours, the primary land use on the southeast portion is industrial and recreation/open space. The northwestern portion of land under the baseline contours to the northwest has a mix of low to high density residential, recreation/open space, and educational (including four schools) (Figure 3.3-1).

3.3.2.2 March Air Reserve Base

March ARB is located in Riverside County, California approximately 15 miles south of the City of San Bernardino and 50 miles east of Los Angeles. The City of Moreno Valley borders the Base to the north and east, the City of Riverside borders to the west, and the City of Perris borders the south. I-215 is located directly west of the installation. The installation occupies approximately 2,150 acres and includes 353 facilities and 215 buildings. The main cantonment area is bordered on the west by I-215, separating the antenna farm, a portion of the northern Clear Zone (CZ), and a small firing range from the remainder of the Base. The majority of the installation is primarily comprised of two land use categories including runway/taxi/apron and mission/operational land uses. Additional land uses include Housing, Administrative, Community (Commercial and Service), Industrial, Medical, Open Space, and Outdoor Recreation.

Land use surrounding March ARB is primarily comprised of industrial, agricultural, commercial, residential, and public use. The eastern boundary of the Base is surrounded by residential, commercial, and agricultural land uses, while the northern boundary is primarily agricultural, commercial, and industrial land use. No schools, churches, or shopping centers are located within the existing noise contours. Some residential and commercial land uses within the southeastern section of the city are currently subject to CNEL of up to 70 dB. There are some areas to the north and west of the Base that are zoned for residential use and are subject to CNEL of up to 70 dB (Figure 3.3-2) (March ARB 2010).

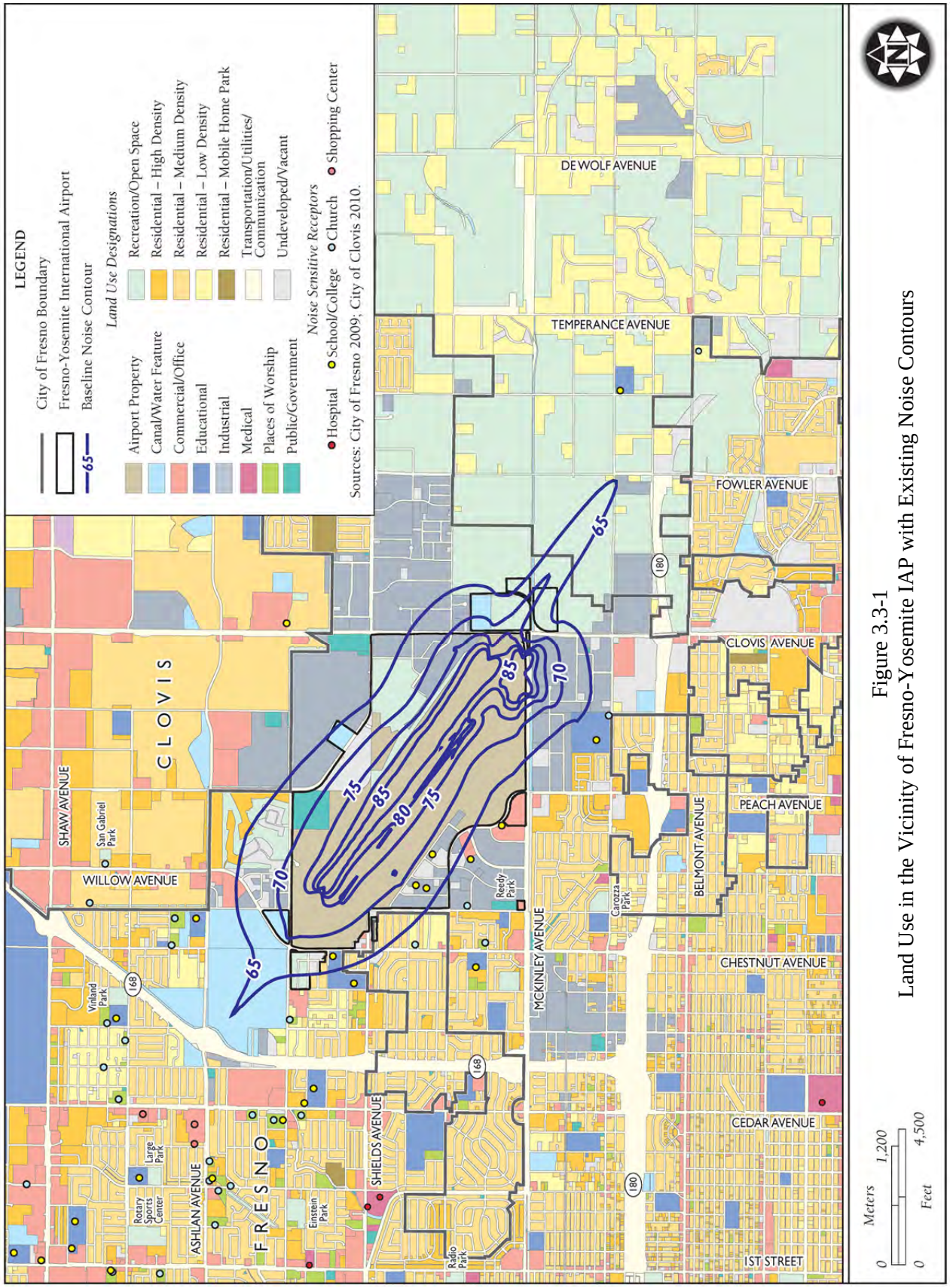


Figure 3.3-1
Land Use in the Vicinity of Fresno-Yosemite IAP with Existing Noise Contours

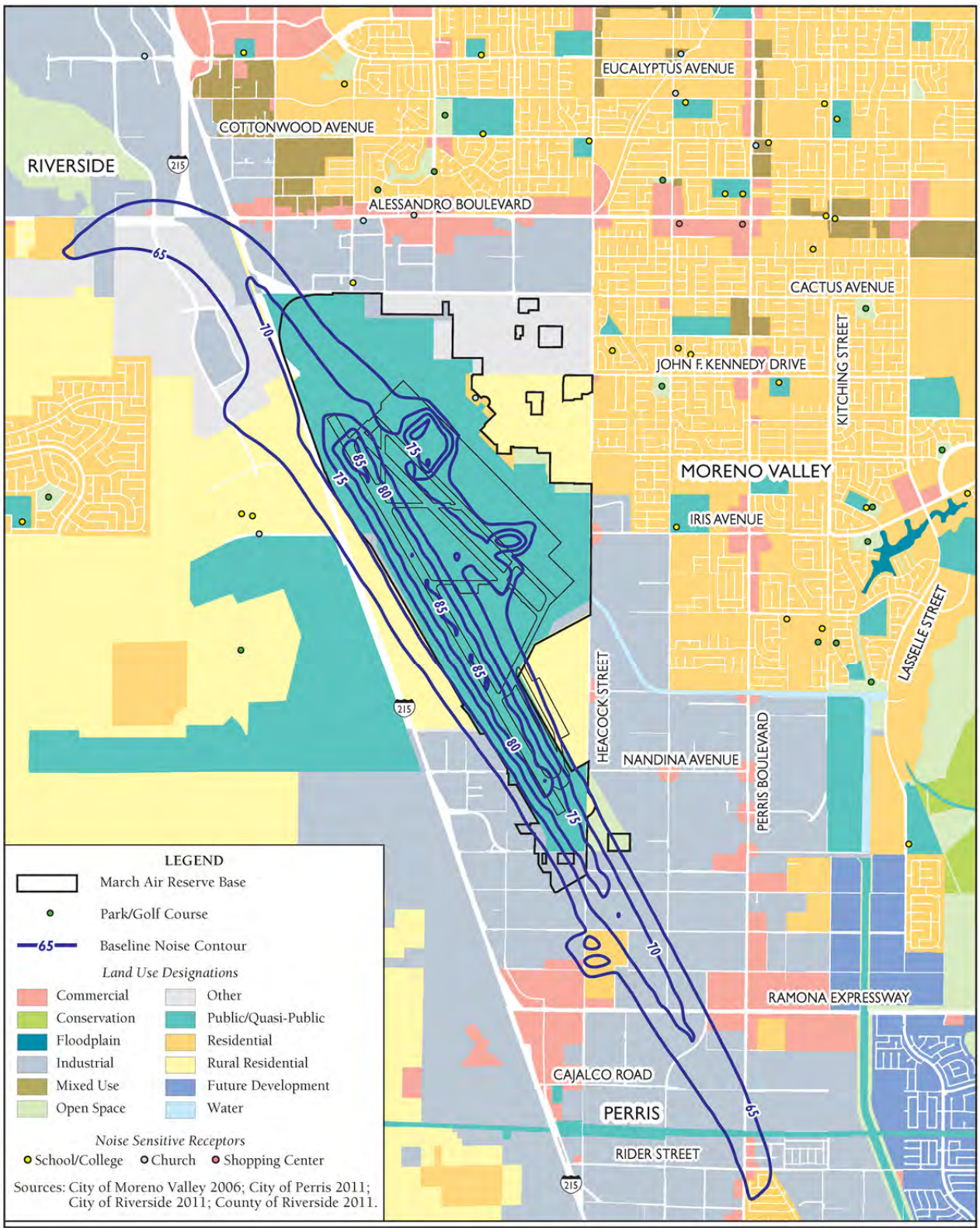


Figure 3.3-2
Land Use in the Vicinity of March ARB with Existing Noise Contours

3.4 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

3.4.1 Definition of the Resource

Socioeconomics comprises the basic attributes and resources associated with the human environment, particularly population and economic activity. Economic activity typically encompasses employment, personal income, and economic growth. Impacts to these fundamental socioeconomic components also influence other issues such as housing availability and the provision of public services. To illustrate local baseline conditions, socioeconomic data provided in this section consists primarily of county and city level data for the areas surrounding the 144 FW installation and March ARB. Where 2010 Census data was not yet available for all demographic and economic data, American Community Survey (ACS) 3-year estimates were used (data on poverty, housing, employment, and school enrollment). However, for estimations of poverty status underneath existing and proposed noise contours, 2010 5-year estimates were used for the census tract level. Census tracts are small subdivisions of a county that represent smaller geographical divisions than a city, and therefore were necessary in order to calculate poverty data underneath the noise contours.

In 1994, EO 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations* (Environmental Justice), was issued to focus the attention of federal agencies on human health and environmental conditions in minority and low-income communities. EO 12898 aims to ensure that disproportionately high and adverse human health or environmental effects to these communities are identified and addressed. This environmental justice analysis focuses on the distribution of race and poverty status in areas potentially affected by implementation of the Proposed Action.

For the purpose of this analysis, minority populations and low-income populations are defined as:

- *Minority Populations:* All categories of non-white population groups as defined in the U.S. Census, including African American, Hispanic, American Indian and Alaska Native, Asian or Pacific Islander, and other groups.

- *Low-Income Populations:* Persons living below the poverty level, as defined by the 2000 Census.

Because children may suffer disproportionately from environmental health risks and safety risks, EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, was introduced in 1997 to prioritize the identification and assessment of environmental health and safety risks that may affect children, and to ensure that federal agency policies, programs, activities, and standards address environmental and safety risks to children. This section

identifies the distribution of children and locations where the number of children in the affected area may be disproportionately high (e.g., schools, childcare centers).

The ROI for socioeconomics associated with the Fresno-Yosemite IAP is Fresno County and the City of Fresno. The ROI associated with March ARB is Riverside County and the bordering cities of Riverside, Perris, and Moreno Valley (subsequently referred to as the metropolitan area). The ROI does not include the land below the SUA proposed for use since no ground disturbance would occur in these areas and the Proposed Action would not generate changes in noise, frequency of use, duration of use, or number of operations at these locations.

3.4.2 Existing Conditions

3.4.2.1 Fresno-Yosemite International Airport

Population and Employment

Population. Current population data and estimates for the County and the City of Fresno are provided in Table 3.4-1. From 1990 to 2000, the County population increased from 667,490 to 799,407, an increase of approximately 19.8 percent (U.S. Census Bureau 2009a). In 2010 the County population grew to over 930,450, approximately a 39.4 percent increase over the 1990 population (U.S. Census Bureau 2010a). The City of Fresno grew from 354,202 to 427,652 between 1990 and 2000, an increase of approximately 20.7 percent (U.S. Census Bureau 2009a). In 2010 the City of Fresno grew to over 494,665, an increase over the 1990 population by approximately 39.7 percent (U.S. Census Bureau 2010a).

Table 3.4-1. Population Growth within the Vicinity of the 144 FW Installation

Area	*1990 Census*	*2000 Census*	*2010 Census*
State of California	29,760,021	33,871,648	37,253,956
Fresno County	667,490	799,407	930,450
City of Fresno	354,202	427,652	494,665

Source: U.S. Census Bureau 2009a, 2010a

The 144 FW currently supports a workforce authorization of 718 traditional guardsmen and 327 full-time Air Guard personnel, totaling 1,045 authorized personnel. A total of 1,010 are currently stationed at Fresno-Yosemite IAP, while 35 are stationed at March ARB.

Employment and Earnings. Based on 2010 ACS 3-year estimates, there were 422,302 persons in the labor force (able to work) and 368,670 employed within Fresno County, resulting in an unemployment rate of 12.7 percent (Table 3.4-2) (U.S. Census Bureau 2010b). Based on 2010 ACS 3-year estimates, the City of Fresno has an unemployment rate of 13.6 percent (U.S. Census Bureau 2010b). The top occupation groups in Fresno County by number of employed persons include Government, Trade, Transportation and Utilities, and Educational and Health Services. Top employers in Fresno County include Community Medical Centers, Kaiser

Permanente, Pelco (Manufacturing – Video Security), and Saint Agnes Medical Center (Employment Development Department 2010).

Table 3.4-2. Employment Data (2010) within the Vicinity of the 144 FW Installation[1]

Area	*Labor Force*	*Employed*	*Unemployed*	*Rate (%)*
State of California	18,691,490	16,728,884	1,962,606	10.5
Fresno County	422,302	368,670	53,632	12.7
City of Fresno	226,384	191,130	30,788	13.6

Note: 1. 2010 Census data for employment is not yet available. 2010 ACS 3-year estimates were used instead.
Source: U.S. Census Bureau 2010b

Schools. According to the 2010 ACS enrollment 3-year estimates, 202,128 students were enrolled in schools from Kindergarten through Grade 12 in Fresno County. In the City of Fresno, 108,072 students were enrolled in schools from Kindergarten through Grade 12 (U.S. Census Bureau 2010c).

Housing. In 2010, the number of housing units in Fresno County was 315,531, with a vacancy rate of 8.3 percent. In the City of Fresno in 2010, there were a total of 171,288 housing units with a vacancy rate of 7.6 percent (U.S. Census Bureau 2010a).

Environmental Justice

Approximately 44.6 percent of the population of Fresno County is composed of minorities (i.e., an ethnic, racial, or religious group with a distinctive presence in a community) (Table 3.4-3), compared to 42.4 percent for the state of California (U.S. Census Bureau 2010a). The City of Fresno has a higher proportion of minorities (50.4 percent) than the County or the State (U.S. Census Bureau 2010a).

Table 3.4-3. Population within the Vicinity of the 144 FW Installation

Geographic Area	*Total Population*	*Minority Population*	*Percent Minority*	*Low-Income Population*	*Percent Low-Income[1,2]*	*Children Under Age 18*	*Percent Children*
State of California	37,253,956	15,800,022	42.4	5,245,438	14.5	9,295,040	25.0
Fresno County	930,450	415,305	44.6	215,468	23.8	277,507	29.9
City of Fresno	494,665	249,359	50.4	127,402	26.4	148,823	30.1

Note: 1. The percentage of low-income persons is calculated as a percentage of all persons for whom the Bureau of the Census determines poverty status, which is generally a lower number than the total population because it excludes institutionalized persons, person in military group quarters and college dormitories, and unrelated individuals under 15 years old.
2. 2010 Census data for employment is not yet available. 2010 ACS 3-year estimates were used instead.
Source: U.S. Census Bureau 2010a, 2010d

The percentage of population living below the poverty level for the State of California (14.5 percent) is the lowest of the three geographic areas (U.S. Census Bureau 2010d). The City of Fresno has the highest proportion of its population living below poverty level at 26.4 percent, while Fresno County has 23.8 percent (U.S. Census Bureau 2010d).

Table 3.4-4 displays the total population, total minority population, percentage minority, total low-income population, and low-income percentages for the affected areas in the vicinity of Fresno-Yosemite IAP with baseline CNEL greater than 65 dB. Minority and low-income populations in the affected areas are then compared with the total population of Fresno County.

Table 3.4-4. Population within Baseline Noise Contours, Fresno-Yosemite IAP

Noise Contour	*Total Population*	*Minority Population*	*Percent Minority*	*Low-Income Population*	*Percent Low-Income*[1,2]
65-70	1,424	1,014	71.2	307	21.6
70-75	7	5	71.4	1	14.3
75-80	-	-	-	-	-
80-85	-	-	-	-	-
85+	-	-	-	-	-
Total	**1,431**	**1,019**	**71.2**	**308**	**21.5**

Notes: 1. The percentage of low-income persons is calculated as a percentage of all persons for whom the Bureau of the Census determines poverty status, which is generally a lower number than the total population because it excludes institutionalized persons, person in military group quarters and college dormitories, and unrelated individuals under 15 years old.
2. For estimations of poverty status underneath existing and proposed noise contours, 2010 5-year ACS estimates were used. Census tracts are small subdivisions of a county that represent smaller geographical divisions than a city, and therefore were necessary in order to calculate poverty data underneath the noise contours.

Source: U.S. Census Bureau 2010e

In the area surrounding Fresno-Yosemite IAP, approximately 1,431 people were estimated to be affected by existing CNEL between 65 dB and 75 dB. Out of that total, roughly 71.2 percent are considered to be minorities, and 21.5 percent to be low-income. The percentage of minority populations currently affected by noise is greater than the approximate 44.6 percent minority average in Fresno County as a whole. The percentage of low-income populations in the area surrounding Fresno-Yosemite IAP affected by CNEL greater than 65 dB is slightly lower than the 23.8 percent low-income average in Fresno County as a whole.

Protection of Children

In 2010, the number of children under the age of 18 living in Fresno County was approximately 277,507 (29.9 percent of the population) (Table 3.4-3). The State of California has a lower percentage population of children than the County (25.0 percent), while the City of Fresno has the highest percent of children (30.1 percent) (U.S. Census Bureau 2010a). There is no on-installation housing or facilities for children located at the 144 FW installation. Currently there is one Kindergarten through Grade 12 off-installation school that is exposed to aircraft CNEL between 65 dB and 70 dB (Addicott Elementary School). In a noise study conducted by Fresno-Yosemite IAP, it was determined that this school's interior noise level was below the threshold for sound attenuation treatment (Brown-Buntin Associates, Inc. 1994).

3.4.2.2 March Air Reserve Base

Population and Employment

Population. Current population data and estimates for Riverside County and the metropolitan area surrounding March ARB are provided in Table 3.4-5. From 1990 to 2000, the County population increased from 1,170,413 to 1,545,387, an increase of approximately 32 percent (U.S. Census Bureau 2010a, 2010f). In 2010 the County population grew to over 2,189,641, approximately an 87 percent increase over the 1990 population (U.S. Census Bureau 2010f).

Table 3.4-5. Population Growth within the Vicinity of March ARB

Area	*1990 Census*	*2000 Census*	*2010 Census*
State of California	29,760,021	33,871,648	37,253,956
Riverside County	1,170,413	1,545,387	2,189,641
Metropolitan Area[1]	366,744	433,736	565,622

Note: 1. Metropolitan area includes the Cities of Moreno Valley, Perris, and Riverside.
Source: U.S. Census Bureau 2009a, 2009b, 2010a, 2010f

The metropolitan area surrounding March ARB grew from 366,744 to 433,736 between 1990 and 2000, an increase of approximately 18.3 percent (U.S. Census Bureau 2010f). In 2010 the metropolitan area grew to over 565,622, an increase over the 1990 population by approximately 54.2 percent (U.S. Census Bureau 2010f).

The 144 FW currently supports an authorized workforce population of 718 traditional guardsmen and 327 Air Guard Reserve full-time, totaling 1,045 authorized personnel. A total of 1,010 are currently stationed at Fresno-Yosemite IAP, while 35 are stationed at March ARB.

Employment and Earnings. Based on 2010 ACS 3-year estimates, there were 1,006,879 persons in the labor force and 869,943 employed within Riverside County, resulting in an unemployment rate of 13.6 percent (Table 3.4-6) (U.S. Census Bureau 2010b). Based on 2010 ACS 3-year estimates, the metropolitan area surrounding March ARB has an unemployment rate of 13.9 percent (U.S. Census Bureau 2010b). The top occupation groups in Riverside County in 2011 by number of employed persons include Trade, Transportation and Utilities, Government, and Educational and Health Services (Employment Development Department 2011). A few of the top employers in Riverside County include Corona Regional, Hemet Valley, and Eisenhower Medical Centers, Corrections Department, University of California Riverside, Kaiser Permanente, and several Resorts and Casinos (Employment Development Department 2011).

Table 3.4-6. Employment Data (2010) within the Vicinity of March ARB[1]

Area	*Labor Force*	*Employed*	*Unemployed*	*Rate (%)*
State of California	18,691,490	16,728,884	1,962,606	10.5
Riverside County	1,006,879	869,943	136,936	13.6
Metropolitan Area[2]	265,936	228,929	37,007	13.9

Notes: 1. 2010 Census data for employment is not yet available. 2010 ACS 3-year estimates were used instead.
2. Metropolitan area includes the Cities of Moreno Valley, Perris, and Riverside.
Source: U.S. Census Bureau 2010b

Schools. According to the 2010 ACS enrollment 3-year estimates, 466,653 students were enrolled in schools from Kindergarten through Grade 12 in Riverside County. In the metropolitan area surrounding March ARB, 128,756 students were enrolled in schools from Kindergarten through Grade 12 (U.S. Census Bureau 2010c).

Housing. In 2010, the number of housing units in Riverside County was 800,707, with a vacancy rate 14.3 percent. In the metropolitan area in 2010, there were a total of 171,909 housing units with a vacancy rate of 7.0 percent (U.S. Census Bureau 2010f).

Environmental Justice

Approximately 39.0 percent of the population of Riverside County is composed of minorities (i.e., an ethnic, racial, or religious group with a distinctive presence in a community) (Table 3.4-7), compared to 42.4 percent for the state of California (U.S. Census Bureau 2010a, 2010f). The metropolitan area surrounding March ARB has a higher proportion of minorities (48.0 percent) than the County or the State (U.S. Census Bureau 2010f).

Table 3.4-7. Population Data within the Vicinity of March ARB

Geographic Area	*Total Population*	*Minority Population*	*Percent Minority*	*Low-Income Population*	*Percent Low-Income*[1,2]	*Children Under Age 18*	*Percent Children*
State of California	37,253,956	15,800,022	42.4	5,245,438	14.5	9,295,040	25.0
Riverside County	2,189,641	854,494	39.0	306,608	14.5	620,108	28.3
Metropolitan Area[3]	565,622	271,330	48.0	99,400	18.1	169,190	29.9

Notes:
1. 2010 Census data for low-income statistics is not yet available. 2010 ACS 3-year estimates were used instead.
2. The percentage of low-income persons is calculated as a percentage of all persons for whom the Bureau of the Census determines poverty status, which is generally a lower number than the total population because it excludes institutionalized persons, person in military group quarters and college dormitories, and unrelated individuals under 15 years old.
3. Metropolitan area includes the Cities of Moreno Valley, Perris, and Riverside.

Source: U.S. Census Bureau 2010a, 2010d, 2010f

The percentage of population living below the poverty level in the State of California and in Riverside County is 14.5 percent (U.S. Census Bureau 2010d). The metropolitan area has the highest proportion of its population living below poverty level at 18.1 percent (U.S. Census Bureau 2010d).

Protection of Children

In 2010, the number of children under the age of 18 living in Riverside County was approximately 620,108 (28.3 percent of the population) (Table 3.4-7). The State of California has a lower percentage population of children than the County (25.0 percent), while the metropolitan area has the highest percent of children (29.9 percent) (U.S. Census Bureau 2010f). There is no on-Base housing or facilities for children located at the 144 FW installation. Similarly, there are no facilities on March ARB where children may be encountered on a regular

basis. There are no off-Base schools that are currently exposed to aircraft CNEL of 65 dB or above at March ARB.

3.5 SAFETY

3.5.1 Definition of Resource

This section addresses ground and flight safety associated with activities conducted by the 144 FW. Ground safety considers issues associated with human activities and operations and maintenance activities that support 144 FW operations. A specific aspect of ground safety addresses AT/FP considerations. Explosive safety discusses the management and use of ordnance or munitions associated with installation operations and training activities. Flight safety addresses aircraft mishaps and bird/wildlife aircraft strikes.

The ROI for safety includes the airfield at Fresno-Yosemite IAP and its immediate vicinity. In addition, the ROI includes the airfield at March ARB and its immediate vicinity. The ROI does not include the land underneath the SUA proposed for use since no ground disturbance would occur in these areas and the Proposed Action would not generate changes in noise, frequency of use, duration of use, or number of operations at these locations.

3.5.2 Existing Conditions

3.5.2.1 Fresno-Yosemite International Airport

Ground Safety

Day-to-day operations and maintenance activities conducted by the 144 FW are performed in accordance with applicable USAF safety regulations, published USAF Technical Orders, and standards prescribed by AFOSH requirements. The 144 FW provides fire, crash, rescue, and structural fire protection for the installation and its aircraft. The 144 FW has a cooperative response agreement with the local City fire department if additional response is needed. The City of Fresno Fire Department serves as the primary response for the rest of Fresno-Yosemite IAP and operates one fire station at the airport, as well as another City fire facility, Station #10, is located adjacent to the airport on the northeast side. Under current operations, the unit is fully capable of meeting its requirements; there are no identified equipment shortfalls or limiting factors (144 FW 2007a, Fresno-Yosemite IAP 2011b).

RPZs. Since Fresno-Yosemite IAP is a public use airport, it utilizes the FAA's airport land-use compatibility guidelines called RPZs. These guidelines are similar to CZs and Accident Potential Zones (APZs) that are described below for March ARB, in that RPZs are rectangular zones extending outward from the ends of active runways and delineate those areas recognized

as having the greatest risk of aircraft mishaps, most of which occur during take-off or landing (Figure 3.5-1). Development restrictions associated with RPZs are intended to preclude incompatible land use activities from being established in these areas. RPZs have allowed development to be compatible with airport operations.

Under FAA design criteria (which applies to all obligated airports), the airport must own the landing area. Secondly the airport owner must have sufficient interest in the RPZs to protect the RPZs from both obstructions and incompatible land use. Finally, the airport owner must strive to attain compatible zoning around the airport in order to prevent incompatible land uses.

Explosive Safety. The 144 FW stores, maintains, and uses a range of munitions required for performance of their mission. All ordnance is handled and stored in accordance with USAF explosive safety directives (USAF Manual 91-201, *Explosive Safety Standards*; USAF Policy Directive 91-2, *Safety Programs*; and DoD 6055.9-Std, *Ammunition and Explosives Safety Standards*), and all munitions maintenance is carried out by trained, qualified personnel using USAF-approved technical procedures. Restrictions apply to the areas immediately surrounding the munitions storage facilities to provide separation between facilities and activities to minimize serious injury, loss of life, and damage to property. The size of the safety areas, referred to as QD arcs, varies depending on the type and amount of munitions stored. The DoD defines munitions through a system called the DoD Hazard Classification System. This system consists of nine hazard classes and takes into account the munitions' blast, fragment, debris, and thermal hazards to establish appropriate QD protection principles and design procedures to achieve personnel protection, protect facilities and equipment, and prevent propagation of explosions. There are several different types of munitions storage including underground storage facilities, earth covered materials, barricades, storage modules, and special structures. There is a corresponding QD arc associated with each type of storage, depending on the types and amounts of munitions stored. QD arcs take into account specific public transportation distance and inhabited building distance standards associated with each type of munitions.

Ordnance for the 144 FW is currently stored in the Weapons Storage Area on the north side of the airport runways in Buildings 2620-2624 and Building 2640. Munitions stored include bombs, missiles, small to medium caliber ammunition, and flares. Figure 3.5-1 shows the QD arcs associated with these facilities. The QD arc located southeast of the airfield is due to the placement of alert airplanes that are armed with munitions.

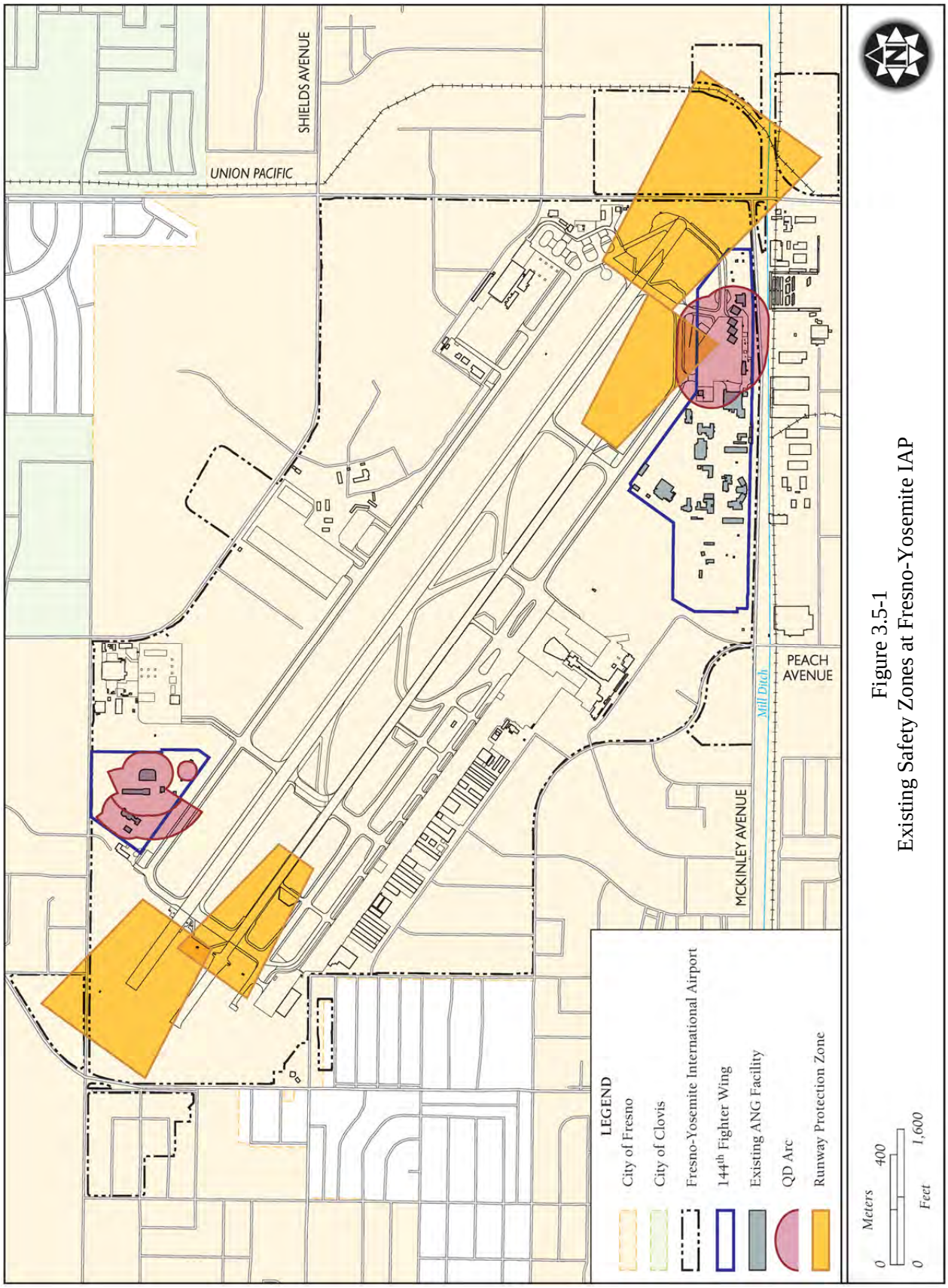


Figure 3.5-1
Existing Safety Zones at Fresno-Yosemite IAP

Anti-Terrorism/Force Protection

As a result of terrorist activities, the DoD and the USAF have developed a series of AT/FP guidelines for military installations: UFC 4-010-01 2007, *DoD Minimum Antiterrorism Standards for Buildings*; AFI 31-210 1999, *The Air Force Antiterrorism/Force Protection (AT/FP) Program*; and DoD O-2000.12-H 1993, *Protection of DoD Personnel and Activities Against Acts of Terrorism and Political Turbulence.* These guidelines address a range of considerations that include access to the installation, access to facilities on the installation, facility siting, exterior design, interior infrastructure design, and landscaping. The intent of this siting and design guidance is to improve security, minimize fatalities, protect personnel, and limit damage to facilities in the event of a terrorist attack.

Many of the military facilities at the 144 FW installation at Fresno-Yosemite IAP were constructed before such considerations became a critical concern. Thus, under current conditions, many facilities do not comply with all current AT/FP standards. However, as new construction occurs and as facilities are modified, it is the intention of CA ANG to incorporate these standards to the maximum extent practicable.

Flight Safety

The primary public concern with regard to flight safety is the potential for aircraft accidents. Such mishaps may occur as a result of mid-air collisions, collisions with manmade structures or terrain, weather-related accidents, mechanical failure, pilot error, or bird/wildlife-aircraft collisions. Flight risks apply to all aircraft, they are not limited to the military. Flight safety considerations addressed include aircraft mishaps and bird/wildlife-aircraft strikes.

Aircraft Mishaps. Aircraft mishaps are classified as A, B, C, or E, with Class A mishaps being the most severe, with total property damage of $2 million or more, total aircraft loss, and a fatality and/or permanent total disability (DoD 2011). Based on historical data on mishaps at all installations, and under all conditions of flight, the military services calculate Class A mishap rates per 100,000 flying hours for each type of aircraft in the inventory. Combat losses are excluded from these mishap statistics. This EIS will focus on Class A mishaps because of their potentially catastrophic results.

F-16 aircraft have flown more than 9,462,699 hours since 1975 for the USAF. Over that period, 342 Class A mishaps have occurred with 312 aircraft destroyed. This results in a Class A mishap rate of approximately 3.6 per 100,000 flight hours (Air Force Safety Center [AFSC] 2011a).

It is impossible to predict the precise location of an aircraft accident, should one occur. Major considerations in any accident are loss of life and damage to property. The aircrew's ability to exit from a malfunctioning aircraft is dependent on the type of malfunction encountered. The

probability of an aircraft crashing into a populated area is extremely low, but it cannot be totally discounted. Several factors are relevant: the population density of the ROI; pilots of aircraft are instructed to avoid direct overflight of population centers at very low altitudes; and, finally, the limited amount of time the aircraft is over any specific geographic area limits the probability that impact of a disabled aircraft in a populated area would occur.

Secondary effects of an aircraft crash include the potential for fire and environmental contamination. Again, because the extent of these secondary effects is situationally dependent, they are difficult to quantify. The terrain overflown in the ROI is diverse. For example, should a mishap occur, highly vegetated areas during a hot, dry summer would have a higher risk of experiencing extensive fires than would more barren and rocky areas during the winter. When an aircraft crashes, it may release hydrocarbons. Those petroleum based products not consumed in a fire could contaminate soil and water. The potential for contamination is dependent on several factors. The porosity of the surface soils would determine how rapidly contaminants are absorbed. The specific geologic structure in the region would determine the extent and direction of the contamination plume. The locations and characteristics of surface and groundwater in the area would also affect the extent of contamination to those resources.

Due to the myriad factors in such an occurrence, detailed steps cannot be foreseen; however, each crash response would be considered on a case-by-case basis to ensure minimizing resultant evidence of intrusiveness to the maximum extent practicable, consistent with national security considerations and the need to protect life and property from further risk.

Aircraft operations from Fresno-Yosemite IAP and March ARB are governed by flight standard rules. Specific procedures are contained in standard operating procedures that must be followed by all aircrews operating from the installation (AFI 13-204, *Airfield Operations Procedures and Programs*) to ensure flight safety.

The 144 FW has had two Class A mishaps with the F-16 aircraft, one in 1997 and one in 2007 (personal communication, Navin 2011). There have been no Class A or Class B aircraft accidents for the 144 FW at Fresno-Yosemite IAP in the last 3 years (144 FW 2011a).

Bird/Wildlife Aircraft Strike Hazards (BASH). According to the AFSC BASH statistics, more than 50 percent of bird/wildlife strikes occur below 400 feet, and 90 percent occur at less than 2,000 feet AGL (AFSC 2007). The USAF BASH Team maintains a database that documents all reported bird/wildlife aircraft strikes. Historic information for the past 37 years indicates that 44 USAF aircraft have been destroyed and 35 fatalities have occurred from bird/wildlife aircraft strikes (AFSC 2011b).

The USAF BASH Team has developed an Avian Hazard Advisory System (AHAS). The AHAS considers extensive operational (exposure potential) and biological (bird populations and densities) data and indicates the relative risk of bird-aircraft strikes in specific geographic areas at varying times of the year and hours of the day.

The 144 FW of the CA ANG has an effective, on-going BASH program through which information and assistance is freely shared between airfield users, the Fresno-Yosemite IAP staff, and the local air traffic controllers. Serious BASH-related accidents within the immediate Fresno-Yosemite IAP area are rare. Most of the reported strikes were non-damaging and discovered on the post-flight maintenance inspection. The 144 FW has recently recorded three minor BASH incidents in 2010 (144 FW 2011a).

3.5.2.2 March Air Reserve Base

Ground Safety

CZs, APZs. The USAF AICUZ Program provides compatible use guidelines for land use areas exposed to aircraft noise and accident potential. Land use guidelines include recommendations for CZs and APZs at an airfield. CZs and APZs are rectangular areas that extend outward from the end of the active runways and delineate those areas recognized as having the greatest risk of aircraft mishaps, most of which occur during take-off or landing. The CZs begin at the end of the runway and extend outward 3,000 feet and have the highest accident potential. APZ I extends out from the CZ an additional 5,000 feet while APZ II extends an additional 7,000 feet beyond that. DoD generally purchases lands or establishes easement to prevent developments with the CZ, and encourages local communities to prevent intensive land use within the APZs. March ARB utilizes these land use guidelines for these zones (Figure 3.5-2).

Flight Safety

Detachment 1 at March ARB has never had a Class A mishap (personal communication, Navin 2011). There have been no Class B aircraft accidents for the 144 FW at March ARB in the last 3 years (144 FW 2011a).

BASH. March ARB and the 144 FW have an effective, on-going BASH program through which information and assistance is freely shared between airfield users and March ARB staff, and the local air traffic controllers. Most of the reported strikes were non-damaging and discovered on the post-flight maintenance inspection. The 144 FW has recently recorded three minor BASH incidents in 2010 (144 FW 2011a).

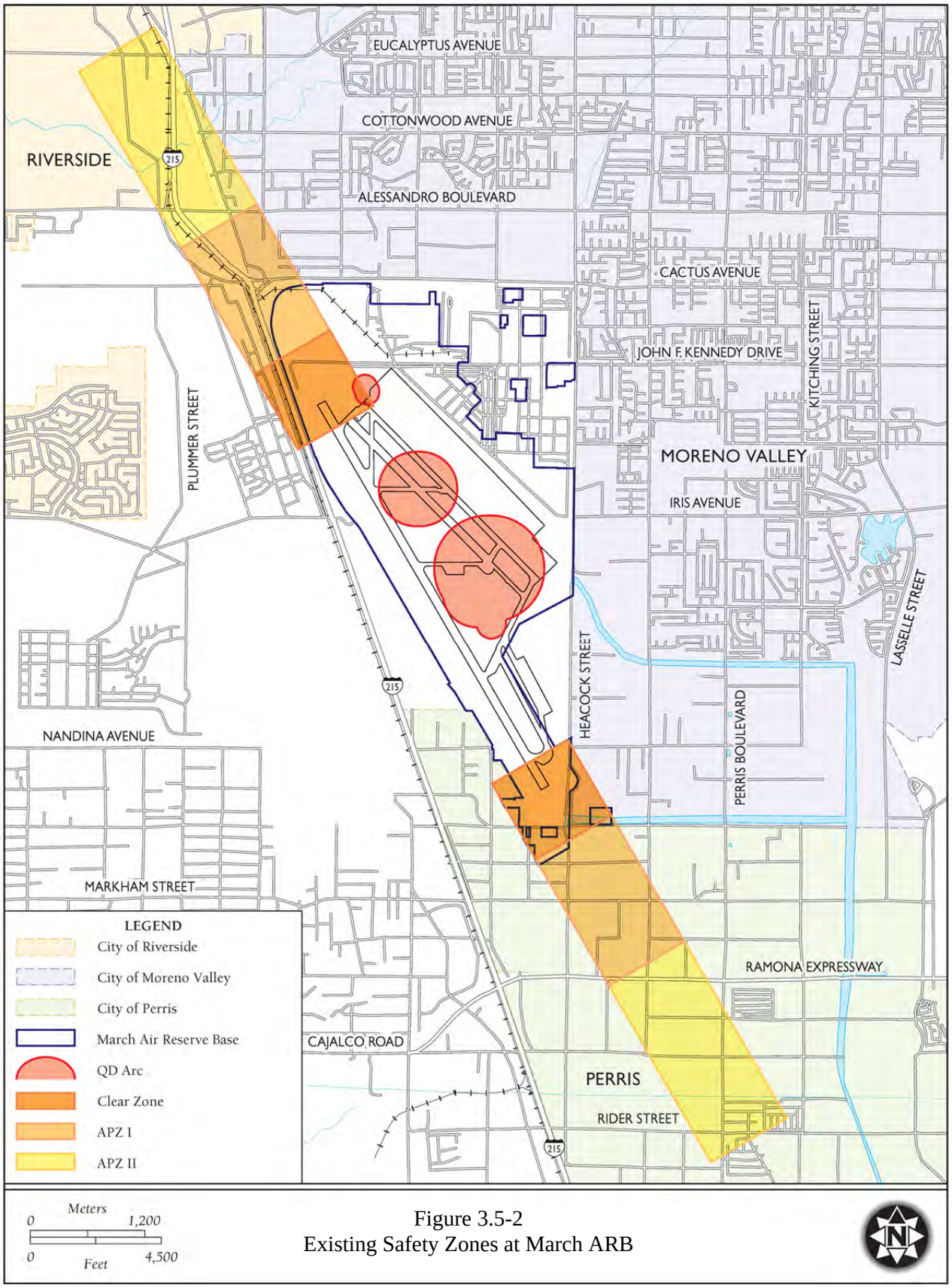


Figure 3.5-2
Existing Safety Zones at March ARB

3.6 HAZARDOUS MATERIALS AND WASTES

3.6.1 Definition of Resource

This EIS analyzes impacts related to hazardous materials, toxic substances, hazardous waste, and contaminated sites. The potential for hazardous materials to be introduced to the 144 FW installation during the course of site development and construction activities; for toxic and hazardous wastes to be generated as a result of construction and demolition activities; and for encounters with contaminated media during the course of site preparation and construction/demolition activities is analyzed.

Impacts related to the continuing use of hazardous materials and generation of hazardous wastes associated with aircraft operations and maintenance as a result of the proposed aircraft conversion are also analyzed. Operational changes (increases/decreases in flying time) would affect the amount of hazardous materials used and stored at the installation, as well as the amount of hazardous waste generated. In addition, changes in maintenance activities and schedules could result in a change in the use of hazardous or toxic substances or generation of hazardous wastes compared to existing conditions.

The ROI for hazardous materials and waste includes areas that could be exposed to an accidental release of a hazardous substance from construction activities, other specific areas affected by past and current hazardous waste operations, and areas where hazardous materials would be utilized or stored. Therefore, the ROI for this action is defined as the 144 FW installation. The ROI does not include March ARB since no ground disturbance would occur in these areas and, while there would be an increase in throughput of fuel, there is no change to the proposed number of operations or type of hazardous materials and wastes generated or stored at March ARB.

3.6.1.1 Hazardous Materials and Waste

Hazardous materials are chemical substances that pose a substantial hazard to human health or the environment. Hazardous materials include hazardous substances, extremely hazardous substances, hazardous chemicals, and toxic chemicals. In general, these materials pose hazards because of their quantity, concentration, physical, chemical, or infectious characteristics. The Resource Conservation and Recovery Act (RCRA) (42 USC 6903[5]) defines a hazardous waste as a solid waste, or combination of solid waste, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may: 1) cause, or significantly contribute to, an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or 2) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed. For the purposes of

this analysis, hazardous wastes include solid wastes that are regulated as hazardous based on either direct listing by USEPA or because they exhibit certain characteristics (ignitability, reactivity, corrosivity, and toxicity), as well as those contaminants present in environmental media (e.g., soil or groundwater).

Hazardous substances are defined and regulated under the laws administered by OSHA, USEPA, and the U.S. Department of Transportation. Each of these agencies incorporates hazardous substance terminology in accordance with its unique Congressional mandate: OSHA regulations categorize substances in terms of their impacts on employee and workplace health and safety; U.S. Department of Transportation regulations categorize substances in terms of their safety in transportation; and USEPA regulations categorize substances in terms of protection of the environment and the public health. With regard to environmental impacts, hazardous substances are regulated under several federal programs administered by the USEPA, including Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Toxic Substances Control Act (TSCA), and RCRA. DoD installations are required to comply with these laws and Emergency Planning and Community Right-to-Know Act (EPCRA) (per EO 15314), along with other applicable federal, state, and DoD regulations, as well as with relevant EOs.

Military munitions used for their intended purposes on ranges or collected for further evaluation and recycling are not considered waste per the Military Munitions Rule (40 CFR § 266.202). The Military Munitions Rule amended portions of RCRA (40 CFR §§ 260 through 170) and defines when conventional and chemical military munitions become solid waste potentially subject to RCRA. Since any munitions associated with the proposed F-15 aircraft would be used for its intended training purpose and flare residual material does not constitute a hazardous waste, any residual material that falls to the ground would not be considered a solid waste and thus not a hazardous waste.

3.6.1.2 Toxic Substances

The promulgation of TSCA (40 CFR §§ 700-766) represented an effort by the federal government to address those chemical substances and mixtures for which it was recognized that the manufacture, processing, distribution, use, or disposal may present unreasonable risk of personal injury or health of the environment, and to effectively regulate these substances and mixtures in interstate commerce. The TSCA Chemical Substances Inventory lists information on more than 62,000 chemicals and substances. Toxic chemical substances regulated by USEPA under TSCA include asbestos and lead, which for the purposes of this analysis, are evaluated in the most common forms found in buildings, namely asbestos-containing materials (ACMs) and lead-based paint (LBP). TSCA also establishes management obligations for the cleanup of polychlorinated biphenyls (PCBs).

ACMs have been classified as a HAP by the USEPA in accordance with Section 112 of the CAA. Surveys would be conducted for ACMs, as required by 40 CFR § 61.145, during the design phase of each construction project and prior to demolition or renovation of any structure. Any located ACM would be characterized, managed, transported, and disposed of according to applicable state and federal requirements for protecting human health and safety and the environment.

LBP may also be present in buildings or other facilities that would be modified or demolished as part of the Proposed Action. Similar to ACMs, surveys would be conducted on structures to be modified or demolished for LBP during the design phase of each construction project and prior to structure demolition or renovation. LBP sampling would be conducted on the structures to be removed and analyzed in accordance with USEPA approved Toxicity Characteristic Leaching Procedure methodology. Based on this federal testing methodology, the paint would be considered hazardous if lead is detected at concentrations greater than 5 micrograms per liter. If LBP were detected at hazardous concentrations, these materials would be removed according to accepted methodologies. LBP would be characterized, managed, transported, and disposed according to applicable state and federal requirements for protecting human health and safety and the environment.

Beginning in the 1920s, PCBs had many common household uses, including applications in electrical transformers, as coolants in refrigeration machinery, and in oil and hydraulic fluids. PCBs are toxic and have been classified as a persistent organic pollutant, acting as carcinogens that do not break down easily in the environment. Thus, the manufacture and use of PCBs in the U.S. was banned by Congress in 1979 and cleanup actions are regulated through TSCA.

3.6.1.3 Contaminated Sites

Potential hazardous waste contamination areas are being investigated as part of the Defense Environmental Restoration Program (DERP). DoD developed the DERP to identify, investigate, and remediate potentially hazardous material disposal sites on DoD property prior to 1984. As part of DERP, DoD created the Environmental Restoration Program (ERP) and the Military Munitions Response Program (MMRP). These programs were instituted to satisfy the requirements of CERCLA and RCRA for former and current hazardous waste sites.

3.6.2 Existing Conditions

3.6.2.1 Fresno-Yosemite International Airport

Hazardous Materials

Hazardous materials are used at the 144 FW installation for aircraft operations support and maintenance, including petroleum, oils, and lubricants (POL) management and distribution. Types of hazardous substances found on the 144 FW installation include hydraulic fluid, engine oil, JP-8 and other fuels, brake fluid, hydrazine, antifreeze and deicing fluids, solvents, filters, mercury, corrosive liquids, paints, paint thinner, adhesives, batteries, light bulbs, scrap metal, used tires, and contaminated solids (144 FW 2011b).

Hazardous materials used by ANG and contractor personnel on the 144 FW installation are controlled through the Hazardous Materials Pharmacy Program (HAZMART) pollution prevention process (144 FW 2011b). This process centralizes procurement, handling, storage, and issuing of hazardous materials and their turn-in, recovery, reuse, or recycling. The HAZMART process includes review and approval by ANG personnel to ensure users are aware of exposure and safety risks. The HAZMART Pharmacy facility for the 144 FW is located in Building 237.

Hazardous Waste

The 144 FW is regulated as a Small Quantity Generator of hazardous waste and maintains USEPA Identification Number CA0572825909. The 144 FW Hazardous Waste Management Plan (144 FW 2011b) governs the 144 FW Hazardous Waste Management Program. There are 27 hazardous waste generation points (where a waste is initially created or generated) and 22 satellite accumulation points (where a waste is initially accumulated) identified at the installation in Buildings 100, 101, 102, 117, 121, 123, 125, 126, 130, 157, 167, 228, 2600, and C-26. There is one central accumulation site (less than 180 day storage area) located within Building 237 (144 FW 2011b). The 144 FW pollution prevention programs are governed by the Spill Prevention Control and Countermeasures Plan (144 FW 2009b) and the Oil and Hazardous Substances Spill Prevention and Response Plan (144 FW 2009c).

Toxic Substances

Regulated toxic substances typically associated with buildings and facilities include asbestos, LBP, and PCBs. An asbestos survey was performed at the 144 FW installation in 1993. ACM identified in the insulation, floor tiles, and mastic were found in the following buildings: 100, 102, 104, 110, 117, 121, 122, 123, 157, 2602, and 2606 (144 FW 2007b).

A LBP survey has not been conducted at the 144 FW installation (144 FW 2007b). Any buildings on the installation constructed prior to 1978 are presumed to contain LBP and would

be tested for LBP prior to demolition or renovation. Table 3.6-1 includes the buildings at the 144 FW installation constructed prior to 1978, in addition to those facilities found to contain ACM as a result of the 1993 asbestos survey.

Table 3.6-1. 144 FW Buildings Containing ACM and Potential LBP

Building Number	*Building Name*	*Constructed Prior to 1978*	*ACM Present? (Y/N)*
100	Maintenance Hangar	1955	Y
102	Vehicle Maintenance Shop	1955	Y
104	Avionics Shop	1957	Y
110	Aircraft General Purpose Shop	1961	Y
111	Nose Dock	1966	N
112	Liquid Oxygen Storage	1965	N
114	Vehicle Operations Parking Shed	1967	N
116	Vehicle Operations Parking Shed	1969	N
117	Petroleum Operations	1975	Y
120	Indoor Small Arms Range	1975	N
121	Jet Engine Shop	n/a[1]	Y
122	Squadron Operations	1977	Y
123	AGE Storage Facility	n/a[1]	Y
157	Fuel System Maintenance Dock/Corrosion Control	n/a[1]	Y
175	Bead Blast Storage	1977	N
179	Fuels Operations Storage Shed	1977	N
2602	Guard Shack	1966	Y
2606	Storage Igloo	1966	Y
2620	Magazine Storage	1966	N

Notes: 1. This facility was not constructed prior to 1978.
ACM = asbestos-containing material; AGE = aerospace ground equipment; N = no; n/a = not applicable; Y = yes
Source: 144 FW 2007b, 2010b

The 144 FW does not maintain, operate, or own any PCB equipment or PCB-contaminated equipment and the subject property is considered PCB-free (144 FW 2007b).

Environmental Restoration Program

The ERP program at the 144 FW began in 1987 when a Preliminary Assessment (PA) of the installation was conducted. As a result of this PA, three ERP Sites were identified; two additional ERP sites have since been identified at the installation. Following Site Investigations in 1992 at the five ERP sites, Supplemental Site Investigations were conducted for Sites 1 through 4 and a Remedial Investigation was conducted at Site 5. In January 1996, decision documents were prepared recommending No Further Action for all five ERP Sites at the 144 FW installation. The California Department of Toxic Substances Control (CA DTSC) and the Central Valley Regional Water Quality Control Board approved the No Further Action recommendations in March of 1997 (144 FW 2007b). The location of four ERP Sites is shown in Figure 3.6-1. ERP Site 3 is located within the Marine Corps Reserve Center and is not shown on the figure as it is out of the ROI for this analysis.

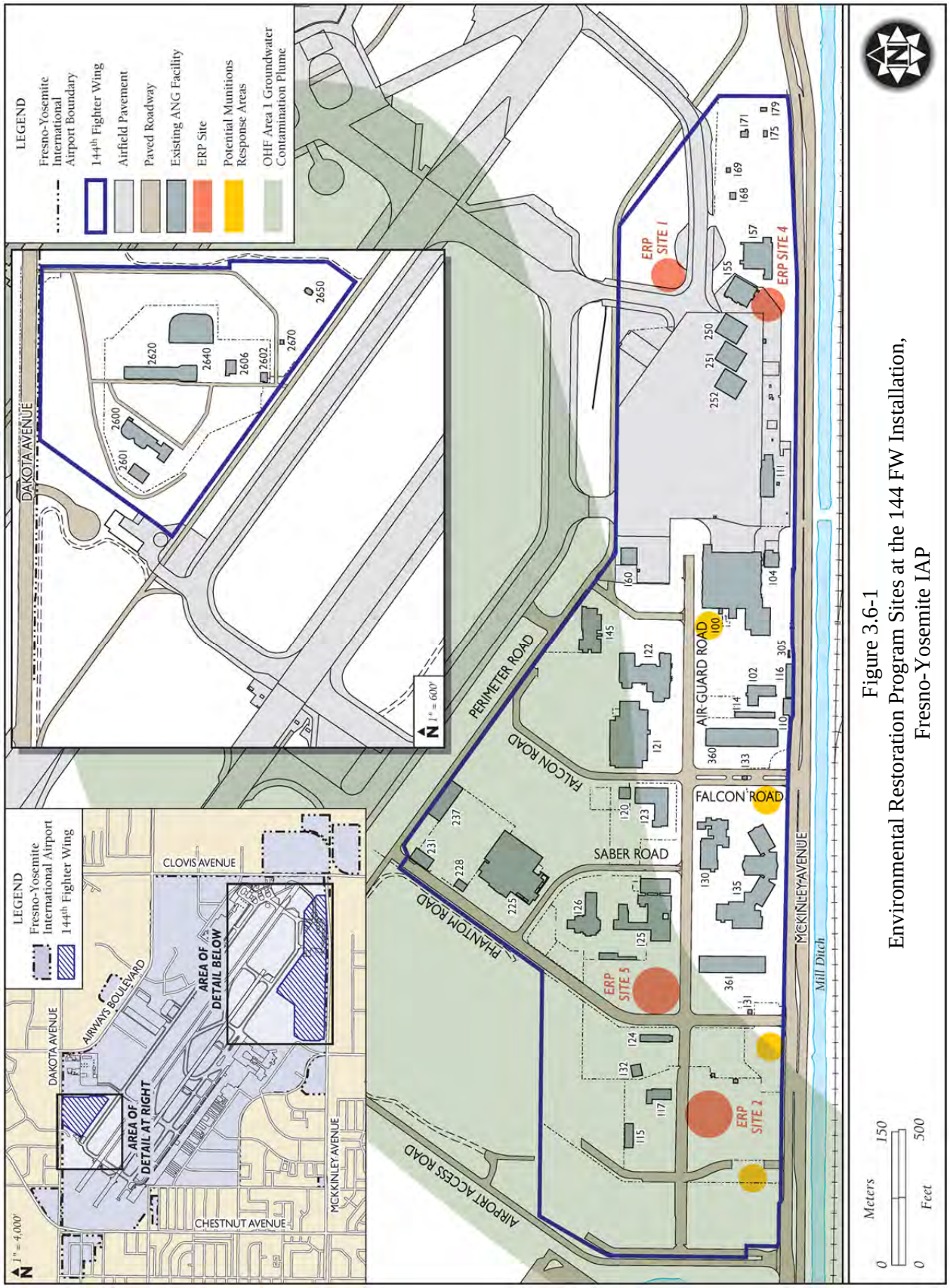


Figure 3.6-1
Environmental Restoration Program Sites at the 144 FW Installation, Fresno-Yosemite IAP

In addition to the five ERP sites, there is a site outside of the installation that affects the regional groundwater quality beneath the 144 FW installation. The groundwater contamination is associated with the Old Hammer Field (OHF) Area 1 Remedial Investigation Site. This site was a former U.S. Army Air Corps airfield that operated from early 1940 through 1946 at which point the City of Fresno developed the area into a municipal airport. The first evidence of groundwater contamination associated with OHF Area 1 was documented in 1992. A Remedial Investigation conducted in the late 1990s found chlorinated VOCs, including Trichloroethene (TCE) as the dominant VOC. The site currently covers 78 acres and is located north of the 144 FW installation, extending over approximately 75 percent of the installation (as shown in Figure 3.6-1). The OHF Steering Committee (including the City of Fresno, USACE, NGB, and the Boeing Company) has entered into a cooperative agreement with the CA DTSC and the Central Valley Regional Water Quality Control Board for the investigation and remediation of Area 1. The site is currently undergoing remedial activities including soil vapor extraction, in-situ chemical oxidation, predesign investigation and potential remediation of the southeast plume source area, long term monitoring, and toe-of-plume groundwater extraction (144 FW 2007b). A description of the four ERP sites located within the 144 installation (as shown in Figure 3.6-1) and the OHF Area 1 are summarized in Table 3.6-2.

Table 3.6-2. ERP Sites within the 144 FW Installation

ERP Site	*Materials of Concern*	*Status*
ERP Site 1: Old Fire Training Area	JP-4, aviation gasoline, used oils	No Further Action status approved by CA DTSC in March 1997.
ERP Site 2: Base POL Area	JP-4	No Further Action status approved by CA DTSC in March 1997.
ERP Site 4[1]: Suspect Burial Site	Household goods, stoves, plates, scrap metal, building materials	No Further Action status approved by CA DTSC in March 1997.
ERP Site 5: Base Collection Pond	POLs, PCE	Supplemental Site Investigation Report approved by CA DTSC in March 1997 concluding that residual soil contamination does not pose a threat to human health or the environment and therefore does not warrant further investigation. PCE contaminated groundwater at Site 5 will be addressed with the regional TCE plume from OHF Area 1.
OHF Area 1	TCE	Preliminary Assessment, Site Investigation, Remedial Investigation, and Feasibility Study completed; Remedial Action currently in process.

Notes: 1. ERP Site 3 not shown as it is located outside the ROI of this EIS.
CA DTSC = California Department of Toxic Substances Control; ERP = Environmental Restoration Program; OHF = Old Hammer Field; PCE = perchloroethylene; POL = petroleum, oils, and lubricants; TCE = trichloroethene
Source: 144 FW 2007b

3.6.2.2 March Air Reserve Base

The throughput of petroleum substances (e.g., fuels, oils) used during operations would be expected to increase from what is currently used to maintain the F-16 fleet; however, the amount of petroleum substances in storage at any given time is not expected to change. Given that the Proposed Action does not include any ground disturbance through construction at March ARB, and there is no change to the proposed number of operations or type of hazardous materials and wastes generated or stored at March ARB, this resource topic will not be discussed further for March ARB.

3.7 INFRASTRUCTURE

3.7.1 Definition of the Resource

Infrastructure refers to the system of public works, such as utilities and transportation, that provide the underlying framework for a community. Utilities include such amenities as water, power supply, and waste management. Transportation and circulation refer to roadway and street systems, the movement of vehicles on roadway networks, pedestrian and bicycle traffic, and mass transit. The infrastructure components to be discussed in this section include the electrical system, natural gas system, sanitary sewer system, solid waste management, potable water system, and the transportation network.

The ROI for infrastructure primarily consists of the 144 FW installation, with additional information presented for the surrounding vicinity, where relevant. The ROI does not include March ARB since no ground disturbance, personnel changes, or changes in infrastructure would occur at the Base.

3.7.2 Existing Conditions

3.7.2.1 Fresno-Yosemite International Airport

Electrical and Natural Gas Systems

Energy (electricity and natural gas) is supplied to the 144 FW installation by Pacific Gas and Electric (PG&E). PG&E provides natural gas and electric service to approximately 15 million people within a 70,000-square-mile service area in northern and central California. Electricity consumption for calendar year 2010 at the 144 FW installation was 3,654.82 megawatt-hours (144 FW 2011c). Natural gas consumption for calendar year 2011 at the 144 FW installation was 10,828.80 thousand cubic feet (144 FW 2011c). In a recent Planning Report (144 FW 2011d), the 144 FW review of utilities on the installation revealed no potential issues were associated with the utility system at the installation.

Sanitary Sewer System

The 144 FW installation generates wastewater from sanitary, stormwater, and industrial processes, including oil/water separator discharge, wash rack discharge, floor wash down, latrines, sinks, and showers. Wastewater generated within the 144 FW installation is conveyed into the municipal sewage system, operated by the City of Fresno to the Fresno/Clovis Regional Water Reclamation Facility. The facility can treat up to 80 million gallons per day but typically receives 68 million gallons of wastewater per day for treatment (Fresno-Yosemite IAP 2011b).

Solid Waste Management

Municipal solid waste at the 144 FW installation is managed in accordance with the 144 FW Solid Waste Management Plan and guidelines specified in AFI 32-7042, *Waste Management* (2009). This AFI incorporates, by reference, the federal standard for solid waste regulations contained within 40 CFR, Subtitle D, *Non-hazardous Waste,* and other applicable federal regulations, AFIs, and DoD Directives. In general, AFI 32-7042 establishes the requirement for installations to have a solid waste management program that incorporates the following: a solid waste management plan; procedures for handling, storage, collection, and disposal of solid waste; recordkeeping and reporting; and pollution prevention.

The 144 FW installation generates solid waste in the form of office trash, non-hazardous industrial wastes, normal municipal waste, and construction debris. These nonhazardous solid wastes are collected in dumpsters located throughout the 144 FW installation and transported to either the American Avenue Landfill or Orange Avenue Landfill.

Potable Water System

The 144 FW purchases water from the City of Fresno Department of Public Utilities, Water Division for its domestic use and fire protection. Potable water in the area is supplied primarily from the regional groundwater aquifer using nearly 250 wells. The City of Fresno Water Division pumps approximately 146 million gallons of water per day. The groundwater supply is supplemented between 15 to 30 percent yearly with treated surface water from Millerton Lake and Pine Flat Reservoir (Fresno-Yosemite IAP 2011a). In calendar year 2010, 13.79 million gallons of potable water was supplied to the 144 FW installation (144 FW 2011c).

Transportation and Circulation

Regional and Local Circulation. The 144 FW installation is located in the northeastern portion of the City of Fresno. The primary entry into Fresno is the north-south artery of Highway 99, which runs south from Sacramento through central California. Highway 41 connects Fresno with the Central Coast area and provides direct entry into Yosemite National Park. Highway 180

passes through downtown Fresno and provides access to Sequoia and Kings Canyon National Parks. Highway 168 passes through the northern portions of Fresno and Clovis and ends in the Shaver Huntington Lake area. Interstate 5 passes through the western portion of Fresno County, near Coalinga (144 FW 2007a).

Access to the 144 FW installation is provided by East McKinley Avenue, a major arterial located along the southern boundary of the installation, between North Peach Avenue and North Clovis Avenue. McKinley Avenue has a raised median strip with turn lanes at the access points to installation parking lots and entry gates (144 FW 2000a).

Circulation at the 144 FW Installation. The perimeter of the installation is fully enclosed by a fence. There are two access routes to the 144 FW installation, both along McKinley Avenue. Primary access to the installation is provided via Falcon Road, which is signalized at its intersection with McKinley Avenue. The main entrance into the installation is gated, and vehicles must pass through a security and identification checkpoint before access is granted. Consequently, circulation can be congested near the main entrance at the start and end of the workday. A second entryway into the installation is at the end of Phantom Road and provides access for contractors into a parking lot for POVs (144 FW 2009a).

Roads within the 144 FW are grid patterned, allowing full directional access to facilities and designated POV parking areas. The majority of streets within the installation are curbed and easily distinguishable (144 FW 2009a). Primary circulation within the installation is provided by Air Guard Road, which runs east-west through the center of the cantonment area. Other roads that intersect Air Guard Road include Mustang Drive, Falcon Road, Sabre Drive, and Phantom Drive.

Parking at the 144 FW Installation. The USAF has established guidelines intended to ensure that adequate parking is available at USAF and ANG facilities. According to these standards, the ratio of available parking spaces to personnel should be no less than 0.75. The installation currently includes 6 main POV parking lots and 10 smaller POV and government-owned vehicle parking lots, totaling 926 marked on-site parking spaces (144 FW 2007a).

3.7.2.2 March Air Reserve Base

Given that the Proposed Action does not include any construction projects at March ARB, and there is no change to the proposed number of authorized personnel at March ARB, this resource topic will not be discussed further for March ARB.

3.8 EARTH RESOURCES

3.8.1 Definition of the Resource

Earth resources include the topography, geology, and soils of a given area. Topography incorporates the physiographic or surface features of an area and is usually described with respect to elevation, slope, aspect, and landforms. Long-term geological, erosional, and depositional processes typically influence the topographic relief of an area. Geology is the study of the origin, history, and structure of the earth and the materials of which it is made. Geological resources of an area typically consist of bedrock materials, mineral deposits, and fossil remains. The principal geologic factors influencing stability of structures are soils stability and seismic properties. Soil refers to the unconsolidated earthen organic or mineral materials overlying bedrock or other parent material. Soil structure, elasticity, strength, shrink-swell potential, and erodibility all determine the suitability of the ground to support man-made structures and facilities. Relative to development, soils typically are described in terms of their type, slope, physical characteristics, and relative compatibility or limitations with regard to particular construction activities and types of land use.

The ROI for earth resources includes the 144 FW installation. The geologic description for the project site is general to the 144 FW installation, while the soils and topographic discussions are site specific, where applicable. The ROI does not include March ARB since no ground disturbance will occur there.

3.8.2 Existing Conditions

3.8.2.1 Fresno-Yosemite International Airport

Topography

Elevation at the 144 FW installation is approximately 326 feet above sea level. Total relief is less than 10 feet and the installation is essentially flat. No substantial topographic features occur on the installation (144 FW 2007b).

Geology

The 144 FW installation occurs on recent age alluvial fan sediments and basin deposits (BSK Associates 2009). Fine-grained silt and sand characterize the unconsolidated alluvial fan deposits and extend to depths of 1,000 feet or more below ground surface (bgs) (144 FW 2007a). Localized clay beds are also common below 200 feet bgs. Coarser-grained deposits are found in the upper 200 feet. A higher percentage of fine-grained material occurs below this depth. Finer sediments (silts and clays) are associated with overbank and floodplain deposits, and coarser sediments (sands and gravels) are associated with levee, crevasse splay, channel lag,

and point bar deposits (144 FW 2007b). Crystalline bedrock is anticipated to be at depths greater than 1,000 feet (BSK Associates 2009).

In regard to the potential for seismic activity, there are no known active fault zones within 30 miles of the 144 FW installation. Portions of the installation have been rated as Soil Site Class D, which ranges from the most stable A (hard rock) down to the least stable category, F (soft clay) (BSK Associates 2009).

Soils

The general soils classification assigned to the 144 FW installation is the Atwater association. The Atwater series consist of material blown from dry, sandy streambeds and other areas of granitic alluvium. The soils formed in old, stabilized dunes and are deep, well drained, and coarse to moderately coarse in texture (U.S. Department of Agriculture [USDA] 1971). Atwater soils typically have a loamy sand surface layer approximately 24 inches thick with a light brownish-gray to dark grayish-brown color. A brown sandy loam subsoil occurs and is about 19 inches thick. A light yellowish-brown layer of loamy sand follows, extending to a depth of 60 inches. The final layer is composed of moderately coarse, cemented sandy alluvium material of indefinite thickness (USDA 1971, Natural Resources Conservation Service [NRCS] 2011).

Individual soil types found at the installation include Atwater sandy loam at the eastern portion, Atwater sandy loam, moderately deep at the western portion, and Atwater loamy sand at the detached weapons storage area, as shown in Figure 3.8-1 (144 FW 2000b, 2007b).

Atwater sandy loam, 0 to 3 percent slopes. This soil is the most extensive of the Atwater series. It tends to be gently undulating with a sandy loam surface layer. In profile, the soil is characteristic of the Atwater series. Parent materials include old stabilized dunes and wind sorted material. This soil is well drained, moderately coarse textured. The available moisture holding capacity ranges from low to moderate. Runoff is slow and erosion hazards are negligible (USDA 1971). Approximately 29 percent of the installation, particularly the eastern portion, is composed of this soil type.

Atwater sandy loam, moderately deep, 0 to 3 percent slopes. This soil is similar to the Atwater sandy loam, 0 to 3 percent slopes except that it has a thick, hard, unrelated substratum of compacted, weakly cemented, sandy material that underlies this soil at a moderate depth. The depth of the soil over the substratum generally ranges from about 3 to 4 feet, but in some areas it occurs as shallow as 2 feet. The holding capacity of this soil is low due to the restricted penetration of roots. Runoff is very slow and there is little or no erosion hazard (USDA 1971). Approximately 48 percent of the installation is composed of this soil type, including the majority of the cantonment area, particularly on the western side.

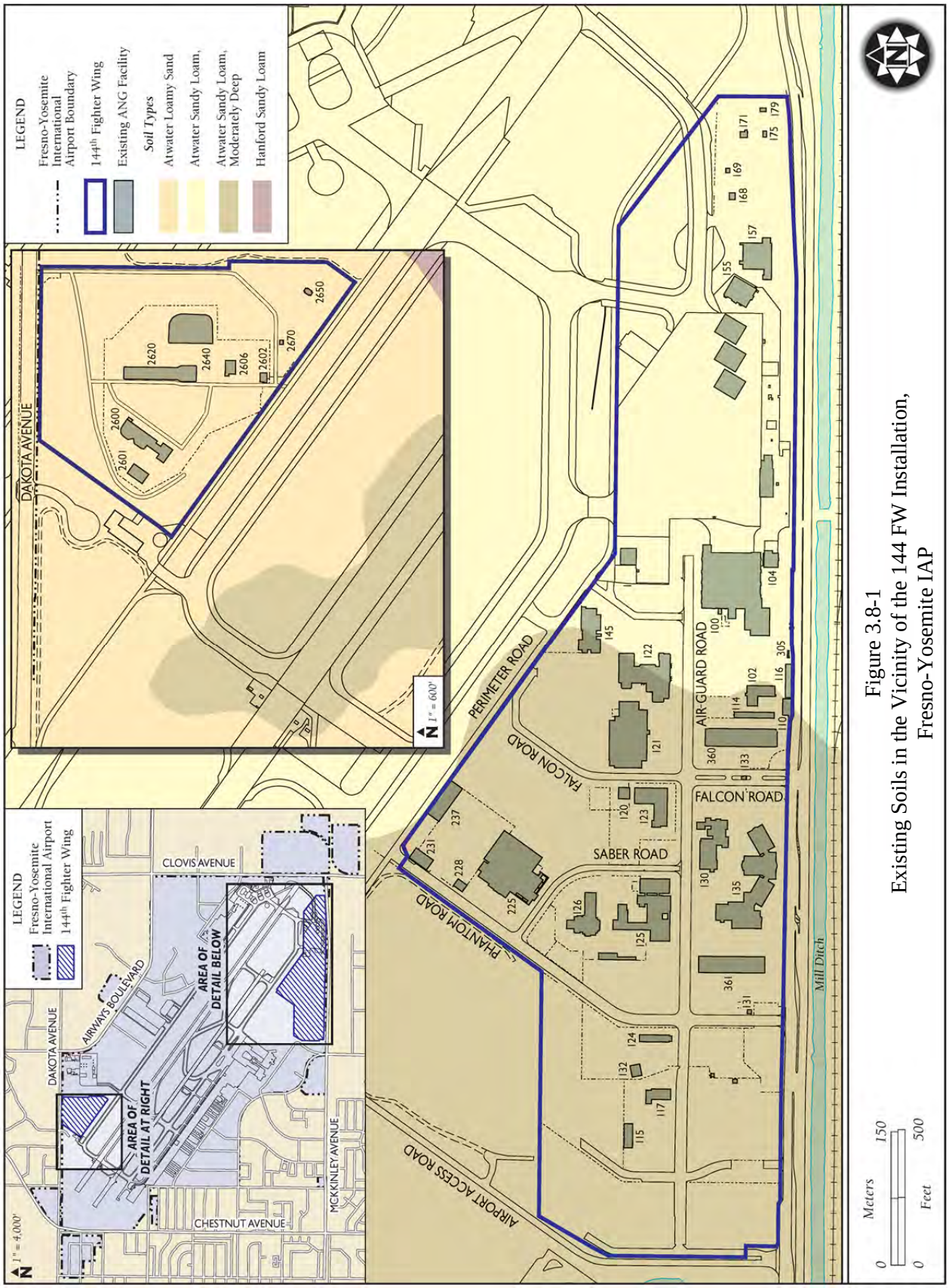


Figure 3.8-1
Existing Soils in the Vicinity of the 144 FW Installation, Fresno-Yosemite IAP

Atwater loamy sand, 0 to 3 percent slopes. This soil is described as typical for the Atwater series. The surface layer ranges from nearly level to gently undulating. Color ranges from light brownish gray to pale brown in color. The surface is typically loose or slightly hard when dry. An unrelated, compact layer occurs at depths as shallow as 60 inches, but is normally deeper than 72 inches. The gentle slopes and moderately high permeability of this soil creates slow runoff conditions. The moisture holding capacity is low and erosion hazards due to surface water are negligible. Periods of high winds can create moderate to severe soil blowing hazards in unprotected areas (USDA 1971). Approximately 23 percent of the installation is composed of this soil type, including the munitions storage area.

3.8.2.2 March Air Reserve Base

Given that the Proposed Action does not include any construction projects at March ARB, this resource topic will not be discussed further for March ARB.

3.9 WATER RESOURCES

3.9.1 Definition of Resource

Water resources analyzed in this EIS include both surface and groundwater quantity and quality, and floodplains. Surface water includes all lakes, ponds, rivers, and streams and is important for a variety of reasons including irrigation, power generation, recreation, flood control, and human health. The nation's waters are protected under the CWA. The goal of the CWA is to restore and maintain the chemical, physical, and biological integrity of the nation's waters so that they can support "the protection and propagation of fish, shellfish, and wildlife and recreation in and on the water." Pollutants regulated under the CWA include "priority" pollutants, including various toxic pollutants; "conventional" pollutants, such as biochemical oxygen demand, total suspended solids, fecal coliform, oil and grease, and pH; and "non-conventional" pollutants, including any pollutant not identified as either conventional or priority. Under the CWA Section 402, it is illegal to discharge any point and/or nonpoint pollution sources into any surface water without a National Pollutant Discharge Elimination System (NPDES) permit.

The State of California is charged with administering the NPDES permit program under the auspices of the USEPA. The City of Fresno resides within Region 5, Central Valley Regional Water Quality Control Board jurisdiction. The Regional Water Quality Control Boards in California have responsibility for overseeing and enforcing the state's water quality regulatory and planning programs.

Construction projects that disturb 1 or more acres of soil or that disturb less than 1 acre but are part of a larger common plan of development, are required to obtain coverage under the General Permit for Storm Water Discharges Associated with Construction and Land Disturbance

Activities (General Permit No. CAS000002). The permit is based on a project's overall risk and requires measures to prevent erosion and reduce sediment and other pollutants in their discharges. Industrial discharges associated with the 144 FW installation are required to obtain coverage under the General Permit for Discharges Associated with Industrial Activities (General Permit No. CAS000001). Specific industrial activities must use the best technology available to reduce pollutants in their discharges in addition to development of both a Stormwater Pollution Prevention Plan (SWPPP) and a monitoring plan.

Groundwater includes the subsurface hydrologic resources of the physical environment and is by and large a safe and reliable source of fresh water for the general population, especially those in areas of limited precipitation and is commonly used for potable water consumption, agricultural irrigation, and industrial applications. Groundwater also plays an important part in the overall hydrologic cycle and its properties are described in terms of depth to aquifer or water table, water quality, and surrounding geologic composition. The State of California encourages coordinated agency management of groundwater resources per section 10755.2 of the California Water Code.

Floodplains are defined by EO 11988, *Floodplain Management*, as "the lowland and relatively flat areas adjoining inland and coastal waters including flood-prone areas of offshore islands, including at a minimum, the area subject to a one percent or greater chance of flooding in any given year" (that area inundated by a 100-year flood). Floodplains and riparian habitat are biologically unique and highly diverse ecosystems providing a rich diversity of aquatic and terrestrial species, as well as promoting stream bank stability and regulating water temperatures. EO 11988 requires federal agencies to avoid, to the extent possible, the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct or indirect support of floodplain development whenever there is a practicable alternative.

The ROI for water resources includes the 144 FW installation situated within the boundaries of the Fresno-Yosemite IAP, as well as nearby surface waters that receive runoff generated within the project area. The ROI does not include March ARB since no ground disturbance will occur there.

3.9.2 Existing Conditions

3.9.2.1 Fresno-Yosemite International Airport

Surface Water

The 144 FW is located within the San Joaquin Valley Groundwater Basin in the Kings Subbasin (Groundwater Subbasin Number 5-22.08) encompassing 976,000 acres (1,530 square miles) in Fresno, Kings, and Tulare counties. The San Joaquin Valley is a large structural trough up to

200 miles long and 70 miles wide surrounded on the west by the Coast Ranges, on the south by the San Emigdio and Tehachapi Mountains, on the east by the Sierra Nevada, and on the north by the Sacramento-San Joaquin Delta and Sacramento Valley. The San Joaquin and Kings Rivers are the two major drainages within or bordering the Kings Subbasin. The Kings River drains into the Tulare Lake Basin, Fresno Slough, and ultimately to the San Joaquin River (California Department of Water Resources [CADWR] 2006).

Surface water within the vicinity of the 144 FW installation consists primarily of controlled discharges from Kings River to local irrigation canals. The closest irrigation canal to the installation is Mill Ditch, located along the southern property boundary of the Fresno-Yosemite IAP parallel to McKinley Avenue. There are a total of four stormwater infiltration ponds within the Fresno-Yosemite IAP, two managed by the airport and two managed by the Fresno Metropolitan Flood Control District. Stormwater is typically contained within the infiltration ponds and overflow does not typically occur. However, during periods of high rainfall, overflow stormwater is directed to Mill Ditch (144 FW 2009d).

Stormwater flow within the installation is generally at a southwesterly gradient and is divided into seven primary drainage basins with seven corresponding outfall locations (144 FW 2009d), as described in Table 3.9-1. The main cantonment discharges into a stormwater infiltration basin bordering the installation to the southwest. The stormwater basin is maintained by the Fresno Metropolitan Flood Control District and also receives discharges from the municipal storm sewer system and the Fresno-Yosemite IAP. Each of the seven outfalls is regulated under the General Permit for Discharges Associated with Industrial Activities (General Permit No. CAS000001).

Groundwater

Groundwater in the San Joaquin Valley is an important local water supply, providing approximately 41 percent of the agricultural and municipal uses in the region. Groundwater recharge occurs from stream and river seepage, in addition to percolation from irrigation, canal seepage, and intentional recharge (USEPA 2009b). The Kings Subbasin groundwater aquifer system consists of unconsolidated continental deposits of Tertiary and Quaternary age overlain by a younger series of deposits of Quaternary age. Groundwater flow is generally to the southwest (CADWR 2006). The City of Fresno delivers water to the city and county primarily through the groundwater supply, which is supplemented by treated surface water.

Table 3.9-1. Drainage Basin Characteristics at the 144 FW Installation

Outfall Number/Drainage Basin Number	*Size (acres)*	*Industrial Activities Associated with Drainage Basin*	*Percent Impervious*	*Outfall Location*
SDO-01/DA-01	39.2	POL Storage Area; Civil Engineering Building 125; Base Supply Complex, Building 225; Pesticide Storage; Hazardous Materials Pharmacy, Building 228; AGE Maintenance, Building 123; Composite Maintenance, Building 121	80	City of Fresno Regional Stormwater Infiltration Basin
SDO-02/DA-02	0.3	Refueler Maintenance, Building 117	50	Municipal storm sewer system on East McKinley Avenue
SDO-03/DA-03	1.9	Hush House, Building 167; Outdoor Scrap Storage	75	Municipal storm sewer system on East McKinley Avenue
SDO-04/DA-04	6.3	Fuel Cell, Building 157; a portion of the Hush House Area, Building 167	35	Municipal storm sewer system on East McKinley Avenue
SDO-05/DA-05	9.2	Aircraft Parking Apron; Aircraft Shelters	95	Discharges through an oil/water separator, grit chamber, and to a lift station before being discharged to the municipal storm sewer system on East McKinley Avenue
SDO-06/DA-06	8.9	Western portion of the Aircraft Parking Apron; Aircraft Maintenance Hangar, Building 100; Aircraft Wash Rack	90	Discharges to an oil/water separator/ holding tank southeast of the hangar, a stormwater/ spill control valve is kept in the closed position and is typically opened during storm events, stormwater is discharged to the municipal storm sewer system on East McKinley Avenue
SDO-07/DA-07	2.1	West side of Aircraft Maintenance Hangar, Building 100	90	Municipal storm sewer system on East McKinley Avenue
SDO-08/DA-08	1.4	Vehicle Maintenance, Building 102	95	Municipal storm sewer system on East McKinley Avenue

AGE = aerospace ground equipment; DA =Drainage Area; POL = petroleum, oils, and lubricants; SDO = Stormwater Discharge Outfall
Source: 144 FW 2009d

The 144 FW relies entirely on groundwater supplied by the City of Fresno for their potable water supply. As demand for water has increased in the region, the use of artificial recharge to augment groundwater supplies has also grown to ensure that groundwater continues to be available to the community in the future. The City of Fresno has implemented a Groundwater Recharge Program that uses surface water to replace lost groundwater at an artificial recharge zone called Leaky Acres and smaller facilities in Southeast Fresno (City of Fresno 2011). Problems associated with the groundwater supply include degradation of quality, moderate overdraft, high consumption, and stringent water quality standards leading to a reduction in potable water supply in the vicinity of the 144 FW installation (Fresno-Yosemite IAP 2006). There is one groundwater well on the installation classified as an emergency potable water source by the San Joaquin Valley Regional Water Control Board. The installation is able to draw water from the well for use under emergency conditions for up to 15 days annually.

Floodplains

Per Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps for Fresno County, California and Incorporated Areas, Panel 1590 of 3525 (Map Number 06019C1590H, Revised February 18, 2009), the majority of the 144 FW installation is located within an area designated as Zone X, which are areas determined to be outside the 0.2 percent annual chance flood (50 year flood), indicating areas of minimal flooding. However, there are areas of Zone X/0.2 percent annual chance flood located within the southwestern portion of the installation (FEMA 2009). In addition, an area considered to be within Zone A (Special Flood Hazard Areas Subject to Inundation by the 1 percent Annual Chance Flood [100 year flood]) is located southwest of the installation associated with the City of Fresno stormwater infiltration basin.

3.9.2.2 March Air Reserve Base

Given that the Proposed Action does not include any construction projects at March ARB, this resource topic will not be discussed further for March ARB.

3.10 BIOLOGICAL RESOURCES

3.10.1 Definition of the Resource

Biological resources include living, native, or naturalized plant and animal species and the habitats within which they occur. Plant associations are generally referred to as *vegetation* and animal species are referred to as *wildlife*. Habitat can be defined as the resources and conditions present in an area that produces occupancy of a plant or animal (Hall *et al.* 1997). Although the existence and preservation of biological resources are intrinsically valuable, these resources also provide aesthetic, recreational, and socioeconomic values to society. This analysis focuses on species or vegetation types that are important to the function of the ecosystem, of special societal

importance, or are protected under federal or state law or statute. For purposes of this analysis, these resources are divided into four major categories: vegetation, wetlands, wildlife, and special status species.

Vegetation types include all existing terrestrial plant communities as well as their individual component species. The affected environment for vegetation includes only those areas potentially subject to ground disturbance.

Wetlands are considered sensitive habitats and are subject to federal regulatory authority under Section 404 of the CWA and EO 11990, *Protection of Wetlands*. Jurisdictional wetlands are defined by the USACE as those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions (Environmental Laboratory 1987). Areas meeting the federal wetland definition are under the jurisdiction of the USACE. Wetlands generally include swamps, marshes, bogs, and similar areas. Like vegetation, the affected environment for wetlands includes only those areas potentially subject to ground disturbance.

Wildlife generally includes all fish, amphibian, reptile, bird, and mammal species with the exception of those identified as special status species, which are treated separately. Wildlife also includes those bird species protected under the federal Migratory Bird Treaty Act, the Bald and Golden Eagle Protection Act, and other species-specific conservation legal authorities. Assessment of a project's effect on migratory birds places an emphasis on "species of concern" as defined by EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*. Additional assessment of potential impacts on migratory birds that are regionally rare occurs under the special status species category.

Special status species are defined as those plant and animal species listed as endangered, threatened, and species proposed for listing by the USFWS under the ESA. The federal ESA protects federally listed endangered and threatened plant and animal species. Federally identified candidate species (species proposed for listing) are not protected under law; however, these species could become federally listed over the near-term, and therefore are considered herein to avoid future conflicts if they were to be listed during the preparation of this EIS. Additionally, the California Department of Fish and Game protects state-listed plant and animal species through state environmental conservation administrative codes.

The ROI for biological resources consists only of lands that could be affected by the proposed construction and operations at the 144 FW installation at Fresno-Yosemite IAP and March ARB. The ROI does not include the land underneath the SUA proposed for use since no ground disturbance would occur in these areas and the Proposed Action would not be expected to

generate changes in noise, frequency of use, duration of use, or number of operations at these locations.

3.10.2 Existing Conditions

3.10.2.1 Fresno-Yosemite International Airport

Vegetation

Fresno-Yosemite IAP is located within the California Dry Steppe Province, which consists primarily of grasslands dominated by introduced annual grasses (Bailey 1995). Most areas associated with the 144 FW installation have been actively altered through landscaping and paving, and therefore contain little native vegetation. Vegetation surrounding the runways/taxiways and adjacent to the aircraft aprons consists primarily of ruderal native and non-native grass such as softchess brome (*Bromus hordeaceus*) and Pacific fescue (*Vulpia microstachys* var. *pauciflora*) as well as non-native forbs such as toadflax (*Linaria pinifolia*, *L. maroccana*), filaree (*Erodium cicutarium*), wire lettuce (*Lactuca serriola*), and native miniature lupine (*Lupinus bicolor*) (Fresno-Yosemite IAP 2011b).

Wildlife

Due to the lack of substantial areas of endemic vegetation and the frequency of human activities at the 144 FW installation, the amount of suitable wildlife habitat present is limited. As a result, the majority of the wildlife present at the 144 FW installation consists of species that are highly adapted to developed and disturbed areas including Starlings (*Sturnus vulgaris*), House Finches (*Carpodacus mexicanus*), Western Meadowlarks (*Sturnella neglecta*), and American Crows (*Corvus brachyrhynchos*). Waterbirds such as the Canada Goose (*Branta canadensis*), Mallard (*Anas platyrhynchos*), Killdeer (*Charadrius vociferus)*, Black-necked Stilt (*Himantopus mexicanus*), and Greater Yellowlegs (*Tringa melanoleuca*) can be found within the stormwater detention basins. Amphibian and reptile species that have the potential to occur in the area include western toads (*Bufo boreas*) and gopher snakes (*Pituophis melanoleucus*). Mammals known to occur at Fresno-Yosemite IAP include the California ground squirrel *(Spermophilus beecheyi*) and the red fox (*Vulpes vulpes*) (Fresno-Yosemite IAP 2011b).

Threatened and Endangered and Special Status Species

According to the California Natural Diversity Database (CNDDB) there are 36 special status species that occur within the vicinity of Fresno-Yosemite IAP (Table 3.10-1). No threatened and endangered or special status species are currently known to occur on Fresno-Yosemite IAP. However, six special-status species have the potential to exist within the airport boundaries due to the presence of suitable habitat (Fresno-Yosemite IAP 2011b).

Table 3.10-1. Special Status Species Occurring in the Vicinity of the Fresno-Yosemite IAP (Page 1 of 2)

Common Name	*Scientific Name*	*Federal Status*	*State Status*	*Presence in Project Area*
Amphibians				
California tiger salamander	*Ambystoma californiense*	T	T, SSC	No potential to occur on 144 FW installation due to lack of habitat; Low potential to occur within airport; poor quality habitat present in the detention ponds only.
Western pond turtle	*Emys marmorata*	None	SSC	No potential to occur on 144 FW installation due to lack of habitat; Low potential to occur within airport; poor quality habitat present in the detention ponds only.
Western spadefoot	*Spea hammondii*	None	SSC	Not likely to occur due to lack of habitat.
Birds				
Burrowing Owl[1]	*Athene cunicularia*	None	SSC	Known to exist on Fresno-Yosemite IAP in the past, however currently is not found on property.
California Horned Lark	*Eremophila alpestris actia*	None	WL	Low potential to occur within airport; poor quality habitat present.
Tricolored Blackbird	*Agelaius tricolor*	None	SSC	Not likely to occur due to lack of habitat.
Western Yellow-billed Cuckoo	*Coccyzus americanus occidentalis*	C	E	Not likely to occur due to lack of habitat.
Invertebrates				
Antioch efferian robberfly	*Efferia antiochi*	None	None	Not likely to occur due to lack of habitat.
California linderiella	*Linderiella occidentalis*	None	None	No potential to occur on 144 FW installation due to lack of habitat; Low potential to occur within airport; poor quality habitat present in the detention ponds only.
Hurd's metapogon robberfly	*Metapogon hurdi*	None	None	Not likely to occur due to lack of habitat.
Midvalley fairy shrimp	*Branchinecta mesovallensis*	None	None	No potential to occur on 144 FW installation due to lack of habitat; Low potential to occur within airport; poor quality habitat present in the detention ponds only.
Moestan blister beetle	*Lytta moesta*	None	None	Not likely to occur due to lack of habitat.
Valley elderberry longhorn beetle	*Desmocerus californicus dimorphus*	T	None	Not likely to occur due to lack of habitat.
Vernal pool fairy shrimp	*Branchinecta lynchi*	T	None	No potential to occur on 144 FW installation due to lack of habitat; Low potential to occur within airport; poor quality habitat present in the detention ponds only.

Table 3.10-1. Special Status Species Occurring in the Vicinity of the Fresno-Yosemite IAP (Page 2 of 2)

Common Name	*Scientific Name*	*Federal Status*	*State Status*	*Presence in Project Area*
Mammals				
American badger	*Taxidea taxus*	None	SSC	Not likely to occur due to lack of habitat.
Fresno kangaroo rat	*Dipodomys nitratoides exilis*	E	E	Not likely to occur due to lack of habitat.
Hoary bat	*Lasiurus cinereus*	None	None	Not likely to occur due to lack of habitat.
Pallid bat	*Antrozous pallidus*	None	SSC	Not likely to occur due to lack of habitat.
San Joaquin kit fox	*Vulpes macrotis mutica*	E	T	Not likely to occur, extirpated from project area.
San Joaquin pocket mouse	*Perognathus inornatus inornatus*	None	None	Not likely to occur due to lack of habitat.
Spotted bat	*Euderma maculatum*	None	SSC	Not likely to occur due to lack of habitat.
Western mastiff bat	*Eumops perotis californicus*	None	SSC	Not likely to occur due to lack of habitat.
Plants				
California jewel-flower	*Caulanthus californicus*	E	E	Not likely to occur due to lack of habitat.
California satintail	*Imperata brevifolia*	None	None	Not likely to occur due to lack of habitat.
Caper-fruited tropidocarpum	*Tropidocarpum capparideum*	None	None	Not likely to occur due to lack of habitat.
Dwarf downingia	*Downingia pusilla*	None	None	Not likely to occur due to lack of habitat.
Greene's tuctoria	*Tuctoria greenei*	E	Rare	Not likely to occur due to lack of habitat.
Hairy Orcutt grass	*Orcuttia pilosa*	E	E	Not likely to occur due to lack of habitat.
Hardhead	*Mylopharodon conocephalus*	None	SSC	Not likely to occur due to lack of habitat.
Hartweg's golden sunburst	*Pseudobahia bahiifolia*	E	E	Not likely to occur due to lack of habitat.
Madera leptosiphon	*Leptosiphon serrulatus*	None	None	Not likely to occur due to lack of habitat.
San Joaquin adobe sunburst	*Pseudobahia peirsonii*	T	E	Not likely to occur due to lack of habitat.
San Joaquin Valley Orcutt grass	*Orcuttia inaequalis*	T	E	Not likely to occur due to lack of habitat.
Sanford's arrowhead	*Sagittaria sanfordii*	None	None	Not likely to occur due to lack of habitat.
Spiny-sepaled button-celery	*Eryngium spinosepalum*	None	None	Not likely to occur due to lack of habitat.
Succulent owl's-clover	*Castilleja campestris* ssp. *succulenta*	T	E	Not likely to occur due to lack of habitat.

Notes: 1. The Burrowing Owl was not recorded as occurring by the CNDDB. However, this species has been observed on the installation in the past.

144 FW = 144th Fighter Wing; C = Federal Candidate Species; CNDDB = California Natural Diversity Database; E = Endangered; IAP = International Airport; SSC = California Species of Special Concern; T= Threatened; WL = Watch List

Sources: CNDDB 2011, Fresno-Yosemite IAP 2011b

Wetlands

The National Wetlands Inventory (NWI) database was searched for potential wetlands occurring on the 144 FW installation. No NWI wetlands were shown to occur on the installation (USFWS 2011). In addition, a wetland delineation was conducted on the 144 FW installation in 2000. No wetlands were found during this survey (144 FW 2000b).

3.10.2.2 March Air Reserve Base

Vegetation and Wetlands

There is no ground disturbance proposed for March ARB; therefore, vegetation and wetlands will not be discussed further.

Wildlife

Numerous wildlife surveys have been conducted at March ARB. During these surveys 218 species of birds, 32 mammals, 29 reptiles, and 5 amphibians have been observed. Common species of birds include European Starlings (*Sturnus vulgaris*), House Finches (*Carpodacus mexicanus*), Mourning Dove (*Zenaida macroura*), Black Phoebe (*Sayornis nigricans*), Common Raven (*Corvus corax*), Northern Mockingbird (*Mimus polyglottos*), and Brewer's Blackbird (*Euphagus cyanocephalus*). Some of the common raptors include American Kestrel (*Falco sparverius*), Northern Harrier (*Circus cyaneus*), Prairie Falcon (*Falco mexicanus*), Golden Eagle (*Aquila chrysaetos*), and Ferruginous Hawk (*Buteo regalis*) (March ARB 2005b).

Common mammals observed on March ARB include the coyote (*Canis latrans*), red fox (*Vulpes vulpes*), striped skunk (*Mephitis mephitis*), California ground squirrel (*Spermophilus beecheyi*), Botta's pocket gopher (*Thomomys bottae*), Audubon's cottontail (*Sylvilagus audubonii*), deer mouse (*Peromyscus maniculatus*), western harvest mouse (*Reithrodontomys megalotis*), and Pacific kangaroo rat (*Dipodomys agilis*). The most common reptile species on Base is the side blotched lizard (*Uta stansburiana*) (March ARB 2005b).

Threatened and Endangered and Special Status Species

Two federally listed species and 10 state special status species have been observed on March ARB (Table 3.10-2).

Table 3.10-2. Special Status Species Observed or Having the Potential to Occur on March ARB (Page 1 of 2)

Common Name	*Scientific Name*	*Federal Status*	*State Status*	*Documented on March ARB*
Birds				
American Peregrine Falcon	*Falco peregrinus anatum*	None	FP	Migrates through
Bald Eagle	*Haliaeetus leucocephalus*	None	E,FP	Rare Transient
Brown Pelican	*Pelecanus occidentalis*	E	FP	Rare transient
Burrowing Owl	*Athene cunicularia*	SC	SSC	Occurs; 19 active burrows found on Base.
California Horned Lark	*Eremophila alpestris actia*	None	WL	Observed on Base
Ferruginous Hawk	*Buteo regalis*	None	SSC	Observed on Base
Golden Eagle	*Aquila chrysaetos*	None	SSC	Observed on Base
Least Bell's Vireo	*Vireo bellii pusillus*	E	E	Habitat exists on adjacent to Base boundary; Not observed on Base.
Loggerhead Shrike	*Lanius ludovicianus*	None	SSC	Observed on Base
Mountain Plover	*Charodrius montanus*	None	SSC	Transient
Southwestern Willow Flycatcher	*Charadrius traillii extimus*	E	E	Habitat exists on adjacent to Base boundary; Not observed on Base.
Tricolored Blackbird	*Agelaius tricolor*	None	SSC	Observed on Base
Mammals				
California leaf-nosed bat	*Macrotus californicus*	None	SSC	Habitat exists on Base; Not observed on Base.
Los Angeles little pocket mouse	*Perognathus longimembris brevinasus*	None	SSC	Habitat exists on Base; Not observed on Base.
San Diego black-tailed jackrabbit	*Lepus californicus bennetti*	None	SSC	Observed on Base
Southern grasshopper mouse	*Onychomys torridus*	None	SSC	Habitat exists on Base; Not observed on Base.
Stephens' Kangaroo Rat	*Dipodomys stephensi*	E	T	One male found in 2000, no observations since.
Townsend's long-eared bat	*Plecotus townsendii*	None	SSC	Habitat exists on Base; Not observed on Base.
Western mastiff bat	*Eumops perotis*	None	SSC	Habitat exists on Base; Not observed on Base.
Amphibians/Reptiles				
Coastal western whiptail	*Cnemidophorus tigris*	None	SSC	Populations found just outside of Base boundary; No observed on Base.
Red diamond rattlesnake	*Crotalus ruber*	None	SSC	Habitat exists on Base; Not observed on Base.
San Diego horned lizard	*Phrynosoma coronatum blainvillii*	None	SSC	Primary food source present on Base; Not observed on Base.
Southwestern pond turtle	*Actinemys marmorta pallida*	None	SSC	Habitat exists on Base; Not observed on Base.
Western (coast) patch-nosed snake	*Salvadora hexalepis virgultea*	None	None	Habitat exists on Base; Not observed on Base.
Western spadefoot toad	*Scaphiopus hammondii*	None	SSC	Marginal habitat exists on Base; Not observed on Base.

Table 3.10-2. Special Status Species Observed or Having the Potential to Occur on March ARB (Page 2 of 2)

Common Name	*Scientific Name*	*Federal Status*	*State Status*	*Documented on March ARB*
Invertebrates				
Quino checkerspot butterfly	*Euphydryas editha quino*	E	None	Host plant present, no individuals observed.
Riverside fairy shrimp	*Streptocephalus woottoni*	E	None	Evidence of historic population of genus *Streptocephalus*; Genus has not been verified.

ARB = Air Reserve Base; C = Federal Candidate Species; E = Endangered; FP = Fully Protected; SC = Federal Species of Concern; SSC = California Species of Special Concern; T= Threatened; WL = Watch List
Sources: March ARB 2005b, 2010

During a 1996 survey, the Stephens' kangaroo rat (SKR), a federally endangered species, was observed in areas outside the current Base boundary, west of I-215 in the northern CZ and the Antenna Farm. One adult male SKR was observed in 2000 east of the west perimeter fence and a few hundred feet south of the March Field Air Museum. However, several surveys since then have not found any signs of the SKR, suggesting that this species no longer inhabits this area. No SKR's were found on the main cantonment area or on the Small Arms Range (March ARB 2005b, 2010).

The Brown Pelican (*Pelecanus occidentalis*), a federally endangered species, has been observed as a rare transient on March ARB. However, no evidence of this species breeding has been documented (March ARB 2005b).

Evidence of fairy shrimp of the genus *Streptocephalus* (possibly the endangered Riverside fairy shrimp [*Streptocephalus woottoni*]) was documented in 1995. However, there was no attempt to hydrate the cyst, and cysts cannot be identified beyond genus. Recent surveys were conducted for this species on the installation and evidence of this species was not observed in either dry or wet season sampling (March ARB 2010). It is possible this may have been the cysts of *S. dorothea*, a non-federally listed species (March ARB 2005b).

In addition, the Burrowing Owl, a California species of special concern, has been observed on March ARB. The Burrowing Owl is the only owl that nests underground, using burrows abandoned by other animals, primarily ground squirrels in northern California. Burrowing Owl habitat is typically open, dry, and sparsely vegetated. During an August 2011 survey, six active burrows and two adult birds were observed directly south of the aircraft apron, and southwest of the new fire department building (Building 1290) (personal communication, Haas 2011).

3.11 CULTURAL RESOURCES

3.11.1 Definition of Resource

Cultural resources consist of prehistoric and historic districts, sites, structures, artifacts, or any other physical evidence of human activity considered important to a culture, subculture, or community for scientific, traditional, religious, or other reasons. Cultural resources can be divided into three major categories: archaeological resources (prehistoric and historic), architectural resources, and traditional cultural resources.

Archaeological resources are locations where human activity measurably altered the earth or left deposits of physical remains (e.g., tools, arrowheads, or bottles). "Prehistoric" refers to resources that predate the advent of written records in a region. These resources can range from a scatter composed of a few artifacts to village sites and rock art. "Historic" refers to resources that postdate the advent of written records in a region. Archaeological resources can include campsites, roads, fences, trails, dumps, battlegrounds, mines, and a variety of other features.

Architectural resources include standing buildings, dams, canals, bridges, and other structures of historic or aesthetic significance. Architectural resources generally must be more than 50 years old to be considered for protection under existing cultural resource laws. However, more recent structures, such as Cold War era military buildings, may warrant protection if they have exceptional characteristics and the potential to be historically significant structures. Architectural resources must also possess integrity (i.e., its important historic features must be present and recognizable).

Traditional cultural resources can include archaeological resources, buildings, neighborhoods, prominent topographic features, habitats, plants, animals, and minerals that Native Americans or other groups consider essential for the continuance of traditional cultures.

Only cultural resources considered to be significant, known or unknown, warrant consideration with regard to adverse impacts resulting from a proposed action. To be considered significant, archaeological or architectural resources must meet one or more criteria as defined in 36 CFR 60.4 for inclusion in the NRHP. The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:

(a) that are associated with events that have made a significant contribution to the broad patterns of our history; or

(b) that are associated with the lives of persons significant in our past; or

(c) that embody the distinctive characteristics of a type, period, or method of construction, or

(d) that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

(e) that have yielded, or may be likely to yield, information important in prehistory or history.

Several federal laws and regulations have been established to manage cultural resources, including the NHPA (1966), the Archaeological and Historic Preservation Act (1974), AIRFA (1978), the ARPA (1979), and NAGPRA (1990). In addition, coordination with federally recognized Native American tribes must occur in accordance with EO 13175, *Consultation and Coordination with Indian Tribal Governments*.

On November 27, 1999, the DoD promulgated its Annotated American Indian and Alaska Native Policy, which emphasizes the importance of respecting and consulting with tribal governments on a government-to-government basis. This Policy requires an assessment, through consultation, of the effect of proposed DoD actions that may have the potential to significantly affect protected tribal resources, tribal rights, and Indian lands before decisions are made by the respective services (DoD American Indian/Alaska Native Policy), as does DoD Instruction 4710.02, *Interaction with Federally Recognized Tribes* (September 14, 2006).

The ROI for cultural resources includes only those locations on the 144 FW installation where facility renovation or construction and its staging would occur and potential ground disturbance would result. The ROI does not include March ARB since no ground disturbance would occur in these areas and the proposed operations will be consistent with current conditions.

3.11.2 Existing Conditions

3.11.2.1 Fresno-Yosemite International Airport

Archaeological Resources

The majority of the 144 FW installation has been surveyed for archaeological resources. No archaeological resources have been identified at the 144 FW or adjacent lands. Based on the survey conducted, the entire 144 FW installation is considered to have low to no probability for archaeological resources (144 FW 2010a). The California SHPO concurred with this finding during their review of the 144 FW Integrated Cultural Resources Management Plan (144 FW 2010a).

Architectural Resources

No architectural resources have been identified at the 144 FW. According to the Real Property list dated March 2010 used at the time of the 2010 Integrated Cultural Resources Management Plan, the 144 FW installation contained 49 buildings and structures. Nineteen of the 49 buildings and structures were surveyed during the 2006 Cultural Resource Survey; however, none of the 19 buildings and structures surveyed were found to be eligible for listing in the NRHP. In addition to the 19 buildings, 9 historic taxiways, deflectors, concrete pads, and berms were recorded during the 2006 survey. These structures were found to not be eligible for listing on the NRHP (144 FW 2010a).

Fourteen Cold War-era buildings (Buildings 104, 110, 2202, 2203, 2204, 2206, 2207, 2208, 2217, 2219, 2221, 2223, 2602, and 2606) have not been surveyed because they were not part of the installation during the 2006 inventory. They should be surveyed or evaluated for their NRHP eligibility including exceptional significance relative to the Cold War (Consideration Criterion G). Buildings 104 and 110, built in 1957 and 1961 respectively, have been evaluated under Criterion G ("exceptional significance") but need to be evaluated under Criteria A-D as they are now 50 years in age. The remaining buildings and structures at the 144 FW are of recent construction (post-1989) and do not require evaluation at this time.

Traditional Resources

The 144 FW installation contains no known traditional resources. Given the extensive development on the installation, it is unlikely that there are traditional resources located at the 144 FW. However, the 144 FW is required to consult with federally-recognized Tribes by federal law and non-federally recognized Tribes by California State Law. The 144 FW began this process by sending IICEP letters to the following federally-recognized tribes as a part of this EIS: Pechanga Cultural Resources Department, Santa Rosa Rancheria Tachi Yokut Tribe, Table Mountain Rancheria, Big Sandy Rancheria of Western Mono Indians, North Fork Rancheria of Mono Indians, Cold Springs Rancheria of Mono Indians, Cahuilla Band of Mission Indians, Morongo Band of Cahuilla Mission Indians, Pechanga Band of Luiseño Mission Indians, Ramona Band of Cahuilla Mission Indians, Santa Rosa Band of Cahuilla Indians, and the Soboba Band of Luiseño Indians.

The State of California Native American Heritage Commission recommends consultation with the following federally-recognized Tribes for projects in Fresno County: Big Sandy Rancheria of Mono Indians, Cold Springs Rancheria of Mono Indians, Table Mountain Rancheria, and the North Fork Mono Tribe. They also recommend consultation with the following non-federally recognized Tribes: Sierra Nevada Native American Coalition, Dumna Wo-Wah Tribal Government, Dunlap Band of Mono Historic Preservation Society, Chowchilla Tribe of Yokuts,

Traditional Choinumni Tribe, Kings River Choinumni Farm Tribe, and Santa Rosa Tachi Rancheria. The 144 FW is continuing formal consultation with federally-recognized and non-federally recognized tribes. Consultation letters were sent out to aforementioned Tribes in January 2012.

3.11.2.2 March Air Reserve Base

There is no planned construction at March ARB and proposed operations will be consistent with current conditions. As a result, this resource topic will not be discussed further for March ARB.

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CHAPTER 4
ENVIRONMENTAL CONSEQUENCES

The resource analyses presented in this chapter are based on an examination of potential effects that the various alternatives, including the No Action Alternative may have on existing environmental conditions. The alternatives are described in Chapter 2, and the existing environmental conditions for each resource are described in Chapter 3. This chapter examines the potential environmental consequences for each of the resource areas in the same sequence as presented in Chapter 3. Within each resource area, the methodology used to evaluate potential impacts is described, followed by the evaluation of those potential impacts within the ROI as a result of implementation of each of the alternatives using the methodology presented.

As described in Chapter 3, there are 11 resource areas that were described. Impacts associated with each of those resource areas is discussed in this chapter; however, because there is no proposed ground-disturbing activity at March ARB, resources associated with that will not be discussed in detail. These include: hazardous materials and wastes, infrastructure, earth resources, water resources, and cultural resources.

4.1 NOISE

4.1.1 Methodology

In this section, noise associated with flying operations and construction activities related to the Proposed Action are considered and compared with current conditions to assess potential impacts. Data developed during this process also supports analyses in other resource areas. Public annoyance is the most common impact associated with exposure to elevated noise levels and the DNL noise metric has been strongly correlated to public annoyance (Finegold *et al.* 1994). When subjected to DNL levels of 65 dB, approximately 12 percent of the persons exposed will be "highly annoyed" by the noise. At levels below 60 dB, the percentage of annoyance is substantially lower (less than 8 percent), and at levels above 70 dB it is substantially higher (approximately 25 percent). A DNL of 75 dB is also the threshold above which effects other than annoyance may occur (Committee on Hearing, Bioacoustics, and Biomechanics 1977) (Table 3.1-3). According to USAF land use guidelines, DNL 65 dB is the highest aircraft noise level that is normally compatible with residential uses (FICUN 1980). Even with special noise attenuation measures installed, residential developments are never considered to be compatible with a DNL greater than 75 dB.

Federal agencies typically use the DNL noise metric for land use planning purposes, whereas the State of California uses CNEL for this same purpose. The CNEL metric itself is essentially the

same as DNL except for the method of treating noise events that occur between 7 p.m. and 10 p.m.

Because CNEL applies additional noise penalties over and above those applied to DNL, CNEL will always be equal to or slightly greater than DNL. Significance of potential noise impacts is based on the noise sensitivity in areas affected by substantially increased noise levels under the Proposed Action. Generally, noise impacts could be considered significant if they would:

- Increase time-averaged noise level by greater than 1.5 dB at one or more noise sensitive locations (e.g., residential areas) within the 65 dB noise contour;
- Newly expose noise-sensitive land uses, such as residential areas, to noise levels at which they are not considered to be compatible without sound attenuation (above DNL 65 dB), according to federal land use guidelines;
- Expose persons to noise levels that could potentially cause impacts other than annoyance; and
- Increase noise levels at either Fresno-Yosemite IAP or March ARB facilities to a point at which current functions could be not be carried out efficiently.

Baseline noise contours were developed based on the 2011 airport noise study (Coffman Associates, Inc. 2012). In modeling the F-15 proposed noise exposure contours, flight profiles using the current F-16 flight tracks and procedures were used. CNEL contours were computed in INM using the same grid specifications and data in the Fresno-Yosemite IAP recently completed noise study.

There are a variety of data that are input into the INM to develop noise contours, and include such variables as: physical description of the airport; number and mix of aircraft operations; day-evening-night split of operations (by aircraft type); runway utilization rates; prototypical flight track descriptions; and flight track utilization rates. This information by type of aircraft/engine, and meteorological variables are assembled and processed for input into the INM. Contours are generated as 5 dB intervals beginning at DNL 65 dB, the maximum level considered acceptable for unrestricted residential use. While there is no technical reason why a DNL below 65 dB cannot be measured or calculated for comparison purposes, this noise level provides a valid basis for comparing and assessing community noise effects, and represents a noise exposure level that is normally dominated by aircraft noise and not other community or nearby highway noise sources.

Equipment used during the facility construction would also generate short-term noise; however, would contribute little to the general background noise levels around the airfield. Thus, vehicle generated noise will not be analyzed.

Construction noise is generated by the use of heavy equipment on job sites and is short-term in duration (i.e., the duration of the construction period). Commonly, use of heavy equipment occurs sporadically throughout daytime hours. Table 4.1-1 provides a list of representative construction equipment and associated noise levels, adjusted for the percentage of time equipment would typically be operated at full power at a construction site. Construction noise varies greatly depending on the construction process, type and condition of equipment used, and layout of the construction site. Overall, construction noise levels are governed primarily by the noisiest pieces of equipment and impact devices (i.e., jackhammers, pile drivers).

Table 4.1-1. Typical Construction/Demolition Equipment Sound Levels

Equipment	SOUND LEVEL (L_{max} in dB) AT INDICATED DISTANCE FROM EQUIPMENT	
	100 feet	*500 feet*
Excavator	74.7	60.7
Jackhammer	82.9	68.9
Clam Shovel (Dropping)	81.2	67.3
Dozer	75.6	61.7
Pneumatic Tools	79.2	65.2
Concrete Saw	83.6	69.6
Grader	79.0	65.0
Front End Loader	73.1	59.1
Dump Truck	70.4	56.5
Concrete Mixer Truck	72.8	58.8
Crane	74.5	60.6
Generator	74.6	60.6
Pickup Truck	69.0	55.0

dB = decibel; L_{max} = Maximum Sound Level
Source: Federal Highway Administration 2006

4.1.2 Impacts

4.1.2.1 Preferred Alternative

Fresno-Yosemite International Airport

Under the Preferred Alternative, 18 F-15s would be based at Fresno-Yosemite IAP, replacing the 18 F-16 aircraft. There would be no change in the number or type of other aircraft using the airfield. F-15 aircraft flight profiles were adjusted under this alternative to reflect established noise abatement procedures (Appendix B). The percentage of aircraft operations occurring during the evening (7 p.m. to 10 p.m.) and night (10 p.m. to 7 a.m.) would remain the same as under baseline conditions. F-15 airfield operations would not change from the baseline F-16s.

F-15 aircraft operations per average busy flying day (arrivals and departures [12.05] and closed patterns [0.772]) would stay the same. The total number of operations flown by all other aircraft at Fresno-Yosemite IAP would not change from previously identified airfield activities. Also, there would be no change to any other aircraft types or aircraft flight tracks and profiles from the baseline condition.

Figure 4.1-1 compares the Preferred Alternative noise contours with the baseline and depicts the noise exposure area from aircraft operations after the conversion from the current 18 F-16 aircraft to 18 F-15 aircraft. The aircraft operations modeled include all current transient aircraft, and general and commercial aircraft operations depicted in the current Fresno-Yosemite IAP 2011 noise modeling update. Table 4.1-2 shows changes to the acreage of land within each noise contour under the Preferred Alternative.

Table 4.1-2. Land Area at Fresno-Yosemite IAP Affected by CNEL Greater than 65 dB

Noise Level (dB CNEL)	BASELINE TOTAL (ACRES)			PREFERRED ALTERNATIVE TOTAL (ACRES)			*Change Total (Acres)*
	On Airport	*Off Airport*	*Total*	*On Airport*	*Off Airport*	*Total*	
65-70	418	559	977	246	1,106	1,352	375
70-75	405	60	465	490	218	708	243
75-80	205	15	220	283	27	310	90
80-85	145	8	153	161	11	172	19
>85	147	4	151	231	8	239	88
Total	**1,320**	**646**	**1,966**	**1,411**	**1,370**	**2,781**	**815**

Note: Both F-16 and F-15 use the F100-PW-220 engines.
CNEL = Community Noise Equivalent Level; dB = decibel

Under the Preferred Alternative, the noise contours would expand slightly in all directions from the baseline contours. Overall, the number of acres contained within the CNEL 65 dB and greater exposure area would increase by approximately 815 acres, or 41 percent. Approximately 724 of these acres would be off the airport property. Roughly 3,304 persons would be affected by CNEL above 65 dB with 1,873 of these people being newly affected. Based on data from the City of Fresno, it is estimated that 715 homes would be within the 65 dB noise contour, and 20 homes would be within the 70 dB contour under this alternative. This is an increase of 495 homes from the 240 homes that are currently located within the 65 dB noise baseline contour (County of Fresno 2012). No homes would be located within the 75 dB noise contour.

Table 4.1-3 shows a comparison between Preferred Alternative and baseline CNEL for 13 representative sensitive receptors. The change in CNEL for these representative sensitive receptors ranges from 1.6 to 3.2 CNEL. Six representative sites (Scandinavian Middle School, Alliant International University, Phillips Junior College, Hanks Par Three Golf Course, East Princeton Baptist Church, and Faith Baptist Church) are not currently exposed to CNEL of 65 dB but would be under the Preferred Alternative.

Table 4.1-3. Estimated CNEL for Representative Noise-Sensitive Receptors Under Preferred Alternative at Fresno-Yosemite IAP

Representative Noise-Sensitive Receptors	*Baseline CNEL (dB)*	*Preferred Alternative CNEL (dB)*	*Change in CNEL (dB)*
Scandinavian Middle School	62.8	65.5	2.7
Addicott School	67.1	69.8	2.7
Alliant International University	62.3	65.1	2.8
San Joaquin Valley College – Fresno Aviation	68.4	70.8	2.4
San Joaquin Valley College	67.8	70.0	2.2
Hanks Par Three Golf Course	64.1	65.7	1.6
Airways Golf Course	68.3	71.5	3.2
East Princeton Baptist Church	63.4	65.6	2.2
Fresno Adventist Academy	61.1	64.1	3.0
Fresno Christian Growth Center	61.8	63.9	2.1
Faith Baptist Church	62.0	65.1	3.1
Phillips Junior College Fresno Campus	63.7	66.1	2.4
Vale National College	66.4	68.7	2.3

CNEL = Community Noise Equivalent Level; dB = decibel

Single Event Sound Analysis. A total of five representative altitudes were selected for the arrival, departure, and traffic patterns and around the airfield to calculate the SEL (Table 4.1-4). The aircraft ground track figures in Appendix B identify the locations of the altitudes in the departures and arrivals points. Under the Preferred Alternative, there would be no change in the aircraft ground tracks or flight profiles for the aircraft. Similarly, there would be no change in the other types of aircraft that operate at the airfield. SELs would increase with the F-15 for flight arrivals and departures, as shown. The minimum change in the sound level of individual events that an average human ear can detect is about 3 dB, and on average a change in sound level of 10 dB is perceived as a doubling of loudness. Under the Preferred Alternative, the flying profiles would not change, and the scheduled flying program would continue as under baseline conditions, with flights scheduled for the same time periods as currently flown during the morning and afternoons, with limited evening flying.

Table 4.1-4. Comparison of F-16 and F-15 Aircraft SEL, Fresno-Yosemite IAP

Altitude	*1,000 feet AGL*	*1,300 feet AGL*	*2,000 feet AGL*	*3,000 feet AGL*	*4,000 feet AGL*
F-16 AB[1]	115.0 dB	112.7 dB	-	-	-
F-15 AB[1]	119.6 dB	117.0 dB	-	-	-
Change	**+4.6 dB**	**+4.3 dB**	**-**	**-**	**-**
F-16 Max Power[2]	-	-	101.4 dB	97.2 dB	94.2 dB
F-15 Max Power[2]	-	-	106.1 dB	102.3 dB	99.4 dB
Change	**-**	**-**	**+4.7 dB**	**+5.1 dB**	**+5.2 dB**
F-16 Approach Power	90.4 dB	-	83.1 dB	90.2 dB	87.2 dB
F-15 Approach Power	97.2 dB	-	90.1 dB	94.0 dB	91.1 dB
Change	**+6.8 dB**	**-**	**+7.0 dB**	**+3.8 dB**	**+3.9 dB**

Note: 1. AB-Afterburner used for all Take Offs until over the end of the runway or 1,300 feet AGL.
2. Max Power on take-off after terminating AB for departures.
AGL = above ground level; dB = decibel; SEL = Sound Exposure Level

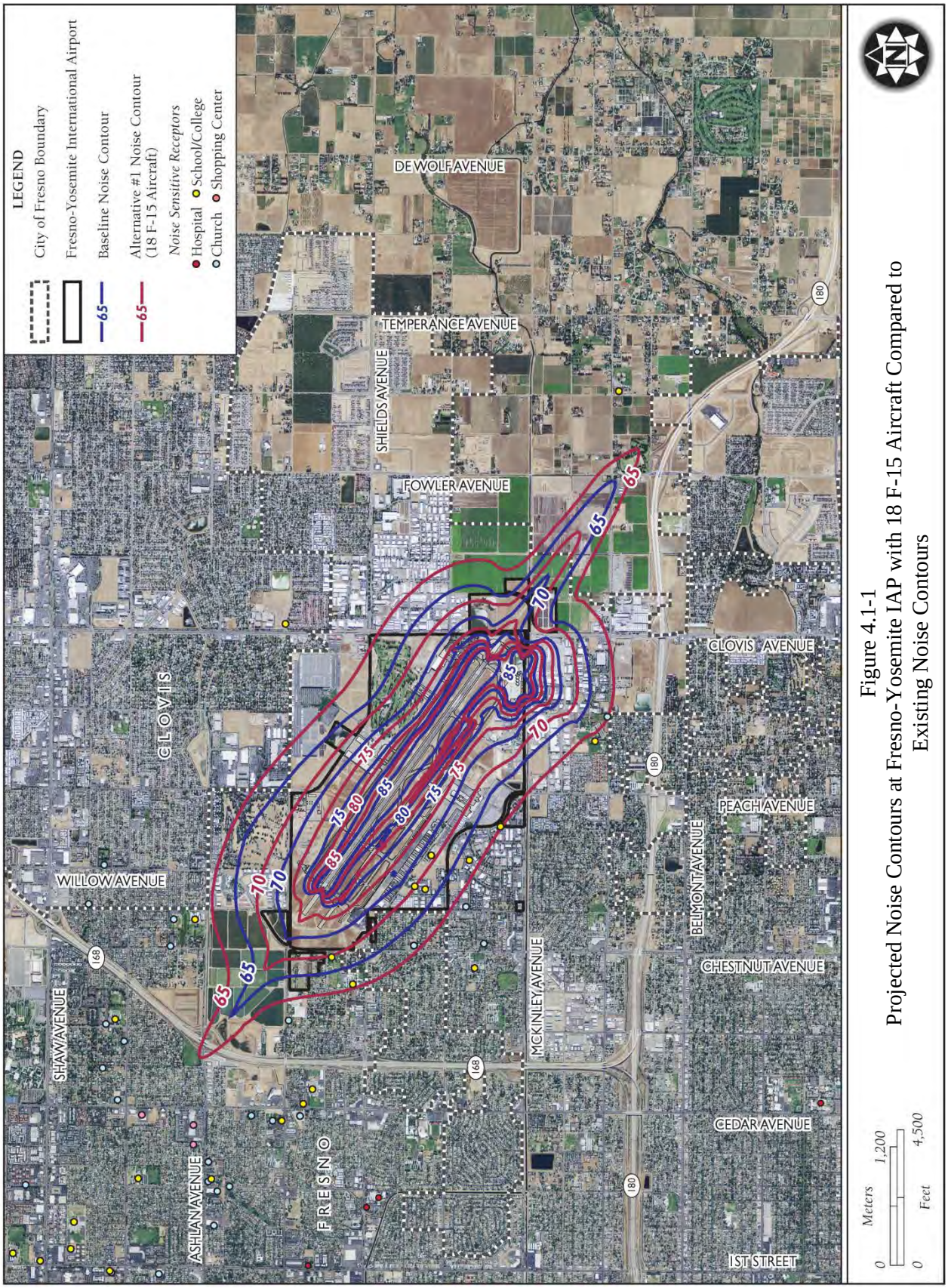

Figure 4.1-1
Projected Noise Contours at Fresno-Yosemite IAP with 18 F-15 Aircraft Compared to Existing Noise Contours

Speech interference and sleep disturbance are based on the SEL and number of individual overflights. As indicated in Table 4.1-4, SELs for the F-15 and F-16 are both above the threshold where interference with speech and sleep could occur. Therefore, because there are no increases in the number of operations, or change in the number of nighttime operations (20 annual arrivals), both speech interference and sleep disturbance would be expected to remain similar to the baseline conditions. Similarly, because the proposed F-15 aircraft would fly the same number of sorties as under the baseline conditions, and is similar in its overall noise footprint, health impacts to those persons exposed to the noise contours would not be expected.

Potential Hearing Loss. As shown in Table 4.1-2, there are 19 acres off the Fresno-Yosemite IAP property that fall within the 80+ dB noise contour. There are no residences located within this acreage, and therefore, there would be no potential hearing loss risk associated with these areas.

Construction Noise. There would be some minor noise from construction equipment associated with construction activities that would occur intermittently during the construction period (2013-2014). Typical noise levels from heavy equipment range from 69 to 84 dB at 100 feet from the source. Table 4.1-1 provides a list of construction equipment and associated noise levels. Aviation-related activities at Fresno-Yosemite IAP dominate the local noise environment for brief times on some days. Equipment used during the facility construction would contribute little to the general background noise levels around the airfield.

March Air Reserve Base

At March ARB, three alert F-16 aircraft would be replaced with three F-15 aircraft. The F-15 aircraft flight tracks and flight profiles would not change from the baseline (Appendix B). The percentage of aircraft operations occurring during the evening (7 p.m. to 10 p.m.) and night (10 p.m. to 7 a.m.) would remain the same as under baseline conditions. While there would be no changes to the flight profiles and flight tracks, there would be an increase in the current assessed closed patterns flown at March ARB by the F-15 aircraft. The number of operations currently performed at March ARB is a slight increase over the number that were evaluated in previous documentation (2008), and therefore this current analysis will show that increase from the previously analyzed number of operations to the current number flown today (AFCEE 2008). An increase of 122 closed patterns (244 airfield operations) are flown at March ARB.

F-15 aircraft operations would account for 3.613 per average busy flying day (arrivals, departures, and closed patterns). The total number of operations flown by all other aircraft at March ARB would not change from previously identified airfield activities. There would be no change to any other aircraft types or aircraft flight tracks and profiles from the baseline condition.

Figure 4.1-2 compares the Preferred Alternative contours with the baseline and depicts the noise exposure area from aircraft operations after the conversion from the current three F-16 aircraft to three F-15 aircraft. Table 4.1-5 shows changes in acreage at March ARB within the various noise contours under the Preferred Alternative.

Table 4.1-5. Land Area at March ARB Affected by CNEL Greater than 65 dB

Noise Level (dB CNEL)	BASELINE TOTAL (ACRES)			PROPOSED TOTAL (ACRES)			*Total Change (acres)*	*% Change*
	On Base	*Off Base*	*Total*	*On Base*	*Off Base*	*Total*		
65-70	331	1,076	1,407	317	1,267	1,584	177	12.6
70-75	508	207	715	462	347	809	94	13.1
75-80	271	15	286	322	20	342	56	19.6
80-85	216	0	216	190	0	190	-26	-12.0
>85	15	0	15	138	0	138	123	820.0
Total	**1,341**	**1,298**	**2,639**	**1,429**	**1,634**	**3,063**	**424**	**16.1**

Note: Both F-16 and F-15 use the F100PW-220 engines.
CNEL = Community Noise Equivalent Level; dB = decibel

Overall, the Preferred Alternative noise contours would retain the same basic shape as the baseline contours with the overall number of acres in the CNEL 65 dB and greater exposure area increasing by 16.1 percent. The Preferred Alternative would generate an increase of 25.9 percent (336 acres) in the CNEL 65 dB and greater exposure area off Base. There would be an increase of acreage above CNEL 65 dB to the west of the center of the main runway, approaching I-215 and to the east of the runway approaching Heacock Street. Land uses within the expanded 65 dB noise contour includes industrial, public/quasi-public, and rural residential (although no homes are located within the area contained within the 65 dB contour). There are no noise sensitive receptors located within the proposed noise contours for the Preferred Alternative at March ARB.

Potential Hearing Loss. As shown in Table 4.1-4, the 80+ dB noise contours do not go off March ARB; therefore, there would be no potential hearing loss risk associated with this proposal.

4.1.2.2 Alternative #2

Fresno-Yosemite International Airport

Under Alternative #2, 24 F-15 aircraft would be based at Fresno-Yosemite IAP, replacing the 18 F-16 aircraft. There would be no change in the number of other aircraft using the airfield. Aircraft flight ground tracks, altitude, engine power profiles, and maintenance procedures would be the same as discussed under baseline conditions and the Preferred Alternative (Appendix B).

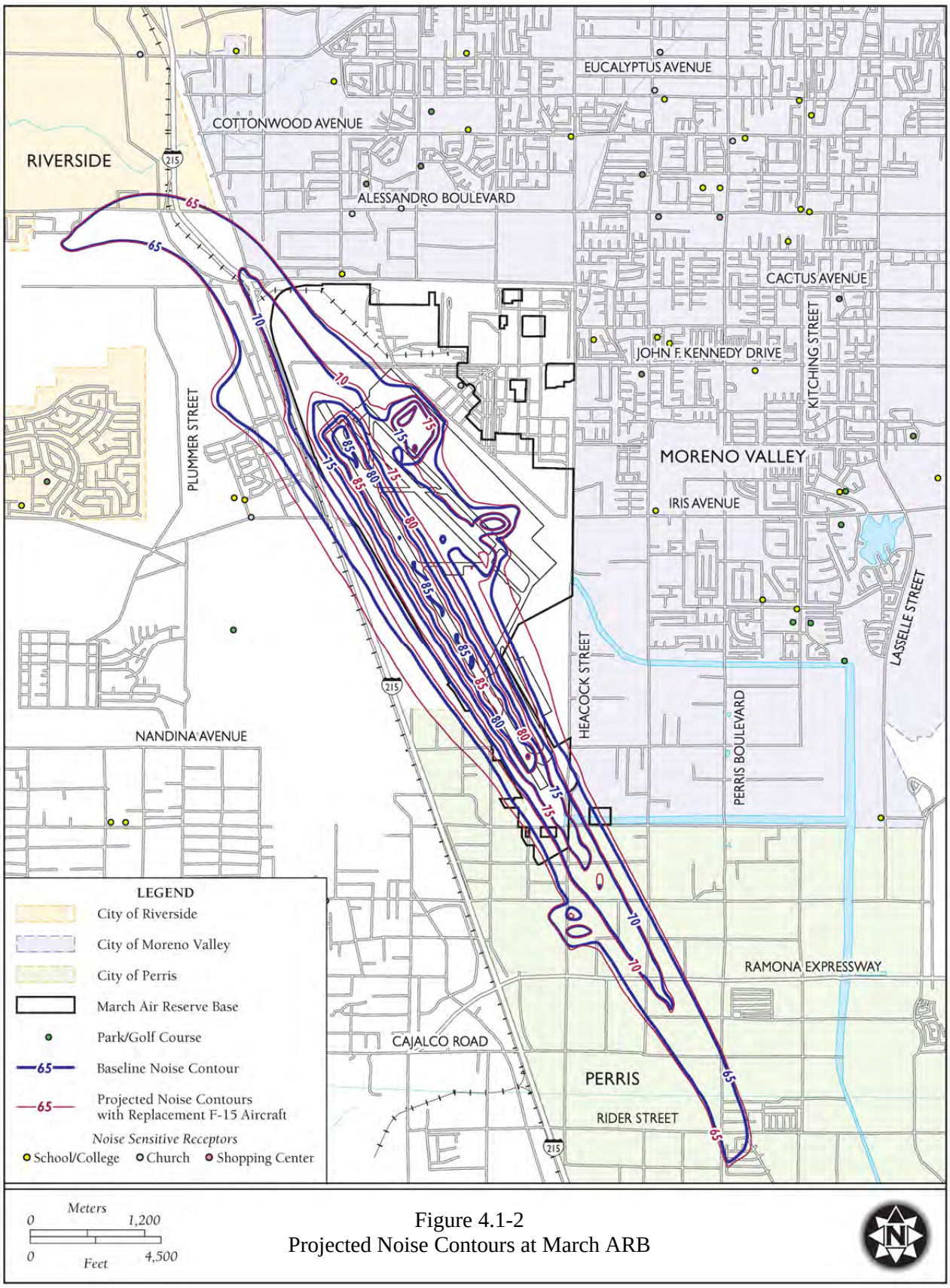

Figure 4.1-2
Projected Noise Contours at March ARB

The percentage of aircraft operations occurring during the evening (7 p.m. to 10 p.m.) and night (10 p.m. to 7 a.m.) would increase from baseline conditions (Appendix B). F-15 airfield operations would also increase from the baseline F-16 operations. The average busy flying day arrivals and departures would increase to 16.03 and closed patterns would increase by 1.02 airfield operations per average busy flying day. The total number of operations flown by all other aircraft types per average busy flying day at Fresno-Yosemite IAP would not change from previously identified airfield activities.

Figure 4.1-3 compares the Alternative #2 contours with the baseline and depicts the noise exposure area from aircraft operations under Alternative #2. Table 4.1-6 shows changes under Alternative #2 to land area.

Table 4.1-6. Land Area at Fresno-Yosemite IAP Affected by CNEL Greater than 65 dB Alternative #2

Noise Level (dB CNEL)	BASELINE TOTAL (ACRES)			ALTERNATIVE #2 TOTAL (ACRES)		
	On Airport	*Off Airport*	*Total*	*On Airport*	*Off Airport*	*Total*
65-70	418	559	977	170	1,372	1,542
70-75	405	60	465	476	338	814
75-80	205	15	220	340	33	373
80-85	145	8	153	175	14	189
>85	147	4	151	258	11	269
Total	**1,320**	**646**	**1,966**	**1,419**	**1,768**	**3,187**

Note: Both F-16 and F-15 use the F100-PW-220 engines.
CNEL = Community Noise Equivalent Level; dB = decibel

Under Alternative #2, the noise contours would expand in all directions compared to the baseline contours. Overall, the number of acres contained within the CNEL 65 dB and greater exposure area would increase by approximately 1,221 acres, or 62 percent. Roughly 4,876 persons would be affected by noise levels above CNEL 65 dB, with 3,445 of these people being newly affected. Based on data from the City of Fresno, it is estimated that 1,291 homes would be within the 65 dB noise contour, and 65 homes would be within the 70 dB contour under this alternative. This is an increase of 495 homes from the 240 homes that are currently located within the 65 dB noise baseline contour (County of Fresno 2012).

Table 4.1-7 shows a comparison between Alternative #2 and baseline CNEL for 13 representative sensitive receptors. The change in CNEL for these representative sensitive receptors ranges from 2.2 to 4.2 CNEL. Eight representative sites (Scandinavian Middle School, Alliant International University, Phillips Junior College, Hanks Par Three Golf Course, East Princeton Baptist Church, Fresno Adventist Academy, Fresno Christian Growth Center, and Faith Baptist Church) are currently not exposed to CNEL 65 dB, but would be under Alternative #2.

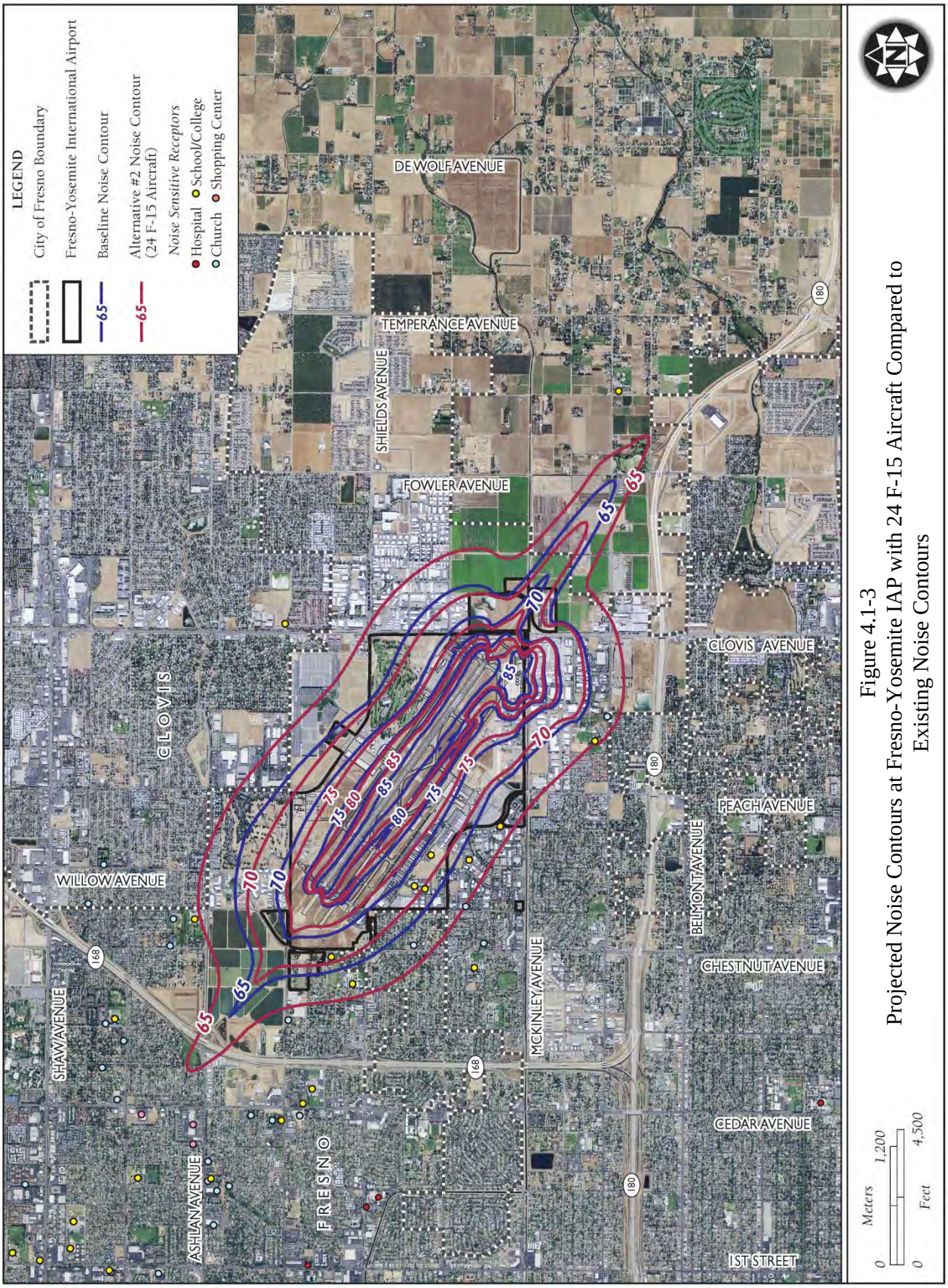

Figure 4.1-3
Projected Noise Contours at Fresno-Yosemite IAP with 24 F-15 Aircraft Compared to Existing Noise Contours

Table 4.1-7. Estimated CNEL for Representative Noise-Sensitive Receptors Under Alternative #2 at Fresno-Yosemite IAP

Representative Noise-Sensitive Receptors	*Baseline CNEL (dB)*	*Alternative #2 CNEL (dB)*	*Change in CNEL (dB)*
Scandinavian Middle School	62.8	66.6	3.8
Addicott School	67.1	70.9	3.8
Alliant University	62.3	66.2	3.9
San Joaquin Valley College – Fresno Aviation	68.4	71.8	3.4
San Joaquin Valley College	67.8	71.0	3.2
Hanks Par Three Golf Course	64.1	66.3	2.2
Airways Golf Course	68.3	72.5	4.2
East Princeton Baptist Church	63.4	66.7	3.3
Fresno Adventist Academy	61.1	65.2	4.1
Fresno Christian Growth Center	61.8	65	3.2
Faith Baptist Church	62.0	66.2	4.2
Phillips Junior College Fresno Campus	63.7	67.1	3.4
Vale National College	66.4	69.7	3.3

CNEL = Community Noise Equivalent Level; dB = decibel

Potential Hearing Loss. As shown in Table 4.1-6, there are 25 acres off the Fresno-Yosemite IAP property that fall within the 80+ dB noise contour. There are no residences located within this acreage, and therefore, there would be no potential hearing loss risk associated with these areas.

March Air Reserve Base

There would be no change to the noise environment at March ARB from those described under the Preferred Alternative. There would be three F-15 alert aircraft replacing three F-16 alert aircraft, as described under the Preferred Alternative. There would be no changes to the aircraft flight profiles or flight tracks described in the Preferred Alternative. All noise impacts and noise contours identified under the Preferred Alternative would be the same.

4.1.2.3 No Action Alternative

Under the No Action Alternative, there would be no aircraft conversion or associated construction occurring at Fresno-Yosemite IAP. The F-15s would not be based at Fresno; however, the F-16s would eventually be transferred to the 162 FW, as scheduled. Therefore, the 144 FW would not have a flying mission until such time as when the USAF identified an appropriate aircraft to be based there. As a result, the noise contours at Fresno-Yosemite IAP would temporarily be reduced in areal extent until a new mission and aircraft could be based there, thus creating a short-term, beneficial impact to the noise environment.

The alert missions and associated aircraft at both Fresno-Yosemite IAP and March ARB would remain under the No Action Alternative even if the other F-16 aircraft associated with the 144 FW were relocated to the 162 FW.

4.2 AIR QUALITY

4.2.1 Methodology

The Proposed Action involves both construction of new facilities to accommodate the F-15 aircraft, and operational emissions associated with the F-15 aircraft. Environmental consequences were evaluated to assess whether a degradation in air quality would be anticipated from implementation of the Proposed Action. To evaluate whether a degradation in air quality would occur from emissions associated with the Proposed Action, emissions were compared with major source thresholds (100 tpy) for attainment pollutants, and the General Conformity Rule *de minimis* thresholds for nonattainment pollutants.

The Proposed Action would include construction activities at the 144 FW installation at Fresno-Yosemite IAP; no construction is proposed for March ARB. Emissions associated with construction were calculated using the URBEMIS Model (Rimpo and Associates 2007), which is the latest version of the land use planning model available. The URBEMIS Model utilizes emission factors from the CARB's OFFROAD Model (CARB 2007a) and EMFAC2007 Model (CARB 2007b) to calculate emissions from construction equipment and vehicles. Appendix C includes data and assumptions used to calculate proposed construction emissions.

Air quality impacts from construction would occur from (1) combustion emissions due to the use of fossil fuel-powered equipment and (2) fugitive dust emissions (PM_{10}) during demolition activities, earth-moving activities, and the operation of equipment on bare soil. Fugitive dust emissions were calculated based on the total site disturbance projected for each construction project for all construction years. Equipment usage was based on similar construction projects to estimate project combustion and fugitive dust emissions.

Operational emissions associated with the Proposed Action include emissions associated with aircraft operations and associated equipment. Mobile source emissions include emissions from aircraft operations (take-offs and landings), AGE, personal vehicle operations, and maintenance aircraft operations performed with the engines still mounted on the aircraft (engine run-ups and trim checks). Air quality impacts associated with the Proposed Action for the F-15 aircraft were assessed by comparing the net emissions associated with F-15 operations with emissions associated with existing operations for the F-16 aircraft. Emissions evaluated for both the baseline and the Proposed Action include (1) aircraft operations; (2) POVs; (3) engine run-ups, and (4) AGE use. According to the 144 FW, the Proposed Action would result in no net change in use of government-owned vehicles, construction (outside of the construction activities

associated with the Proposed Action), or stationary sources. Emissions from these categories of sources were calculated based on guidance from the USAF in their *Air Emissions Factor Guide to Air Force Mobile Sources* (AFCEE 2003), utilizing the latest air emissions modeling tools. A detailed description of the methodology and assumptions used for each source category is provided in Appendix C.

There are no final guidelines for discussing the potential GHG impacts in EIAP documents. CEQ proposed draft guidance for public comment and review on February 18, 2010, but this draft has never been formally adopted by CEQ. Tables 4.2-1 through 4.2-4 set forth the predicted GHG emissions for the Preferred Alternative for Fresno-Yosemite IAP and March ARB.

4.2.2 Impacts

4.2.2.1 Preferred Alternative

As discussed in Chapter 2, under the Preferred Alternative the 144 FW would convert from 18 F-16 aircraft to 18 F-15 aircraft. In general, three of these aircraft would be based at March ARB, and would serve the ACA out of that location. Baseline operations at Fresno-Yosemite IAP total 122,319 annual operations. The number of operations would remain unchanged under the Preferred Alternative.

Fresno-Yosemite International Airport

The construction at the Fresno-Yosemite IAP for the 144 FW associated with the Preferred Alternative would occur during calendar years 2013 and 2014. Only construction of the Aircraft Corrosion Control Hangar (Project HAYW109006) would require more than 12 months to complete. Table 4.2-1 summarizes the annual and total construction emissions associated with the Preferred Alternative. The data in Table 4.2-1 show that annual emissions for proposed construction activities would not exceed the CAA major source thresholds and/or the General Conformity Rule *de minimis* thresholds as set forth in the CAA (100 tpy for attainment pollutants, 10 tpy for O_3 precursors). Air quality impacts associated with these emissions alone would not be significant.

Table 4.2-1. 144 FW Construction Emissions

144 FW Construction Project	EMISSIONS, TONS/YEAR						
	CO	*NO_x*	*VOCs*	*SO_x*	*PM_{10}*	*$PM_{2.5}$*	*CO_2e*
2012							
Project #1 – Construction of New Aircraft Corrosion Control Hangar and Shops	0.27	0.47	0.06	0.00	0.04	0.02	50.52
Project #3 – Addition to Existing Munitions Storage Facility	0.27	0.47	0.06	0.00	0.04	0.02	50.52
Project #4 – Addition to Existing Non-Destructive Inspection Shop	0.10	0.17	0.02	0.00	0.01	0.01	20.41
Total Annual Emissions	**0.64**	**1.11**	**0.14**	**0.00**	**0.09**	**0.05**	**121.45**
2013							
Project #1 – Construction of New Aircraft Corrosion Control Hangar and Shops	0.98	1.34	0.19	0.00	0.09	0.08	180.48
Project #2 – Expansion of Existing Arm and Dearm Pad	0.25	1.76	1.22	0.00	0.20	0.12	87.49
Project #3 – Addition to Existing Munitions Storage Facility	0.59	0.84	0.11	0.00	0.05	0.04	118.27
Project #4 – Addition to Existing Non-Destructive Inspection Shop	0.52	0.81	0.13	0.00	0.05	0.04	103.48
Total Annual Emissions	**2.34**	**4.75**	**1.65**	**0.00**	**0.39**	**0.28**	**489.72**
2014							
Project #1 – Construction of New Aircraft Corrosion Control Hangar and Shops	0.17	0.23	0.13	0.00	0.01	0.01	35.12
Total Annual Emissions	**0.17**	**0.23**	**0.13**	**0.00**	**0.01**	**0.01**	**35.12**

CO = carbon monoxide; CO_2e = carbon dioxide equivalent; NO_x = oxides of nitrogen; PM_{10} = particulate matter less than or equal to 10 microns in diameter; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; SO_x = oxides of sulfur; VOC = volatile organic compound

Project construction equipment would emit minor amounts of HAPs that could potentially impact public health. The main source of HAPs would occur in the form of particulates from the combustion of diesel fuel. Due to the mobile and intermittent operation of proposed diesel-powered construction equipment over a large construction area and the lack of sensitive receptors in the immediate vicinity of the construction, they would produce minimal ambient impacts of HAPs in a localized area. As a result, construction related to the Proposed Action would produce less than significant impacts to public health.

Based on the phasing schedule, the F-16 aircraft would depart Fresno-Yosemite IAP in 2012, and the F-15 aircraft would arrive at Fresno-Yosemite IAP in 2012. Based on projected arrival of aircraft and timing of construction, the 144 FW would phase in operation of the F-15 aircraft during calendar years 2012 and 2013, and would be fully operational by 2014. Construction emissions would therefore be added to operational emissions for calendar years 2012, 2013, and 2014. Operational emissions associated with the Preferred Alternative are summarized in Table 4.2-2, along with a comparison with the baseline emissions for the F-16.

As shown in Table 4.2-2, emissions associated with the Preferred Alternative at Fresno-Yosemite IAP would be below the CAA major source thresholds for attainment pollutants, and would be

below the General Conformity Rule *de minimis* thresholds for all pollutants except NO_x. A Final Conformity Determination (Appendix D) has been prepared. The USAF has reviewed and evaluated the conformity determination and documentation, and it has determined that a finding of conformity may be made based on the SJVAPCD's written determination per 40 CFR § 93.158(a)(5)(i)(A).

March Air Reserve Base

Under the Preferred Alternative, no construction would be required at March ARB. There would be an increase in the number of previously evaluated closed patterns flown at March ARB by the F-15 aircraft. An increase of 122 closed patterns (244 airfield operations) would be flown annually by the replacement F-15 aircraft at March ARB. Operational emissions at March ARB associated with the Preferred Alternative are summarized in Table 4.2-3, along with a comparison with the baseline emissions for the F-16.

As shown in Table 4.2-3, emissions associated with the Preferred Alternative at March ARB would be below the CAA significance thresholds for all pollutants.

4.2.2.2 Alternative #2

As discussed in Chapter 2, under Alternative #2 the 144 FW would convert from 18 F-16 aircraft to 24 F-15 aircraft. In general, three of these aircraft would be based at March ARB and would serve the ACA out of that location. Alternative #2 thus proposes to base 21 aircraft at Fresno-Yosemite IAP. Under Alternative #2, there would be an approximately 33 percent increase in 144 FW operations at Fresno-Yosemite IAP. Baseline operations total 122,319 annual operations. The number of operations would increase to 123,863 under Alternative #2.

At March ARB, the three F-15 aircraft would operate under alert status to serve the ACA mission as described under the Preferred Alternative. There would be no change from expected emissions at March ARB as described above under the Preferred Alternative.

Fresno-Yosemite International Airport

The construction at Fresno-Yosemite IAP for the 144 FW associated with Alternative #2 is assumed to be the same as that under the Preferred Alternative. Construction would occur during calendar year 2013-2014. As discussed under the Preferred Alternative, annual emissions for proposed construction activities would not exceed the significance criteria (100 tpy for attainment pollutants and $PM_{2.5}$ and its precursors, and 10 tpy for O_3 precursors). Air quality impacts associated with construction emissions alone would not be significant.

Operational emissions associated with Alternative #2 are summarized in Table 4.2-4, along with a comparison with the baseline emissions for the F-16.

Table 4.2-2. 144 FW Preferred Alternative Projected Emissions, Fresno-Yosemite IAP (Page 1 of 2)

Emission Source	EMISSIONS, TONS/YEAR						
	CO	*NO_x*	*VOCs*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*	*CO_2e*
2012							
F-16 Aircraft Operations	15.871	6.987	4.366	0.916	1.526	1.510	15,707
F-15 Aircraft Operations	1.205	0.537	0.334	0.070	0.117	0.116	1,193
Refueling	-	-	0.005	-	-	-	-
Engine Testing	3.367	0.440	0.757	0.114	0.197	0.195	299
Aircraft Ground Equipment	7.594	11.483	3.698	0.135	1.088	1.078	337
Privately-Owned Vehicles	4.000	0.366	0.125	0.006	0.058	0.033	644
Total Operational Emissions	**32.04**	**19.81**	**9.29**	**1.24**	**2.99**	**2.93**	**18,180**
Construction Emissions	0.64	1.11	0.14	0.00	0.09	0.05	121
Total Emissions	**32.68**	**20.92**	**9.33**	**1.24**	**3.08**	**2.98**	**18,301**
Baseline Emissions	**36.77**	**22.46**	**10.70**	**1.56**	**3.51**	**3.45**	**24,493**
Net Emissions Decrease	**(4.09)**	**(1.54)**	**(1.37)**	**(0.32)**	**(0.43)**	**(0.47)**	**(6,192)**
Threshold (1)	**100**	**10**	**10**	**100**	**100**	**100**	**N/A**
Exceeds Threshold?	*No*	*No*	*No*	*No*	*No*	*No*	*N/A*
2013							
F-15 Aircraft Operations	25.497	11.370	7.072	1.485	2.482	2.457	25,244
Engine Testing	3.367	0.440	0.757	0.114	0.197	0.195	299
Aircraft Ground Equipment	7.594	11.483	3.698	0.135	1.088	1.078	337
Privately-Owned Vehicles	4.000	0.366	0.125	0.006	0.058	0.033	644
Total Operational Emissions	**40.46**	**23.66**	**11.66**	**1.74**	**3.82**	**3.76**	**26,524**
Construction Emissions	**2.34**	**4.75**	**1.65**	**0.00**	**0.39**	**0.28**	**490**
Total Emissions	**42.80**	**28.41**	**13.31**	**1.74**	**4.21**	**4.04**	**27,014**
Baseline Emissions	**36.77**	**22.46**	**10.70**	**1.56**	**3.51**	**3.45**	**24,493**
Net Emissions Increase	**6.03**	**5.95**	**2.60**	**0.18**	**0.70**	**0.59**	**2,521**
Threshold (1)	**100**	**10**	**10**	**100**	**100**	**100**	**N/A**
Exceeds Threshold?	**No**	**No**	**No**	**No**	**No**	**No**	**N/A**

Table 4.2-2. 144 FW Preferred Alternative Projected Emissions, Fresno-Yosemite IAP (Page 2 of 2)

Emission Source	EMISSIONS, TONS/YEAR						
	CO	*NO_x*	*VOCs*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*	*CO_2e*
2014							
F-15 Aircraft Operations	47.293	21.094	13.118	2.755	4.604	4.558	46,825
Refueling	-	-	0.011	-	-	-	-
Engine Testing	3.367	0.440	0.757	0.114	0.197	0.195	299
Aircraft Ground Equipment	7.594	11.483	3.698	0.135	1.088	1.078	337
Privately-Owned Vehicles	4.000	0.366	0.125	0.006	0.058	0.033	644
Total Operational Emissions	**62.25**	**33.38**	**17.71**	**3.01**	**5.95**	**5.86**	**48,105**
Construction Emissions	0.17	0.23	0.13	0.00	0.01	0.01	35
Total Emissions	**62.42**	**33.61**	**17.84**	**3.01**	**5.96**	**5.87**	**48,140**
Baseline Emissions	**36.77**	**22.46**	**10.70**	**1.56**	**3.51**	**3.45**	**24,493**
Net Emissions Increase	**25.65**	**11.15**	**7.14**	**1.45**	**2.45**	**2.42**	**23,647**
Threshold (1)	**100**	**10**	**10**	**100**	**100**	**100**	**N/A**
Exceeds Threshold?	*No*	***Yes***	*No*	*No*	*No*	*No*	*N/A*
2015 and beyond							
F-15 Aircraft Operations	47.293	21.094	13.118	2.755	4.604	4.558	46,825
Refueling	-	-	0.011	-	-	-	-
Engine Testing	3.367	0.440	0.757	0.114	0.197	0.195	299
Aircraft Ground Equipment	7.594	11.483	3.698	0.135	1.088	1.078	337
Privately-Owned Vehicles	4.000	0.366	0.125	0.006	0.058	0.033	644
Total Operational Emissions	**62.25**	**33.38**	**17.71**	**3.01**	**5.95**	**5.86**	**48,105**
Baseline Emissions	**36.77**	**22.46**	**10.70**	**1.56**	**3.52**	**3.45**	**24,493**
Net Emissions Increase	**25.49**	**10.93**	**7.01**	**1.45**	**2.43**	**2.41**	**23,612**
Threshold (1)	**100**	**10**	**10**	**100**	**100**	**100**	**N/A**
Exceeds Threshold?	*No*	***Yes***	*No*	*No*	*No*	*No*	*N/A*

Note: 1. Based on the federal *de minimis* threshold for NO_x, VOCs, PM_{10}, and $PM_{2.5}$ and its precursor pollutants NO_x, VOCs, and SO_x, and the major source threshold of 100 tons/year for attainment pollutants.

CO = carbon monoxide; CO_2e = carbon dioxide equivalent; N/A = not applicable as no thresholds have been established; NO_x = oxides of nitrogen; PM_{10} = particulate matter less than or equal to 10 microns in diameter; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; SO_2 = sulfur dioxide; VOC = volatile organic compound

Table 4.2-3. 144 FW Preferred Alternative Emissions, March ARB

	EMISSIONS, TONS/YEAR						
Emission Source	***CO***	***NO_x***	***VOCs***	***SO_2***	***PM_{10}***	***$PM_{2.5}$***	***CO_2e***
F-15 Aircraft Operations	11.338	10.011	3.487	0.962	1.470	1.455	10,408
Refueling	-	-	0.003	-	-	-	-
Aircraft Ground Equipment	0.524	0.723	0.045	0.010	0.022	0.022	26
Privately-Owned Vehicles	7.886	0.725	0.213	0.012	0.131	0.073	1,404
Total Emissions	**19.75**	**11.46**	**3.75**	**0.98**	**1.63**	**1.55**	**11,838**
Baseline Emissions	**14.08**	**6.45**	**2.00**	**0.50**	**0.89**	**0.82**	**6,634**
Net Emissions Increase	**5.67**	**5.01**	**1.75**	**0.48**	**0.74**	**0.73**	**5,204**
Threshold (1)	**100**	**10**	**10**	**100**	**100**	**100**	**N/A**
Exceeds Threshold?	*No*	*No*	*No*	*No*	*No*	*No*	*N/A*

Note: 1. Based on the federal *de minimis* threshold for NO_x, VOCs, and $PM_{2.5}$ and its precursor pollutants NO_x, VOCs, and SO_x, and the major source threshold of 100 tons/year for attainment pollutants.

CO = carbon monoxide; CO_2e = carbon dioxide equivalent; N/A = not applicable as no thresholds have been established; NO_x = oxides of nitrogen; PM_{10} = particulate matter less than or equal to 10 microns in diameter; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; SO_2 = sulfur dioxide; VOC = volatile organic compound

Table 4.2-4. 144 FW Alternative #2 Emissions, Fresno-Yosemite IAP

Emission Source	EMISSIONS, TONS/YEAR						
	CO	*NO_x*	*VOCs*	*SO_2*	*PM_{10}*	*$PM_{2.5}$*	*CO_2e*
2013							
F-15 Aircraft Operations	61.451	27.408	17.045	3.580	5.982	5.922	74,067
Refueling	-	-	0.014	-	-	-	-
Engine Testing	3.367	0.440	0.757	0.114	0.197	0.195	299
Aircraft Ground Equipment	9.867	14.920	4.805	0.176	1.414	1.400	438
Privately-Owned Vehicles	4.000	0.366	0.125	0.006	0.058	0.033	644
Total Operational Emissions	**78.69**	**43.13**	**22.75**	**3.88**	**7.65**	**7.55**	**75,447**
Construction Emissions	4.66	6.47	1.05	0.00	0.53	0.47	490
Total Emissions	**83.35**	**49.60**	**23.80**	**3.88**	**8.18**	**8.02**	**75,937**
Baseline Emissions	**36.77**	**22.46**	**10.70**	**1.56**	**3.52**	**3.45**	**24,493**
Net Emissions Increase	**46.58**	**27.14**	**13.10**	**2.32**	**4.66**	**4.57**	**51,444**
Threshold (1)	**100**	**10**	**10**	**100**	**70**	**100**	**N/A**
Exceeds Threshold?	*No*	***Yes***	***Yes***	*No*	*No*	*No*	*N/A*
2014							
F-15 Aircraft Operations	61.451	27.408	17.045	3.580	5.982	5.922	74,067
Refueling	-	-	0.014	-	-	-	-
Engine Testing	3.367	0.440	0.757	0.114	0.197	0.195	299
Aircraft Ground Equipment	9.867	14.920	4.805	0.176	1.414	1.400	438
Privately-Owned Vehicles	4.000	0.366	0.125	0.006	0.058	0.033	644
Total Operational Emissions	**78.69**	**43.13**	**22.75**	**3.88**	**7.65**	**7.55**	**75,447**
Construction Emissions	1.07	1.23	0.34	0.00	0.10	0.09	35
Total Emissions	**79.76**	**44.36**	**23.09**	**3.88**	**7.75**	**7.64**	**75,482**
Baseline Emissions	**36.77**	**22.46**	**10.70**	**1.56**	**3.52**	**3.45**	**24,493**
Net Emissions Increase	**42.99**	**21.90**	**12.39**	**2.32**	**4.23**	**4.19**	**50,989**
Threshold (1)	**100**	**10**	**10**	**100**	**70**	**100**	**N/A**
Exceeds Threshold?	*No*	***Yes***	***Yes***	*No*	*No*	*No*	*N/A*
2015 and beyond							
F-15 Aircraft Operations	61.451	27.408	17.045	3.580	5.982	5.922	74,067
Refueling	-	-	0.014	-	-	-	-
Engine Testing	3.367	0.440	0.757	0.114	0.197	0.195	299
Aircraft Ground Equipment	9.867	14.920	4.805	0.176	1.414	1.400	438
Privately-Owned Vehicles	4.000	0.366	0.125	0.006	0.058	0.033	644
Total Operational Emissions	**78.69**	**43.13**	**22.75**	**3.88**	**7.65**	**7.55**	**75,447**
Baseline Emissions	**36.77**	**22.46**	**10.70**	**1.56**	**3.52**	**3.45**	**24,493**
Net Emissions Increase	**41.92**	**20.67**	**12.05**	**2.32**	**4.13**	**4.10**	**50,954**
Threshold (1)	**100**	**10**	**10**	**100**	**70**	**100**	**N/A**
Exceeds Threshold?	*No*	***Yes***	***Yes***	*No*	*No*	*No*	*N/A*

Note: 1. Based on the federal *de minimis* threshold for NO_x, VOCs, PM_{10}, and $PM_{2.5}$ and its precursor pollutants NO_x, VOCs, and SO_x, and the major source threshold of 100 tons/year for attainment pollutants.

CO = carbon monoxide; CO_2e = carbon dioxide equivalent; N/A = not applicable as no thresholds have been established; NO_x = oxides of nitrogen; PM_{10} = particulate matter less than or equal to 10 microns in diameter; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; SO_2 = sulfur dioxide; VOC = volatile organic compound

As shown in Table 4.2-4, emissions would be above the CAA significance thresholds for NO_x and VOCs for all years, and below the threshold for all other pollutants.

4.2.2.3 No Action Alternative

Under the No Action Alternative, no change in emissions from baseline conditions would occur until the F-16 aircraft are transferred to the 162 FW. At that time, emissions would be reduced until such a time as the USAF identified a new mission/aircraft for the 144 FW. Therefore, impacts to air quality would be minor, but temporarily beneficial. The alert missions and associated aircraft at both Fresno-Yosemite IAP and March ARB would remain under the No Action Alternative even if the other F-16 aircraft associated with the 144 FW were relocated to the 162 FW.

4.3 LAND USE

4.3.1 Methodology

The significance of potential land use impacts is based on the level of land use sensitivity in areas affected by a proposed action. In general, land use impacts would be significant if the action would: (1) be inconsistent or non-compliant with applicable land use plans or policies, including the General Plans of Fresno County, Riverside County or the cities of Fresno, Riverside, and Perris, (2) preclude the viability of an existing land use activity within the ROI, (3) preclude continued use or occupation of an area, or (4) be incompatible with adjacent nearby land use to the extent that public health or safety is threatened.

4.3.2 Impacts

4.3.2.1 Preferred Alternative

Fresno-Yosemite International Airport

Proposed construction activities would be short-term and intermittent but may cause minor traffic and/or noise disruptions to local businesses as well as employees at the 144 FW installation. However, construction activities would be temporary and would occur during normal business hours (i.e., between 7 a.m. and 5 p.m., Monday through Friday). Furthermore, all of the construction activities would occur on the 144 FW installation and would not introduce any new land uses. Under the Preferred Alternative, the number of operations at Fresno-Yosemite IAP would not change. However, as discussed in Section 4.1.2, noise at the Fresno-Yosemite IAP airfield would increase as a result of the Preferred Alternative, an additional 724 acres of land off the airport property would be exposed to CNEL of 65 dB or greater. Overall, there would be an estimated increase of 1,873 persons residing within the noise contours.

To the west of the installation, additional industrial, residential, educational, and commercial land uses would be exposed to aircraft CNEL of 65 dB. To the south and east the additional land exposed would be primarily industrial and opens space, with a small portion of residential area. Under the Preferred Alternative there would be three new schools exposed to aircraft CNEL of 65 dB or above (Scandinavian Middle School, Phillips Junior College Fresno Campus, and Alliant International University). In addition, two additional churches would be impacted by the new noise contours (East Princeton Baptist Church and the Faith Baptist Church) (Figure 4.3-1).

The proposed construction activities would improve efficiency in daily operations by providing more efficient and secure operations for the 144 FW. Land uses at new facilities would be consistent with current functions on the installation and all facilities would be designed and sited to be compatible with existing land uses and safety guidelines.

March Air Reserve Base

Under the Preferred Alternative, no construction would occur at March ARB. Therefore, no impacts would occur to land use from construction under the Preferred Alternative. 144 FW operations under the Preferred Alternative would increase by 122 annual closed patterns, or approximately 23 percent at March ARB. As discussed in Section 4.1.2, noise at the March ARB airfield would increase minimally as a result of the Preferred Alternative, with land only immediately adjacent to the center portion of the airfield being impacted by these noise contours (Figure 4.3-2). The Preferred Alternative would generate an increase of 424 acres exposed to CNEL of 65 dB and greater, with 336 of these acres occurring off the installation. The land uses that are newly contained within these noise contours are within industrial areas; there is no residential area contained within these contours. As a result, impacts to land use at March ARB as a result of implementation of the Preferred Alternative would be minimal.

4.3.2.2 Alternative #2

Fresno-Yosemite International Airport

Under Alternative #2, impacts to land use at Fresno-Yosemite IAP as a result of proposed construction would be the same as described under the Preferred Alternative. Under Alternative #2, the number of operations performed by the 144 FW would increase by 33 percent. As discussed in Section 4.1.2, noise at the Fresno-Yosemite IAP airfield would increase as a result of Alternative #2, and approximately 1,221 acres of land off the airport property would be newly exposed to CNEL of 65 dB or greater. Overall, there would be an estimated increase of 3,445 persons residing within the noise contours.

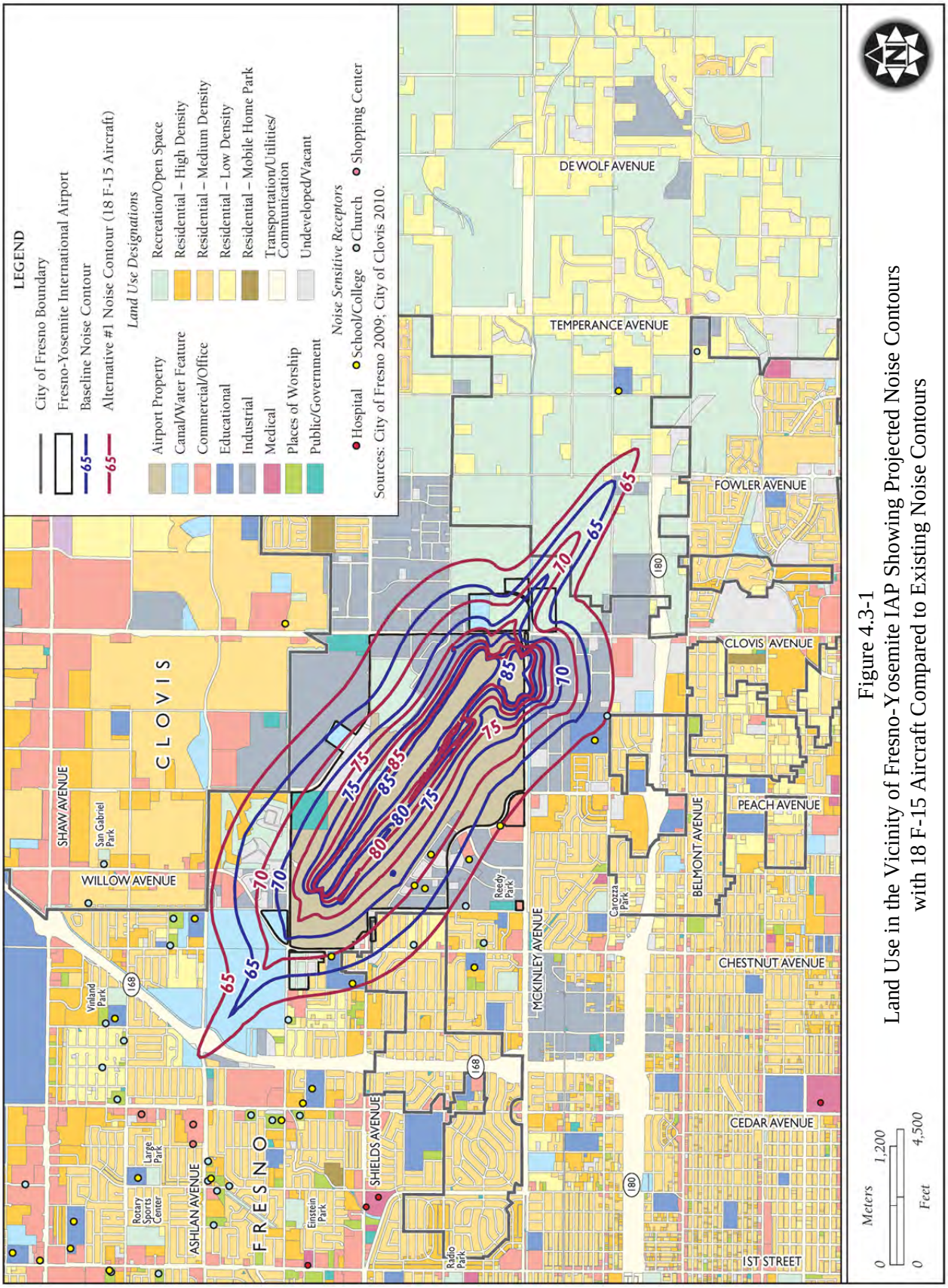

Figure 4.3-1
Land Use in the Vicinity of Fresno-Yosemite IAP Showing Projected Noise Contours with 18 F-15 Aircraft Compared to Existing Noise Contours

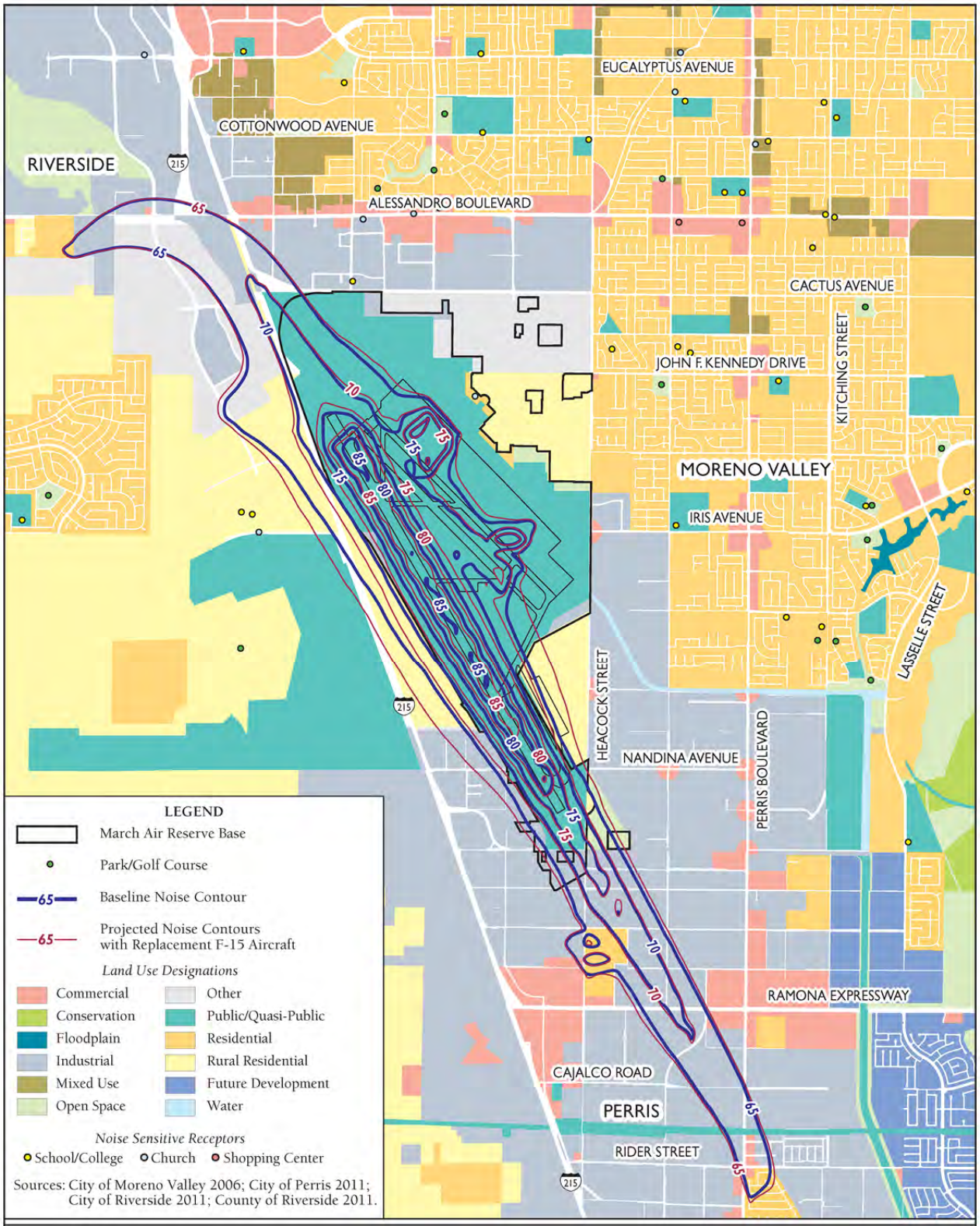

Figure 4.3-2
Land Use in the Vicinity of March ARB Showing
Projected Noise Contours with Existing Noise Contours

To the west of the installation, additional industrial, residential, educational, and commercial land uses would be exposed to aircraft CNEL between 65 dB and 75 dB. To the south and east the additional land exposed would be primarily industrial and open space, with a small portion of residential area. Under Alternative #2 there would be four new schools exposed to aircraft CNEL of 65 dB or above (Scandinavian Middle School, Phillips Junior College Fresno Campus, Alliant International University, Fresno Adventist Academy). Also, three additional churches (Fresno Christian Growth Center, Faith Baptist Church, and East Princeton Baptist Church) would be impacted by the new noise contours (Figure 4.3-3).

March Air Reserve Base

Under Alternative #2, noise and operational impacts to land use would be the same as those described under the Preferred Alternative.

4.3.2.3 No Action Alternative

Under the No Action Alternative, there would be no aircraft conversion or associated construction at Fresno-Yosemite IAP. The F-15s would not be based at Fresno; however, the F-16s would eventually be transferred to the 162 FW, as scheduled. Therefore, the 144 FW would not have a flying mission until such time as when the USAF identified an appropriate aircraft to be based there. The alert mission and associated aircraft at Fresno-Yosemite IAP would remain under the No Action Alternative even if the other F-16 aircraft associated with the 144 FW were relocated to the 162 FW. Impacts to land use as a result of the No Action Alternative would be negligible, as the commercial airport would remain.

Under the No Action Alternative, there would be no change to existing land use at March ARB. The F-15 alert aircraft would not be based at March ARB, and the F-16 would continue to operate the ACA mission. There would be no impacts to land use at March ARB under the No Action Alternative.

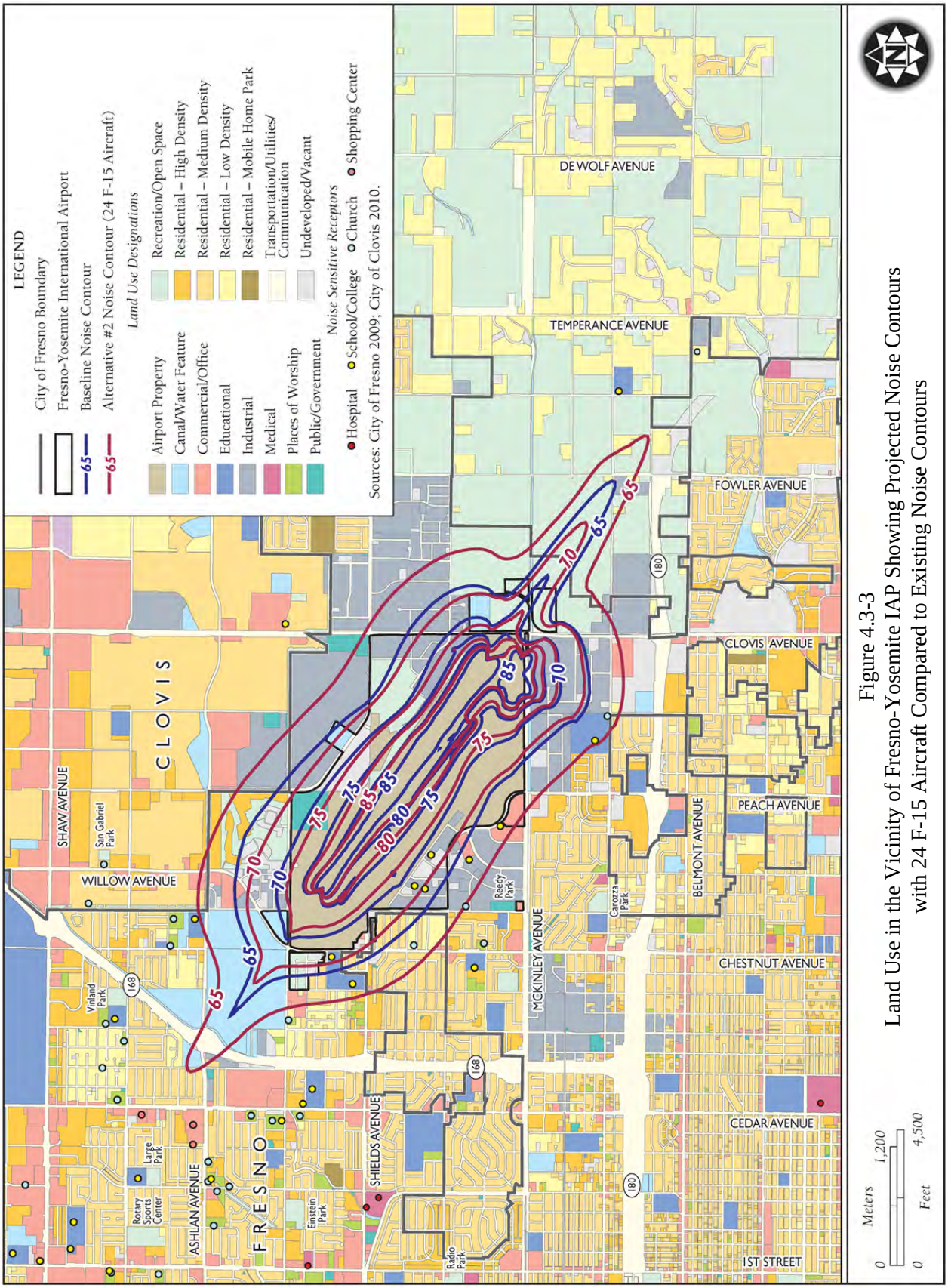

Figure 4.3-3
Land Use in the Vicinity of Fresno-Yosemite IAP Showing Projected Noise Contours with 24 F-15 Aircraft Compared to Existing Noise Contours

4.4 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

4.4.1 Methodology

Socioeconomic impacts are assessed in terms of direct effects on the local economy and population and related indirect effects on other socioeconomic resources within the ROI. Socioeconomic impacts would be considered significant if the Proposed Action resulted in a substantial shift in population trends or notably affected regional employment, earnings, or community resources such as schools.

In order to comply with EO 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations*, and EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, areas containing relatively high disadvantaged or youth populations are given special consideration regarding potential impacts in order to address the potential for disproportionately high or adverse human health or environmental effects to these communities. Ethnicity and poverty status in the vicinity of the Proposed Action have been examined and compared to city, county, state, and national data to determine if any minority or low-income communities could potentially be disproportionately affected by implementation of the Proposed Action or alternatives.

Three criteria must be met for impacts to minority and low-income communities to be considered significant: (1) there must be one or more such populations within the ROI, (2) there must be adverse (or significant) impacts from the Proposed Action, and (3) the environmental justice populations within the ROI must bear a disproportionate burden of those adverse impacts. If any of these criteria are not met, then impacts with respect to environmental justice would not be significant.

4.4.2 Impacts

4.4.2.1 Preferred Alternative

Fresno-Yosemite International Airport

Under the Preferred Alternative, construction activities would be contained entirely within the boundaries of Fresno-Yosemite IAP. Economic activity associated with proposed construction activities at the 144 FW installation, such as employment and materials purchasing, would provide short-term economic benefits to the local economy. However, short-term beneficial impacts resulting from construction payrolls and materials purchased would be negligible on a regional scale.

Population and Housing. The proposed aircraft conversion and related activities would result in a minor change in staffing requirements for the 144 FW. Currently, the 144 FW is authorized

1,010 personnel at Fresno-Yosemite IAP. Under the Preferred Alternative, the F-15 mission would add an additional 22 military positions (increase in 23 full time positions and reduction of one traditional Guard position). Combined with their approximately 30 family members, this would represent less than 1 percent of the City of Fresno and less than 1 percent of Fresno County.

An increase in 22 military personnel positions would amount to increase of approximately 2 percent to the existing 144 FW personnel. Total payroll associated with these personnel would amount to an estimated salary increase of $1,571,761 for full-time employees.

All 144 FW personnel live off-installation as there is no on-installation housing. A conservative scenario would result in 22 homes purchased at the same time as personnel relocate to the area. This would represent less than 1 percent of the total housing units in the City of Fresno and less than 1 percent of Fresno County. However, not all the military personnel who would relocate would own homes.

Minority and Low-Income Populations. As presented in Table 4.4-1, of the roughly 3,304 persons that would be affected by CNEL between 65 dB and 75 dB, approximately 2,424 would be minority (73.4 percent). This is an increase of 2.2 percent of minorities affected. The number of low-income persons affected by CNEL greater than 65 dB would be approximately 733 (an increase of 0.7 percent). Overall, the number of persons affected by CNEL of 65 dB and greater would increase under this alternative, and the percentage of minority and low-income persons affected would increase slightly. As a result, there would be no disproportionate impacts to minority or low-income populations in the vicinity of Fresno-Yosemite IAP.

Table 4.4-1. Population within Preferred Alternative Noise Contours, Fresno-Yosemite IAP

Noise Contour	*Total Population*	*Minority Population*	*Percent Minority*	*Low-Income Population*	*Percent Low-Income*[1,2]
65-70	3,015	2,219	73.6	672	22.3
70-75	289	205	70.9	61	21.1
75-80	-	-	-	-	-
80-85	-	-	-	-	-
85+	-	-	-	-	-
Total	**3,304**	**2,424**	**73.4**	**733**	**22.2**

Notes: 1. The percentage of low-income persons is calculated as a percentage of all persons for whom the Bureau of the Census determines poverty status, which is generally a lower number than the total population because it excludes institutionalized persons, person in military group quarters and college dormitories, and unrelated individuals under 15 years old.
2. For estimations of poverty status underneath existing and proposed noise contours, 2010 5-year ACS estimates were used.

Sources: U.S. Census Bureau 2010a, 2010e

Protection of Children. There are no facilities on the installation where children may be encountered on a regular basis. Currently there is one off-installation Kindergarten through Grade 12 school that is exposed to aircraft CNEL of 65 dB or above; in a noise study conducted by Fresno-Yosemite IAP it was determined that this school's interior noise level was below the threshold for sound attenuation treatment (Brown-Buntin Associates, Inc. 1994). Under the Preferred Alternative there would be one new Kindergarten through Grade 12 school exposed to aircraft CNEL between 65 dB and 70 dB or above (Scandinavian Middle School). This school had noise attenuation treatment in 1992 under FAA grant 3-06-0087-13 (Brown-Buntin Associates, Inc. 1994). Schools would be reevaluated for sound attenuation sufficiency under the airport's Part 150 program.

March Air Reserve Base

Under the Preferred Alternative, no construction would occur on March ARB. Therefore, there would be no economic activity associated with proposed construction activities. In addition, there would be no change in personnel numbers for March ARB under this alternative. Therefore, there would be no impact to housing or population. The noise contours at March ARB for the Preferred Alternative would increase minimally (Figure 4.1-2); however, they would not contain any residential areas. As a result, there would be no disproportionate impacts to minority or low-income populations in the vicinity of March ARB.

4.4.2.2 Alternative #2

Fresno-Yosemite International Airport

Under Alternative# 2, construction activities would be the same as those described under the Preferred Alternative.

Population and Housing. The proposed aircraft conversion and related activities would result in a minor change in staffing requirements for the 144 FW. Currently, the 144 FW is authorized 1,010 personnel at Fresno-Yosemite IAP. Under Alternative #2, the F-15 mission would add an additional 29 military positions (increase in 37 full time positions and reduction of 8 traditional Guard positions). Combined with their approximately 39 family members, this would represent less than 1 percent of the City of Fresno and less than 1 percent of Fresno County.

An increase in 29 military personnel positions would amount to increase of approximately 3 percent to the existing 144 FW personnel. Total payroll associated with these personnel would amount to an estimated salary increase of $2,071,867 for full-time employees.

All personnel currently live off-installation. A conservative scenario would result in 29 homes purchased at the same time as personnel relocate to the area. This would represent less than 1 percent of the total housing units in the City of Fresno and less than 1 percent of Fresno County. However, not all the military personnel who would relocate would own homes.

Minority and Low-Income Populations. Under Alternative #2, population contained within the noise contours at Fresno-Yosemite IAP would increase from baseline and the Preferred Alternative levels (Figure 4.1-3). As presented in Table 4.4-2, of the roughly 4,876 persons that would be affected by CNEL greater than 65 dB, approximately 3,581 would be minority (73.4 percent). This is an increase of 2.2 percent of minorities affected. The number of low-income persons affected by CNEL greater than 65 dB would be approximately 1,065 (an increase of 0.3 percent). Overall, the number of persons affected by CNEL of 65 dB and greater would increase under this alternative, and the percentage of minority and low-income persons affected would result in a minor increase. As a result, there would be no disproportionate impacts to minority or low-income populations in the vicinity of Fresno-Yosemite IAP.

Table 4.4-2. Population within Alternative #2 Noise Contours, Fresno-Yosemite IAP

Noise Contour	*Total Population*	*Minority Population*	*Percent Minority*	*Low-Income Population*	*Percent Low-Income*[1,2]
65-70	4,246	3,131	73.7	925	21.8
70-75	630	450	71.4	140	22.2
75-80	-	-	-	-	-
80-85	-	-	-	-	-
85+	-	-	-	-	-
Total	**4,876**	**3,581**	**73.4**	**1,065**	**21.8**

Note: 1. The percentage of low-income persons is calculated as a percentage of all persons for whom the Bureau of the Census determines poverty status, which is generally a lower number than the total population because it excludes institutionalized persons, person in military group quarters and college dormitories, and unrelated individuals under 15 years old.
2. For estimations of poverty status underneath existing and proposed noise contours, 2010 5-year ACS estimates were used.

Sources: U.S. Census Bureau 2010a, 2010e

Protection of Children. There are no facilities on the installation where children may be encountered on a regular basis. Currently there is one off-Base Kindergarten through Grade 12 school that is exposed to aircraft CNEL of 65 dB or above. Under Alternative #2 there would be two new Kindergarten through Grade 12 schools exposed to aircraft CNEL of 65 dB or above (Fresno Adventist Academy and Scandinavian Middle School), compared to baseline. Schools would be reevaluated for sound attenuation sufficiency under the airport's Part 150 program.

March Air Reserve Base

Under Alternative #2, no construction would occur on March ARB. Therefore, there would be no economic activity associated with proposed construction activities. In addition, there would be no change in personnel numbers for March ARB under this alternative. Therefore, there would be no impact to housing or population. The noise contours at March ARB for Alternative #2 would increase minimally (Figure 4.1-2); however, they would not contain any residential areas. As a result, there would be no disproportionate impacts on minority or low-income populations in the vicinity of March ARB.

4.4.2.3 No Action Alternative

Under the No Action Alternative, there would be no aircraft conversion or associated construction at Fresno-Yosemite IAP. The F-15s would not be based at Fresno; however, the F-16s would eventually be transferred to the 162 FW, as scheduled. Therefore, the 144 FW would not have a flying mission until such time as when the USAF identified an appropriate aircraft to be based there. Currently, it is not known how many of the current 1,010 personnel would be transferred from Fresno-Yosemite IAP under the No Action Alternative. However, it is assumed that some portion would sell their homes and relocate out of the area. The alert mission and associated aircraft at Fresno-Yosemite IAP would remain under the No Action Alternative even if the other F-16 aircraft associated with the 144 FW were relocated to the 162 FW. As a result, the total population that would be impacted by noise would decrease temporarily, creating a short-term, beneficial impact. However, the No Action Alternative would have a negative impact on the surrounding communities due to the loss of personnel, their families, and their economic input to the community.

4.5 SAFETY

4.5.1 Methodology

For the Proposed Action, the elements of the proposal that have a potential to affect safety are evaluated relative to the degree to which the action increases or decreases safety risks to aircrews, the public, and property. Ground and crash safety are assessed for the potential to increase risk, and the unit's capability to manage that risk by responding to emergencies and suppressing fire. In considering explosive safety, projected changed uses and handling requirements are compared to current uses and practices. If a unique situation is anticipated to develop as a result of any of the proposals, the capability to manage that situation is assessed. Analysis of flight risks correlates Class A mishap rates and BASH with projected airspace utilization associated with the action. When compared to similar data for current use of the airspace, assessments can be made of the magnitude of the safety impacts resulting from the change. Since fire and crash risk are also a function of the risks associated with mishaps and bird/wildlife-aircraft strikes, those statistical data are also considered in assessing that risk. Finally, when new or altered risks arising from the proposals are considered individually and collectively, assessments can be made about the adequacy of disaster response planning, and any additional or modified requirements that may be necessary as a result of the action.

4.5.2 Impacts

4.5.2.1 Preferred Alternative

Fresno-Yosemite International Airport

Impacts to safety under the Preferred Alternative would be minimal. Providing new and renovated facilities for the 144 FW that support operational requirements and are properly sited with adequate space and a modernized supporting infrastructure would generally enhance ground and flight safety during required operations, training, maintenance and support procedures, security functions, and other activities conducted by the 144 FW.

Ground Safety. Under the Preferred Alternative, the 144 FW would convert to F-15 aircraft. The fire and crash response capability currently provided by the 144 FW at Fresno-Yosemite IAP is sufficient to meet all requirements.

To support the mission change, some new facilities would be constructed and other existing facilities would require modification. However, no construction activities would involve any unusual or extraordinary techniques. During construction and modifications, best management practices (BMPs) would be employed, and strict adherence to all applicable standard industrial safety requirements and procedures would further minimize the relatively low risk associated with these construction activities.

The aircraft conversion and mission change would not increase the number of daily operations flown by the 144 FW. Therefore, no adverse impacts to ground safety are anticipated at the airfield.

AT/FP. The proposed construction projects meet all criteria specified in the ANG Handbook 32-1084, *Facility Requirements.* AT/FP requirements have also been addressed to the extent practicable in all projects. Projects would use AT/FP site design standards for siting of facilities, parking, walkways, and other features. The new construction would bring the facilities into compliance with UFC 4-022-01, *Security Engineering: Entry Control Facilities/Access Control Points* and UFC 4-010-01, *DoD Minimum Antiterrorism Standards for Buildings*, providing additional protection for the personnel based there.

RPZs. Proposed construction, renovation, and infrastructure improvement projects related to the Preferred Alternative would not penetrate any RPZs. New construction would be sited so as not to be an obstruction to airspace. Therefore, construction activity would not result in any greater safety risk or obstructions to navigation. Operations would fall within the same general types as those that have historically occurred at Fresno-Yosemite IAP. For example, the F-15 would follow established local approach and departure patterns used and perfected for over 10 years,

minimizing accident risks to the community. Therefore, flight activity and subsequent operations would not require changes to RPZs.

Explosive Safety. Under the Preferred Alternative, the 144 FW would add a 4,365 SF igloo to the existing munitions storage area. This would expand the current QD arcs slightly to the north and south, but would not encompass any inhabited buildings, and would remain within the installation boundary (Figure 4.5-1).

All facilities would be sited to be in compliance with the proposed QD arcs and no unauthorized construction would occur within the proposed QD arcs. None of the construction or demolition would be in conflict with the QD arcs. Per USAF Manual 91-201, there would be no public transportation route or inhabited building located within the proposed QD arcs. No explosives would be handled during construction or demolition activities. Therefore, no additional risk would be expected as a result of implementation of the Preferred Alternative.

Flight Safety. There would be no increase in airfield operations at Fresno-Yosemite IAP for the Preferred Alternative compared to existing conditions. However, flight safety would improve with the conversion to the F-15 aircraft since the F-15 aircraft has a slightly lower Class A mishap rate than the F-16 (approximately 3.6 per 100,000 flight hours) (AFSC 2011a). F-15 aircraft have flown more than 5,907,793 hours since 1972 for the USAF. Over that period, 141 Class A mishaps have occurred with 118 aircraft destroyed. This results in a Class A mishap rate of approximately 2.4 per 100,000 flight-hours (AFSC 2011a). Therefore, the F-15 has a better flight safety record than the F-16.

F-15 aircrews associated with the 144 FW would continue to follow applicable procedures outlined in the 144 FW BASH Plan (144 FW 2002). The 144 FW has developed aggressive procedures designed to minimize the occurrence of bird aircraft strikes, and has documented detailed procedures to monitor and react to heightened risk of bird strikes (144 FW 2002). When risk increases (e.g., during bird migrations), limits are placed on low altitude flight and some types of training (e.g., multiple approaches, closed pattern work). Special briefings are provided to pilots whenever the potential exists for greater bird-strike hazards within the training airspace; F-15 pilots would be subject to these same procedures. Therefore, no impact would occur related to BASH issues.

March Air Reserve Base

Impacts to safety under the Preferred Alternative would be minimal. No construction would occur at March ARB under the Preferred Alternative.

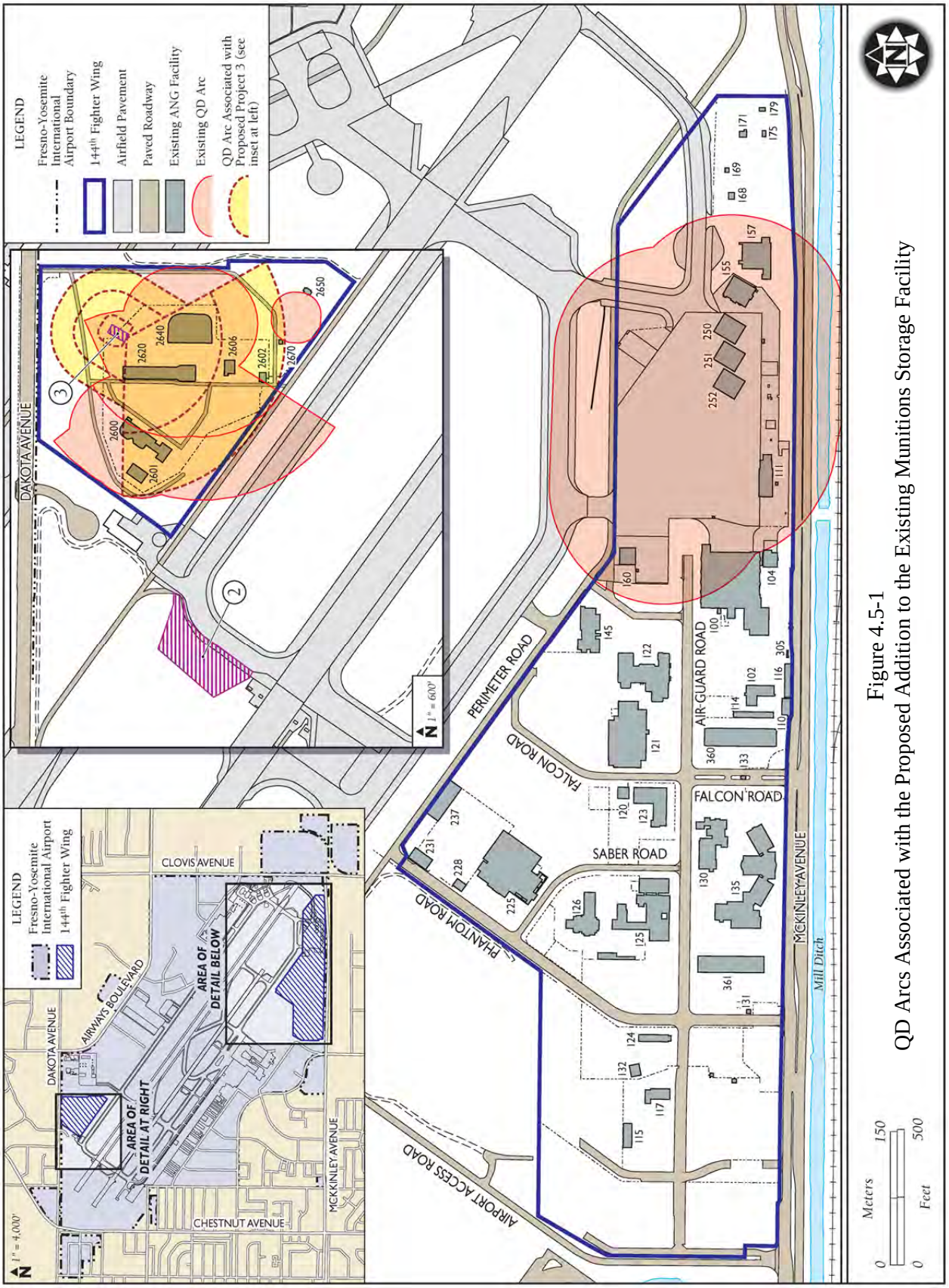

Figure 4.5-1
QD Arcs Associated with the Proposed Addition to the Existing Munitions Storage Facility

Ground Safety. Under the Preferred Alternative, the 144 FW would convert to F-15 aircraft. Following the aircraft conversion under the Preferred Alternative, all operations would remain as described under existing conditions; however, the alert F-16s would be replaced with the F-15 aircraft. There would be no increase in the number of operations or closed patterns flown by the 144 FW Detachment 1 at March ARB as a result of this alternative. However, the number of closed patterns performed is a slight increase from those analyzed in 2008. There would be no changes expected to departure/arrival patterns and tracks, flight profiles, noise abatement procedures, or use of runways. No adverse impacts to ground safety are anticipated at the airfield.

APZs. Operations would fall within the same general types that have historically occurred at March ARB. For example, the F-15 would follow established local approach and departure patterns, minimizing accident risks to the community. Therefore, flight activity and subsequent operations would not require changes to APZs.

Flight Safety. There would be no increase in the number of operations or closed patterns flown by the 144 FW Detachment 1 at March ARB as a result of this alternative. However, the number of closed patterns performed is a slight increase from those analyzed in 2008. No increase in the safety risk is expected due to the accident and mishap potential associated with aircraft operations. F-15 aircrews associated with the 144 FW would continue to follow applicable procedures outlined in the 144 FW BASH Plan (144 FW 2002). The 144 FW has developed aggressive procedures designed to minimize the occurrence of bird aircraft strikes, and has documented detailed procedures to monitor and react to heightened risk of bird strikes (144 FW 2002). When risk increases, limits are placed on low altitude flight and some types of training (e.g., multiple approaches, closed pattern work). Special briefings are provided to pilots whenever the potential exists for greater bird-strike hazards within the training airspace; F-15 pilots would be subject to these same procedures. Therefore, no impact would occur related to BASH issues.

4.5.2.2 Alternative #2

Fresno-Yosemite International Airport

Impacts to safety under Alternative #2 would be minimal. Providing new and renovated facilities for the 144 FW that support operational requirements and are properly sited with adequate space and a modernized supporting infrastructure would generally enhance ground and flight safety during required operations, training, maintenance and support procedures, security functions, and other activities conducted by the 144 FW.

Ground Safety. Under Alternative #2, the 144 FW would convert to F-15 aircraft. The fire and crash response capability currently provided by the 144 FW at Fresno-Yosemite IAP is sufficient to meet all requirements. Impacts from construction with regard to general ground safety, RPZs, explosive safety, and AT/FP under Alternative #2 would be the same as under the Preferred Alternative.

Under Alternative #2, the number of 144 FW daily operations at Fresno-Yosemite IAP would increase by approximately 33 percent. However, there would be no changes expected to departure/arrival patterns, flight profiles, or relative use of runways. No adverse impacts to ground safety are anticipated at the airfield.

RPZs. Under Alternative #2, operations would fall within the same general types as those that have historically occurred at Fresno-Yosemite IAP. For example, the F-15 would follow established local approach and departure patterns, minimizing accident risks to the community. Therefore, flight activity and subsequent operations would not require changes to RPZs.

Flight Safety. There would be approximately a 33 percent increase in 144 FW daily operations at Fresno-Yosemite IAP under Alternative #2 compared to existing conditions. However, given the very low mishap rate for the F-15 aircraft, there would be no substantial increase in the safety risk to aircrews and personnel due to the accident and mishap potential associated with aircraft operations.

Although there would be an approximately 33 percent increase in 144 FW airfield operations under this alternative, F-15 aircrews associated with the 144 FW would continue to follow applicable procedures outlined in the 144 FW BASH Plan (144 FW 2002). The 144 FW has developed aggressive procedures designed to minimize the occurrence of bird aircraft strikes, and has documented detailed procedures to monitor and react to heightened risk of bird strikes (144 FW 2002). When risk increases, limits are placed on low altitude flight and some types of training (e.g., multiple approaches, closed pattern work). Special briefings are provided to pilots whenever the potential exists for greater bird-strike hazards within the training airspace; F-15 pilots would be subject to these same procedures. Therefore, no impact would occur related to BASH issues.

March Air Reserve Base

Proposed activities at March ARB are the same for both the Preferred Alternative and Alternative #2; therefore, the safety impacts associated with March ARB would be the same as those described under the Preferred Alternative.

4.5.2.3 No Action Alternative

Under the No Action Alternative, there would be no aircraft conversion or associated construction occurring at Fresno-Yosemite IAP. The F-15s would not be based at Fresno; however, the F-16s would be transferred to the 162 FW, as scheduled. Therefore, the 144 FW would not have a flying mission until such time as when the USAF identified an appropriate aircraft to be based there. The alert mission and associated aircraft at Fresno-Yosemite IAP would remain under the No Action Alternative even if the other F-16 aircraft associated with the 144 FW were relocated to the 162 FW. As a result, impacts to safety as a result of the No Action Alternative would be temporarily beneficial, due to a decrease in operations as well as personnel, which would result in less opportunity for safety issues until a new mission and/or aircraft was established at the installation.

Under the No Action Alternative, the alert mission and associated F-16 aircraft at March ARB would remain even if the other F-16 aircraft associated with the 144 FW were relocated to the 162 FW. There would be no change to safety at March ARB as a result of the No Action Alternative.

4.6 HAZARDOUS MATERIALS AND WASTES

4.6.1 Methodology

This section addresses the potential impacts caused by hazardous materials and waste management practices and the impacts of existing contaminated sites on reuse options. Hazardous materials and petroleum products, hazardous and petroleum wastes, ERP sites, ACM, and LBP are discussed in this section.

The qualitative and quantitative assessment of impacts from hazardous materials and solid waste management focuses on how and to what degree the alternatives affect hazardous materials usage and management, hazardous waste generation and management, and waste disposal. A substantial increase in the quantity or toxicity of hazardous substances used or generated would be considered potentially significant. Significant impacts could result if a substantial increase in human health risk or environmental exposure was generated at a level that cannot be mitigated to acceptable standards.

Regulatory standards and guidelines have been applied in evaluating the potential impacts that may be caused by hazardous materials and wastes. The following criteria were used to identify potential impacts:

- Generation of 100 kilograms (or more) of hazardous waste or 1 kilogram (or more) of an acutely hazardous waste in a calendar month, resulting in increased regulatory requirements.
- A spill or release of a reportable quantity of a hazardous substance as defined by the USEPA in 40 CFR Part 302.
- Manufacturing, use, or storage of a compound that requires notifying the pertinent regulatory agency according to the EPCRA.
- Exposure of the environment or public to any hazardous material and/or waste through release or disposal practices.

4.6.2 Impacts

4.6.2.1 Preferred Alternative

Fresno-Yosemite International Airport

Under the Preferred Alternative, the 144 FW would convert from 18 F-16 aircraft to 18 F-15 aircraft. There would be no change to the number or type of airfield operations conducted by the 144 FW at Fresno-Yosemite IAP. Additionally, as part of this alternative, a total of four construction, modification, or infrastructure improvement projects would be implemented beginning in 2013. Table 2.3-3 lists the construction projects that would occur under the Proposed Action.

Hazardous Materials. Training activities and other functions would be expected to remain similar between the F-15 and existing F-16 aircraft. The type of hazardous materials needed for maintenance and operation of the F-15 would be expected to remain similar to those currently used for maintenance and operation of the F-16 fleet; however, the proposed F-15 aircraft would no longer require the use of hydrazine, a highly toxic and unstable compound. The hydrazine system is used in the F-16 aircraft to fuel the emergency power generator for powering instruments and control surfaces in the event of an engine failure. Hydrazine use and storage at the 144 FW would no longer be required under the Proposed Action and would be disposed of in accordance with the 144 FW Hazardous Waste Management Plan (144 FW 2011b) and other applicable local, state, and federal laws and regulations.

Since the F-15 aircraft is a dual engine aircraft (compared with the single engine F-16 aircraft), the throughput of petroleum substances (e.g., fuels, oils) used during operations would be expected to increase from what is currently used to maintain the F-16 fleet. Additionally, it is expected that short-term increases would be realized in terms of the quantity of fuel stored and

used during construction activities, because various fuels (e.g., diesel, gasoline) would be required to run earth moving equipment and power tools and to provide electricity and lighting as conditions warrant. Procedures for hazardous material management established for the 144 FW installation would continue to be followed in future operations associated with the Proposed Action and as required during all construction and renovation activities.

Hazardous Waste. The type of hazardous waste streams generated by F-15 operations would be expected to remain similar to those being generated by the existing F-16 aircraft as the aircraft would be replaced one-for-one. Additionally, with the exception of hydrazine, the two aircraft require the same types of hazardous materials for their maintenance and operations (e.g., fuels, oils); however, because the F-15 is a dual engine aircraft and would use more hazardous materials, the hazardous waste streams would be expected to increase. The increase in hazardous waste generation (e.g., used oil, used filters, oily rags, etc.) would continue to be managed in accordance with the installation's Hazardous Waste Management Plan and all applicable federal, state, and local regulations. Additionally, no changes to the installation's small quantity generator status would be expected to occur due to the increase in hazardous waste generation from aircraft operations.

Toxic Substances. Under the Preferred Alternative, Building 160 is proposed for demolition and Buildings 2640 and 121 include proposed additions to their existing facilities. According to the 1993 asbestos report (144 FW 2007b), Building 121 was found to contain ACM in the floor tile and mastic; however, the ACM was removed in September 2005. None of the buildings associated with the Proposed Action were built before 1978 so the probability of LBP presence is low. Any structures proposed for demolition, addition, or retrofit would be inspected for ACM and LBP according to established ANG procedures prior to any renovation or demolition activities. All ACM would be properly removed and disposed of prior to or during demolition in accordance with 40 CFR 61.40 through 157. All LBP would be managed and disposed of in accordance with TSCA, OSHA regulations, California requirements (regarding site work practices for buildings with LBP), and established ANG procedures. Materials, especially discarded oil products, would be screened for PCB contamination prior to disposal.

Environmental Restoration Program. Project #1, Construction of New Aircraft Corrosion Control Hangar, and Project #4, Addition to Existing NDI Shop, are within close proximity to the OHF Area 1 groundwater contamination plume, as shown in Figure 4.6-1. If contaminated media (e.g., soil, groundwater) are encountered during the course of site preparation (e.g., clearing, grading) or site development (e.g., excavation for installation of building footers) for proposed construction activities, work would cease until 144 FW Program Managers establish an appropriate course of action for the construction project to ensure that federal and state agency notification requirements are met, and to arrange for agency consultation as necessary if existing ERP sites are affected. Also, prior to construction activities, the construction contractors would be notified of the nature and extent of known contamination so that they can inform their employees in advance of on-site activities and take appropriate precautions to protect health and safety, and to prevent the spread of contamination. The construction contractors would be responsible for ensuring their workers follow appropriate health and safety requirements.

The Proposed Action would not result in an increased risk of hazardous waste releases or exposure, nor would it trigger any of the four criteria listed in Section 4.6.1, *Methodology*. Therefore, no significant impacts to hazardous materials and wastes would occur with implementation of the Proposed Action.

March Air Reserve Base

The Preferred Alternative does not include any ground disturbance through construction at March ARB, and there is no change to the proposed number of operations or type of hazardous materials and wastes generated or stored at March ARB. However, throughput of petroleum substances (e.g., fuels, oils) used during operations would be expected to increase from what is currently used for the F-16 operations. Further, all scheduled maintenance on the alert aircraft at March ARB is conducted at Fresno-Yosemite IAP; therefore, this resource topic will not be discussed further for March ARB.

4.6.2.2 Alternative #2

Under Alternative #2, the 144 FW would convert from 18 F-16 aircraft to 24 F-15 aircraft. There would be approximately a 33 percent increase in operations for the 144 FW over baseline and the Preferred Alternative conditions. Construction associated with the beddown of 24 F-15 aircraft at Fresno-Yosemite IAP would be the same as that described under the Preferred Alternative.

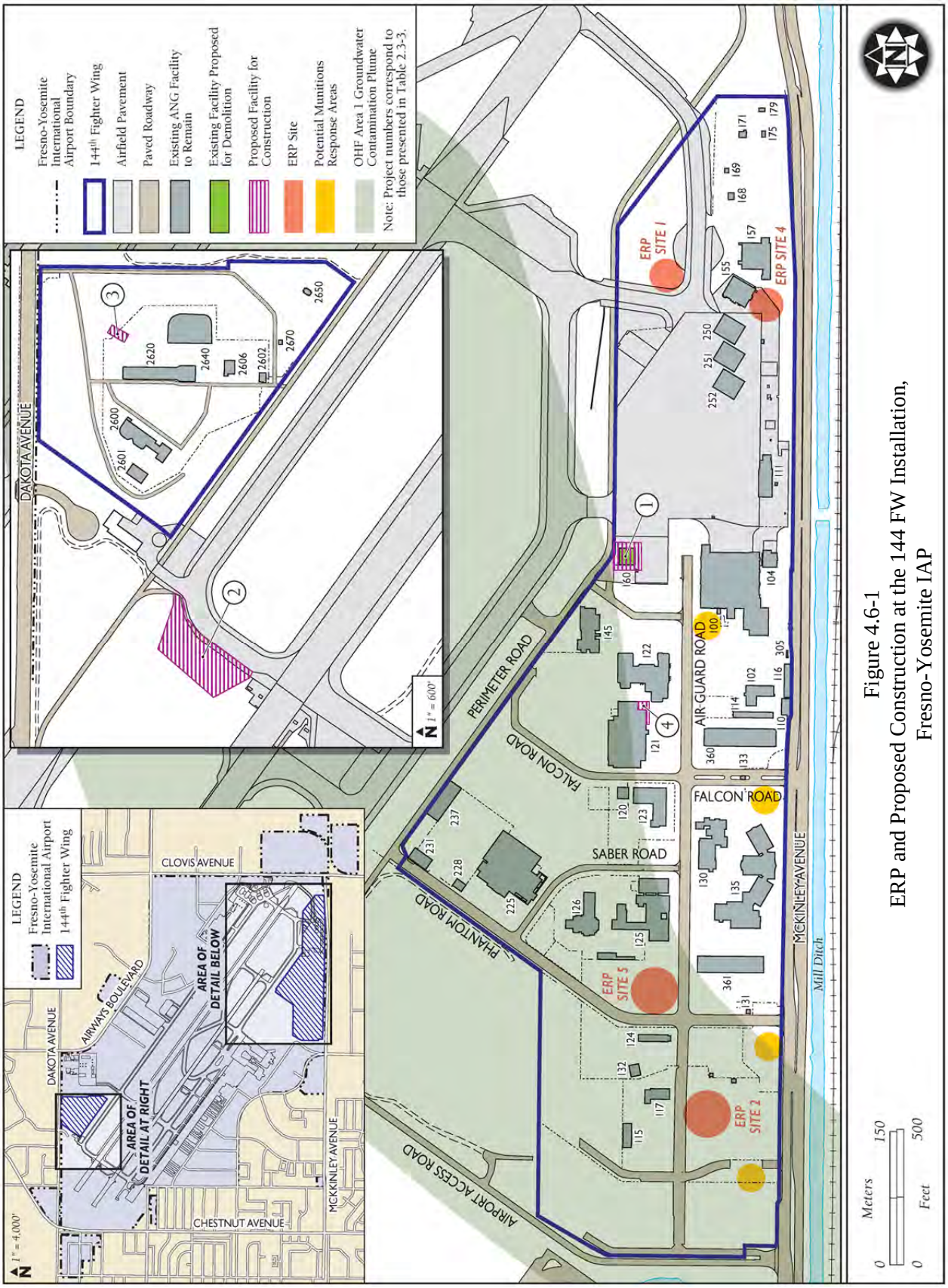

Figure 4.6-1
ERP and Proposed Construction at the 144 FW Installation, Fresno-Yosemite IAP

Hazardous Materials. Training activities and other functions are expected to remain similar between the proposed 24 F-15 and existing 18 F-16 aircraft. The types of hazardous materials needed for maintenance of the F-15 would be expected to remain similar to those currently used for maintenance of the F-16 fleet; however, the quantity of hazardous materials used would be expected to increase proportionately by 33 percent (consistent with the 33 percent increase in operations at the 144 FW) from what is currently used. Although use of these materials would be expected to increase, there would not be an increase in storage of materials on the installation, rather it is expected that there would be an increase in the throughput of materials to the installation.

It is also expected that short-term increases would be realized in terms of the quantity of fuel stored and used during construction activities, because various fuels (e.g., diesel, gasoline) would be required to run earth moving equipment and power tools and to provide electricity and lighting as conditions warrant. Procedures for hazardous material management established for the 144 FW installation would continue to be followed in future operations associated with the Proposed Action and as required during all construction and renovation activities.

Hazardous Waste. The types of hazardous waste streams generated by F-15 operations are expected to remain similar to those being generated by the existing F-16 aircraft. However, under Alternative #2, the quantity of hazardous waste streams generated would be expected to increase by approximately 33 percent, corresponding with the increase in operations from the additional 24 aircraft at the 144 FW. As described above, although the annual amount of hazardous waste would be expected to increase, there would be not be an increase in storage of these wastes on the installation, rather it is expected that there would be an increase in the frequency of waste pick-up at the installation. The increase in hazardous waste generation (e.g., used oil, used filters, oily rags, etc.) would continue to be managed in accordance with the installations Hazardous Waste Management Plan and all applicable federal, state, and local regulations. Additionally, no changes to the installation's small quantity generator status would be expected to occur due to the increase in hazardous waste generation from aircraft operations. Established hazardous waste management procedures would continue to be followed during future squadron operations and all construction and renovation that may occur in association with Alternative #2.

Toxic Substances. Construction associated with the beddown of 24 F-15 aircraft at Fresno-Yosemite IAP would be the same as that described under the Preferred Alternative. As such, impacts related to toxic substances would be similar to that described under the Preferred Alternative.

Environmental Restoration Program. Construction associated with the beddown of 24 F-15 aircraft at Fresno-Yosemite IAP would be the same as that described under the Preferred

Alternative. As such, impacts related to the ERP would be similar to that described under the Preferred Alternative.

Alternative #2 would not result in an increased risk of hazardous waste releases or exposure, nor would affect the criteria listed in Section 4.6.1, *Methodology*. Therefore, no significant impacts to hazardous materials and wastes would occur with implementation of Alternative #2.

March Air Reserve Base

Alternative #2 does not include any ground disturbance through construction at March ARB, and there is no change to the proposed number of operations or type of hazardous materials and wastes generated or stored at March ARB. However, the throughput of petroleum substances (e.g., fuels, oils) used during operations would be expected to increase from what is currently used for the F-16 operations. Further, all scheduled maintenance on the alert aircraft at March ARB is conducted at Fresno-Yosemite IAP; therefore, this resource topic will not be discussed further for March ARB.

4.6.2.3 No Action Alternative

Under the No Action Alternative, the proposed aircraft conversion and associated construction activities at the installation would not occur. Under the No Action Alternative, the F-16 aircraft would continue to be transferred to the 162 FW, as scheduled under Alternatives #1 and #2. Consequently, the 144 FW would not have a flying mission until the USAF identified an appropriate aircraft to be based there. Baseline hazardous materials and waste under the No Action Alternative would experience a substantial reduction in the type and quantity of hazardous materials and associated hazardous waste streams associated with the loss of a flying mission. This reduction in hazardous waste streams would be temporary in nature until the flying mission was reinstated by the USAF. The use of hydrazine required with F-16 operations and maintenance would be continued for the ACA mission F-16 aircraft. Under the No Action Alternative, the alert mission and associated F-16 aircraft at both Fresno-Yosemite IAP and March ARB would remain even if the other F-16 aircraft associated with the 144 FW were relocated to the 162 FW. As the proposed construction would not occur, there would be no temporary increase in hazardous materials and wastes associated with these. Therefore, no significant impacts to hazardous materials and waste would occur as a result of implementation of the No Action Alternative.

4.7 INFRASTRUCTURE

4.7.1 Methodology

Potential impacts to infrastructure elements at the 144 FW installation are assessed in terms of effects of the proposed projects on existing service levels described in Section 3.7.2. Impacts to transportation and utilities are assessed with respect to the potential for disruption or improvement of current circulation patterns and utility systems, deterioration or improvement of existing levels of service, and changes in existing levels of transportation and utility safety. Impacts may arise from physical changes to circulation or utility corridors, construction activity, and introduction of construction-related traffic and utility use. Adverse impacts to roadway capacities would be significant if roads with no history of capacity exceedance had to operate at or above their full design capacity as a result of an action. Transportation effects may arise from changes in traffic circulation, delays due to construction activity, or changes in traffic volumes. Utility system effects may include disruption, degradation, or improvement of existing levels of service or potential change in demand for energy or water resources.

For the range of public services discussed below, the installation is required to proactively plan for and assess all specific infrastructure and utility requirements and other essential services to ensure that the proposed increase in personnel and their dependents would be accommodated under the Proposed Action. The installation routinely evaluates community facilities and services to account for fluctuations associated with new units assigned to the installation and the deployment of existing units. In addition, the installation identifies infrastructure or utility needs within the scope of each corresponding project. If particular projects require additional infrastructure or utilities, they are incorporated as a part of that project. This process ensures that any infrastructure or utility deficiencies are identified in the initial planning stages.

For this analysis, potential infrastructure impacts associated with implementation of the Proposed Action were evaluated. Potential infrastructure impacts would be related to construction activity and facility operations after completion, in addition to any increase in personnel associated with the Proposed Action.

4.7.2 Impacts

4.7.2.1 Preferred Alternative

Fresno-Yosemite International Airport

Under the Preferred Alternative, there would be a minor increase in the number of personnel located at the 144 FW installation, as well as construction of the facilities required to support the beddown of 18 F-15 aircraft. Personnel would increase under the Preferred Alternative by 22

people; this represents an increase of 2.2 percent when compared with the baseline population of 1,010 authorized personnel. In addition, there would be approximately 2.2 acres of new facility footprint from the proposed facility construction and renovation within the 144 FW installation (Figure 2.3-2).

Electrical and Natural Gas Systems. Demand for electricity and natural gas would be expected to increase slightly as a result of the increase in personnel, and the building space and facilities to be constructed would require additional electricity. However, any new facilities and additions associated with the Proposed Action would be implemented with more energy efficient design standards and utility systems than are currently in place. In addition, construction projects would incorporate LEED and sustainable development concepts to achieve optimum resource efficiency, sustainability, and energy conservation. Therefore, average energy consumption would be expected to remain consistent or decrease compared to energy consumption associated with existing facilities.

Construction activity associated with the Preferred Alternative could result in some temporary interruption of utility services during construction. These impacts would be temporary, occurring briefly during active construction periods. In addition, the demand for energy (primarily electricity) could increase slightly during demolition and construction phases. The energy supply at the installation and in the region is adequate and would not be affected by this temporary increase in demand.

Sanitary Sewer System. Wastewater generation would be expected to increase slightly as a result of the increase in 22 personnel. However, there have been no deficiencies identified with the existing system, and it is expected that the existing sanitary sewer system is generally adequate to serve the facilities proposed under this alternative.

Solid Waste Management. The building space and facilities to be constructed would generate construction and demolition debris requiring landfill disposal. Construction activities would occur between Fiscal Year 2013 and 2014 and would take approximately 2 years to complete, resulting in approximately 2.2 acres of new facility footprint and pavements. Off-installation contractors completing construction and demolition projects at the 144 FW installation would be responsible for disposing of waste generated from these activities. Contractors would be required to comply with federal, state, and local regulations for the collection and disposal of municipal solid waste from the installation. Much of this material can be recycled or reused, or otherwise diverted from landfills. All non-recyclable construction and demolition waste would be collected in a dumpster until removal. Construction and demolition waste contaminated with hazardous waste, ACM, LBP, or other undesirable components would be managed in accordance with AFI 32-7042, *Waste Management* (2009).

Potable Water System. Water consumption would be expected to increase slightly under the Preferred Alternative as a result of the increase in personnel; however, an increase in 22 personnel would not be expected to impact regional water supply. Additionally, the demand for water (e.g., if used to control dust) could also increase during demolition and construction phases. However, this increase would be temporary and intermittent and would not be expected to impact regional water supply.

Transportation and Circulation. Construction activities would occur between Fiscal Year 2013 and 2014 and would take approximately 2 years to complete, resulting in approximately 2.2 acres of new facility footprint. Construction equipment would be driven to proposed construction areas and would be kept on-site for the duration of the respective activity. Construction workers would drive daily in their personal vehicles to and from the construction site. In general, construction traffic would result in increases in the use of on-installation roadways during construction activities; however, increases would be temporary and intermittent, occurring only during active construction periods.

The number of authorized personnel would increase by 22 under the Preferred Alternative, approximately 2.2 percent when compared to the existing authorization of 1,010. The increase in personnel would create a potential 22 additional one-way vehicle trips to and from the installation during morning and evening peak periods for these additional personnel. Assuming that each person makes two trips per day, the implementation of the Preferred Alternative would add an additional 44 trips onto the existing roadway network after the construction phase is complete. Impacts to infrastructure would be expected to be negligible under the Preferred Alternative.

March Air Reserve Base

The Preferred Alternative does not include any construction at March ARB, and there is no change to the proposed number of authorized personnel at March ARB. Therefore, this resource topic will not be discussed further for March ARB.

4.7.2.2 Alternative #2

Fresno-Yosemite International Airport

Under Alternative #2, there would be an overall increase in the number of authorized personnel located at the 144 FW installation, as well as construction of the facilities required to support the beddown of 24 F-15 aircraft. Authorized personnel would increase under Alternative #2 by 29 people; this represents an increase of 2.9 percent when compared with the baseline population of 1,010 authorized personnel. In addition, there would be approximately 2.2 acres of new facility footprint from the proposed facility construction and renovation within the 144 FW installation (Figure 2.3-2), which is identical to that proposed under the Preferred Alternative.

The consumption of electricity, natural gas, and potable water and the generation of wastewater and solid waste would be slightly higher than under the Preferred Alternative. The construction footprint is identical to that under the Preferred Alternative; however, there would be an increase in seven authorized personnel when compared to the Preferred Alternative.

In regard to Transportation and Circulation, the increase in personnel would create a potential 29 additional one way vehicle trips to and from the Base during morning and evening peak periods. Assuming that each person makes two trips per day, the implementation of Alternative #2 would add an additional 58 trips for those personnel onto the existing roadway network after the construction phase is complete. Impacts to infrastructure would be expected to be negligible under Alternative #2.

March Air Reserve Base

Alternative #2 does not include any construction at March ARB, and there is no change to the proposed number of authorized personnel at March ARB. Therefore, this resource topic will not be discussed further for March ARB.

4.7.2.3 No Action Alternative

Under the No Action Alternative, the proposed aircraft conversion and associated construction activities at the installation would not occur. Under the No Action Alternative, the 144 FW would eventually be without an aircraft or mission, as the F-16 aircraft will be relocated to the 162 FW during the 2012 calendar year. Personnel associated with the flying mission would also be relocated and the population at the 144 FW would decrease, although the alert mission and associated F-16 aircraft at both Fresno-Yosemite IAP and March ARB would remain even if the other F-16 aircraft associated with the 144 FW were relocated to the 162 FW. This decrease in population would in turn decrease demand for utilities, including the consumption of electricity, natural gas, and potable water and the generation of wastewater and solid waste. Traffic within the installation and surrounding community would also decrease. In regard to impacts associated with the proposed construction, as no construction would occur under the No Action Alternative, baseline infrastructure and transportation, as described in Section 3.7, would remain unchanged. Therefore, no significant impacts to infrastructure and transportation would occur as a result of implementation of the No Action Alternative.

4.8 EARTH RESOURCES

4.8.1 Methodology

Protection of unique geologic features, minimization of soil erosion, and the siting of facilities in relation to potential geologic hazards and soil limitations are considered when evaluating impacts

to earth resources. If a proposed action were to substantially affect or be substantially affected by any of these features, impacts would be considered significant. Generally, impacts associated with earth resources can be avoided or minimized to a level of insignificance if proper construction techniques, erosion control measures, and structural engineering designs are incorporated into project development.

Adverse impacts to soils and the associated potential indirect impacts to water resources can be minimized through the implementation of BMPs such as those typically required to be in compliance with the CWA. Construction projects that disturb one or more acres of soil or that disturb less than one acre but are part of a larger common plan of development, are required to obtain coverage under the General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (General Permit No. CAS000002) in the state of California. The permit is based on a project's overall risk and requires measures to prevent erosion and reduce sediment and other pollutants in their discharges. Compliance with this permit involves development and implementation of a SWPPP that includes site-specific management measures.

Analysis of potential impacts to geologic resources typically includes identification and description of resources that could potentially be affected, examination of the potential effects that an action may have on the resource, assessment of the significance of potential impacts, and provision of management measures in the event that potentially significant impacts are identified. Analysis of impacts to soil resources resulting from proposed activities examines the suitability of locations for proposed operations and activities. Impacts to soil resources can result from earth disturbance that would expose soil to wind or water erosion.

4.8.2 Impacts

4.8.2.1 Preferred Alternative

Fresno-Yosemite International Airport

Under the Preferred Alternative, new construction would consist of four separate projects resulting in approximately 95,765 SF (2.2 acres) of new facility footprint and 82,665 SF (1.9 acres) of net new impervious surface. The 144 FW would implement construction projects for the aircraft conversion, as well as other construction, alteration, and demolition projects associated with their IDP at Fresno-Yosemite IAP (Table 2.3-3). These proposed construction projects would meet all criteria specified in the Air Force Handbook 32-1084, *Facility Requirements*.

Topography. While proposed construction would require some minor modification of terrain by cut and fill techniques and other minor grading, no obvious topographic features would be affected as a result of implementation of these activities.

Geology. Implementation of proposed construction would not substantially affect the geologic units underlying the installation, as no unique geologic features or geologic hazards are present. Although ground disturbance would occur during construction, the majority of construction would occur over previously disturbed surfaces. It is likely that grading of existing soils and placement of structural fill for new facilities would not substantially alter existing soil conditions at the 144 FW installation and adjacent property because much of the property has been previously disturbed or altered as a result of prior development.

Soils. As shown in Figure 4.8-1, proposed construction under the Preferred Alternative would occur primarily on Atwater sandy loam and Atwater sandy loam, moderately deep, with a small amount of the new construction footprint on Atwater loamy sand. According to the NRCS Web Soil Survey (2011), the risk of corrosion to concrete is low, risk of corrosion to steel is moderate, and in regard to the construction of small commercial type buildings, there are no limitations associated with these three soils types for the type of construction activities proposed under the Preferred Alternative.

Under the Preferred Alternative, there would be approximately 82,665 SF (1.9 acres) of net new impervious surface as a result of proposed new construction. To minimize potential impacts associated with erosion, runoff, and sedimentation, BMPs as described in the 144 FW SWPPP (144 FW 2009d) would be implemented during and following the construction period. Such BMPs could include the use of well-maintained silt fences or straw wattles, minimizing surficial areas disturbed, stabilization of cut/fill slopes, minimization of earth-moving activities during wet weather, and covering of soil stockpiles, as appropriate. Following construction, disturbed areas not covered with impervious surface would be reestablished with appropriate vegetation and native seed mixtures and managed to minimize future erosion potential. An NOI must be filed with the state of California to obtain coverage under the General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (General Permit No. CAS000002) prior to implementation of individual projects. Construction activities subject to this permit include clearing, grading, and disturbances to the ground such as stockpiling or excavation. Impacts to earth resources would be negligible.

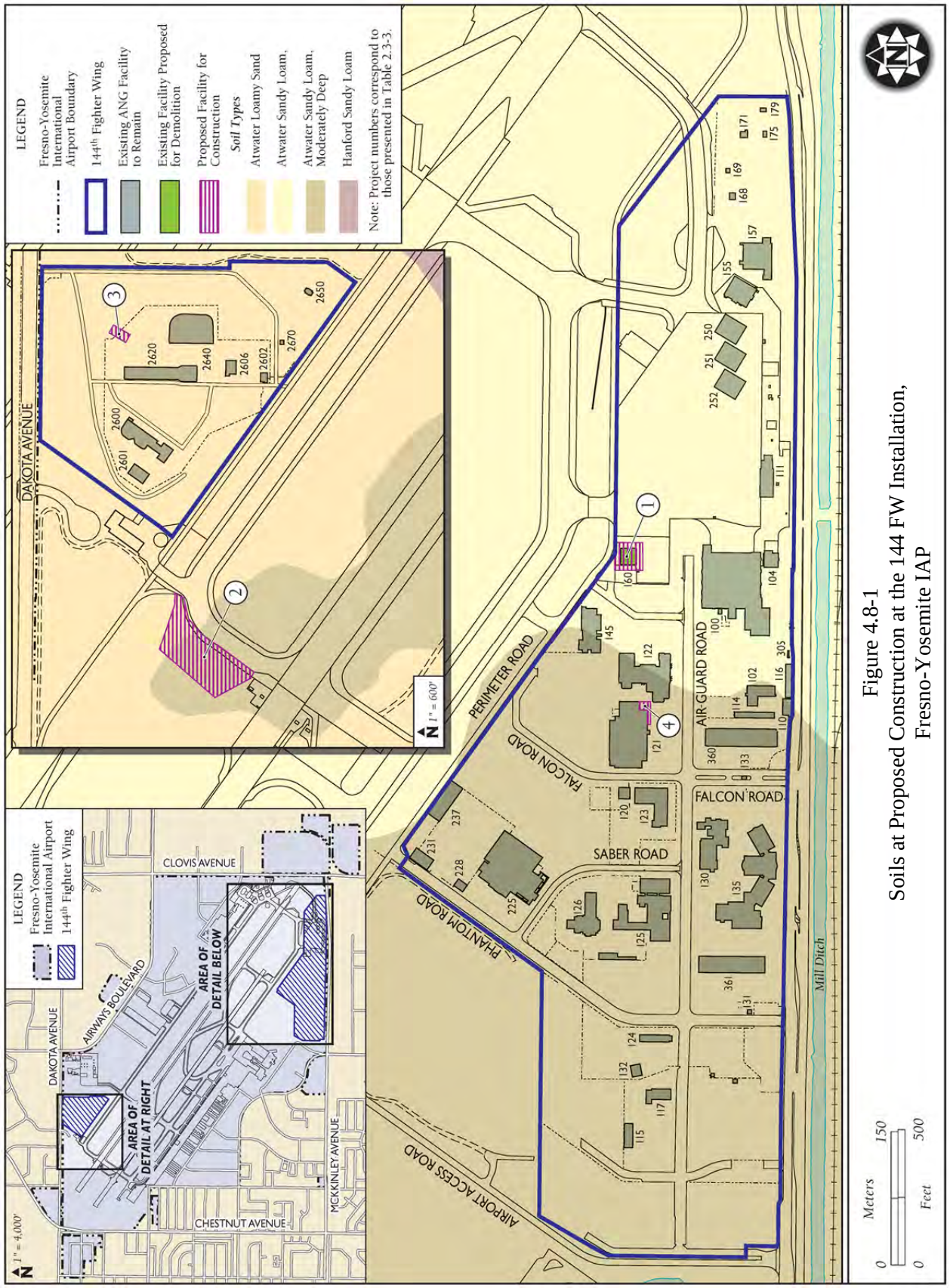

Figure 4.8-1
Soils at Proposed Construction at the 144 FW Installation, Fresno-Yosemite IAP

March Air Reserve Base

The Preferred Alternative does not include any construction at March ARB. Therefore, this resource topic will not be discussed further for March ARB.

4.8.2.2 Alternative #2

Fresno-Yosemite International Airport

The construction footprint for Alternative #2 would be identical to that proposed under the Preferred Alternative. As such, the impacts related to earth resources would be similar to those described under the Preferred Alternative.

March Air Reserve Base

Alternative #2 does not include any construction at March ARB. Therefore, this resource topic will not be discussed further for March ARB.

4.8.2.3 No Action Alternative

Under the No Action Alternative, the proposed aircraft conversion and associated construction activities at the installation would not occur. Baseline earth resources, as described in Section 3.8, would remain unchanged. Therefore, no significant impacts to earth resources would occur as a result of implementation of the No Action Alternative.

4.9 WATER RESOURCES

4.9.1 Methodology

With regard to water resources, the primary concerns associated with the Proposed Action include changes to surface water drainage, effects on water quality during construction activities, and groundwater recharge.

4.9.2 Impacts

4.9.2.1 Preferred Alternative

Fresno-Yosemite International Airport

Surface Water. As a result of implementation of the Preferred Alternative, there would be approximately 82,665 SF (1.9 acres) of net new impervious surface from the proposed facility construction and demolition. This could result in localized increases in surface runoff and total suspended particulates to nearby surface waters. However, in accordance with UFC 3-210-10,

Low Impact Development (as amended, 2010) and EISA Section 438, any increase in surface water runoff as a result of the proposed construction would be attenuated through the use of temporary and/or permanent drainage management features such as use of bioretention, filter strips, vegetated buffers, grassed swales, infiltration trenches, water harvesting, and other applicable BMPs. The integration of Low Impact Development design concepts incorporates site design and stormwater management to maintain the site's pre-development runoff rates and volumes to further minimize potential adverse impacts associated with increases in impervious surface area. The use of these features would also increase groundwater recharge through direct percolation offsetting the loss of pervious surface due to future construction.

To minimize potential impacts associated with erosion, runoff, and sedimentation, BMPs as described in the 144 FW SWPPP (144 FW 2009d) would be implemented during and following the construction period. Such BMPs could include the use of well-maintained silt fences or straw wattles, minimizing surficial areas disturbed, stabilization of cut/fill slopes, minimization of earth-moving activities during wet weather, and covering of soil stockpiles, as appropriate. Following construction, disturbed areas not covered with impervious surface would be reestablished with appropriate vegetation and native seed mixtures and managed to minimize future erosion potential. An NOI must be filed with the state of California to obtain coverage under the General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (General Permit No. CAS000002) prior to implementation of individual projects. Construction activities subject to this permit include clearing, grading, and disturbances to the ground such as stockpiling or excavation.

While an increase of 1.9 acres of impervious surface is relatively minor, any increase in impervious surface could result in an associated increase in stormwater runoff volume and intensity. Increased runoff and peak discharge volumes as a result of increases to impervious surface can be managed by appropriately designed conveyance structures (such as roadways, channels, and culverts) in accordance with site-specific engineering standards that take into consideration the influence of surface water drainage within, adjacent to, and downstream of the project. In addition, implementing features that manage surface water runoff into the design of the project would avoid or minimize conflicts with city, county, state, or federal regulations and prevent adversely affecting adjacent properties and/or the project area itself. Such measures could include:

- water harvesting and natural open space,
- installation of retention/detention basins for water recharge or for release of runoff at predetermined times to minimize peak discharges,

- the use of porous materials, such as pavers or gravel, for driveway and walkway construction, and

- directing runoff toward permeable areas, such that discharge exiting each site post-construction would be equal to or less than existing conditions.

Implementation of these measures, as necessary and appropriate, would ensure that impacts to surface water as a result of implementation of the Preferred Alternative would be minimal.

Groundwater. As a result of the Proposed Action, the increase in the amount of impervious surface (1.9 acres) would also result in a decrease in groundwater recharge. However, as noted above, any increase in surface water runoff as a result of the proposed construction would be attenuated through the use of permit-related temporary and/or permanent drainage management features such as detention/retention basins and BMPs. The integration of water harvesting and natural open space into project design would further minimize potential adverse impacts due to increased impervious surface. The use of these features would also increase groundwater recharge through direct percolation offsetting the loss of pervious surface due to future construction. Additionally, the impervious surface area resulting from the proposed activities would not be one continuous, hardened surface. Rather, the impervious surfaces would occupy several smaller areas, which would further minimize localized impacts to groundwater recharge.

Floodplains. Proposed construction activities at the installation would not occur within the 100-year floodplain zone. As such, there would be no impacts to floodplains under this alternative.

March Air Reserve Base

The Preferred Alternative does not include any construction at March ARB. Therefore, this resource topic will not be discussed further for March ARB.

4.9.2.2 Alternative #2

Fresno-Yosemite International Airport

The same project components would be implemented under Alternative #2 as are proposed under the Preferred Alternative and the total project footprint for Alternative #2 would be identical to the Preferred Alternative. As such, the impacts related to surface and groundwater resources would be similar to those described under the Preferred Alternative.

March Air Reserve Base

Alternative #2 does not include any construction at March ARB. Therefore, this resource topic will not be discussed further for March ARB.

4.9.2.3 No Action Alternative

Under the No Action Alternative, the proposed aircraft conversion and associated construction activities at the installation would not occur. Baseline water resources, as described in Section 3.9.2, would remain unchanged. Therefore, no significant impacts to water resources would occur as a result of implementation of the No Action Alternative.

4.10 BIOLOGICAL RESOURCES

4.10.1 Methodology

This section analyzes the potential for impacts to biological resources at Fresno-Yosemite IAP and March ARB as a result of the Proposed Action. Analysis of impacts focuses on whether and how components of the Proposed Action could affect biological resources.

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

4.10.2 Impacts

4.10.2.1 Preferred Alternative

Fresno-Yosemite International Airport

Vegetation. Construction of new facilities associated with the Preferred Alternative at the 144 FW installation would primarily occur on currently paved areas or actively managed (i.e., mowed and landscaped) areas, and would result in an increase of 82,665 SF (1.9 acres) of impervious surfaces. Impacts to the vegetation at the installation would be minor due to the lack of sensitive vegetation in the project area.

Wildlife. Noise associated with construction may also cause wildlife to temporarily avoid the area, including those that are protected under the Migratory Bird Treaty Act. Noise associated with excavating, as well as an increase in general activity and presence, could evoke reactions in birds. Disturbed nests in the immediate vicinity of construction activity would be susceptible to abandonment and depredation. However, bird and wildlife populations in the vicinity of the airport where project components would occur are likely accustomed to elevated noise associated

with aircraft and general military industrial use. As a result, indirect impacts from construction such as dust and noise are expected to be minimal because the ambient noise levels within the vicinity are high under existing conditions and would be unlikely to substantially increase by the relatively minor and temporary nature of the proposed construction and modifications for all alternatives. Noise levels are expected to increase from baseline with the conversion to the F-15 aircraft; however, these noise levels are not expected to impact wildlife in the area because they are likely accustomed to elevated noise levels associated with aircraft and military operations.

Bird airstrikes are also an inevitable hazard associated with military aircraft training. Under the Preferred Alternative, the F-15 would operate in the same airfield environment as the current aircraft. Annual operations for the F-15 at Fresno-Yosemite IAP are projected to be the same as baseline operations. As a result, the opportunity for bird-aircraft strikes to occur, including those with migratory birds would remain the same as baseline. The 144 FW has developed procedures designed to minimize the occurrence of bird aircraft strikes, and has documented detailed procedures to monitor and react to heightened risk of bird strikes. When risk increases, limits are placed on low-altitude flight and some types of training (e.g., multiple approaches, closed pattern work) in the airport environment. Special briefings are provided to pilots whenever the potential exists for increased bird-strikes within the airspace. Therefore, no impacts would occur related to BASH issues.

Threatened and Endangered and Special Status Species. No impacts to any federally or state threatened, endangered, or special status species would be expected as a result of the Preferred Alternative. No threatened and endangered or special status species are currently known to occur on Fresno-Yosemite IAP or within the land area under the projected noise contours and there is only a low potential for them to occur due to the lack of suitable habitat.

Wetlands. There are no wetland areas that occur within the 144 FW installation. Therefore, no impacts to wetlands would occur as a result of the Preferred Alternative.

March Air Reserve Base

Wildlife. No construction projects would occur at March ARB under the Preferred Alternative. There would be no change in the number of operations flown by the 144 FW at March ARB; however, there is a slight increase in the number of operations that were previously analyzed in a NEPA document. This increase in 244 operations would not substantially change the potential for bird-aircraft strikes to occur, including those with migratory birds. Adherence to the existing, effective BASH program would minimize the risk of bird-aircraft strikes. Overall operational noise is expected to increase very minimally from baseline. Quality wildlife habitat is limited within the installation and immediately adjacent to it, due to the developed nature of the area. Additionally, wildlife species within the area are adapted to the existing urban/industrial

environment. Impacts to wildlife from airfield operations would be minor, as they would be similar to existing operations and maintenance activities.

Threatened and Endangered and Special Status Species. No impacts to any federally or state threatened, endangered, or special status species are expected as a result of the Preferred Alternative. The SKR has not been observed at the Base since 2000, suggesting that this species no longer inhabits this area. The Burrowing Owl, which is listed as a California Species of Concern, has been observed within the installation. However, no ground disturbance would occur as a result of the Preferred Alternative. As a result, impacts to species resulting from operational noise would be minimal and similar to those described above for wildlife.

4.10.2.2 Alternative #2

Fresno-Yosemite International Airport

Vegetation. Impacts from construction of new facilities associated with Alternative #2 at the 144 FW installation would be the same as described in the Preferred Alternative.

Wildlife. Under Alternative #2, noise would increase compared to the Preferred Alternative. However, impacts would be similar to those described in the Preferred Alternative since bird and wildlife populations in the vicinity of the airfield where project components would occur are likely accustomed to elevated noise associated with aircraft and general military industrial use.

Bird airstrikes are also an inevitable hazard associated with military aircraft training. Under Alternative #2, the F-15 would operate in the same airfield environment as the current F-16 aircraft. Annual operations for the F-15 at Fresno-Yosemite IAP would be projected to increase slightly from baseline operations under Alternative #2. However, even with the increase in airfield operations above current levels, the overall potential for bird-aircraft or wildlife strikes is not anticipated to be substantially greater than current levels. The 144 FW has developed procedures designed to minimize the occurrence of bird strikes, and has documented detailed procedures to monitor and react to heightened risk of bird strikes. When risk increases, limits are placed on low-altitude flight and some types of training (e.g., multiple approaches, closed pattern work) in the airport environment. Special briefings are provided to pilots whenever the potential exists for increased bird strikes within the airspace. Therefore, minimal impacts would occur related to BASH issues under Alternative #2.

Threatened and Endangered and Special Status Species. No impacts to any federally or state threatened, endangered, or special status species would be expected as a result of Alternative #2. No threatened and endangered or special status species are currently known to occur on Fresno-Yosemite IAP or within the land area under the projected noise contours .

Wetlands. There are no wetland areas that occur within the 144 FW installation. Therefore, no impacts to wetlands would occur as a result of Alternative #2.

March Air Reserve Base

Under Alternative #2, impacts to biological resources would be the same as under the Preferred Alternative. No construction would occur, and operations and noise would be the same as under the Preferred Alternative.

4.10.2.3 No Action Alternative

Under the No Action Alternative, there would be no aircraft conversion or associated construction occurring at Fresno-Yosemite IAP. The F-15s would not be based at Fresno; however, the F-16s would be transferred to the 162 FW, as scheduled. Therefore, the 144 FW would not have a flying mission until such time as when the USAF identified an appropriate aircraft to be based there. As a result, impacts to biological resources as a result of the No Action Alternative would be negligible despite a reduction in overall noise and operations as well as personnel related to the 144 FW. Fresno-Yosemite IAP would remain a commercial airport and biological resources would continue to be subject to typical airport noises.

Under the No Action Alternative at March ARB, the F-16 would continue to fly the ACA mission, and there would be no change from the baseline condition.

4.11 CULTURAL RESOURCES

4.11.1 Methodology

Cultural resources are subject to review under both federal and state laws and regulations. Section 106 of the NHPA of 1966 empowers the ACHP to comment on federally initiated, licensed, or permitted projects affecting cultural sites listed or eligible for inclusion on the NRHP. Once cultural resources have been identified, significance evaluation is the process by which resources are assessed relative to significance criteria for scientific or historic research, for the general public, and for traditional cultural groups. Only cultural resources determined to be significant (i.e., eligible for the NRHP) are protected under the NHPA.

Analysis of potential impacts to cultural resources considers both direct and indirect impacts.

Direct impacts may occur by:

(1) physically altering, damaging, or destroying all or part of a resource;

(2) altering characteristics of the surrounding environment that contribute to resource significance;

(3) introducing visual, audible, or atmospheric elements that are out of character with the property or alter its setting; or

(4) neglecting the resource to the extent that it deteriorates or is destroyed.

Direct impacts can be assessed by identifying the type and location of the proposed action and by determining the exact locations of cultural resources that could be affected. Indirect impacts primarily result from the effects of project-induced population increases and the resultant need to develop new housing areas, utilities services, and other support functions necessary to accommodate population growth. These activities and subsequent use of facilities can disturb or destroy cultural resources.

4.11.2 Impacts

4.11.2.1 Preferred Alternative

Fresno-Yosemite International Airport

As part of the consultation process, the 144 FW and the NGB conducted consultation through formal correspondence with the California SHPO, local government agencies, such as the California Native American Heritage Commission, as well as Federally recognized Tribes that had been identified as potentially having an interest in the project. To date, this correspondence includes:

- Scoping letters were sent July 12, 2011 announcing the intent of the proposal and solicitation for comment
- Follow-on correspondence, including the Draft Description of the Proposed Action and Alternatives, was sent August 29, 2011
- A Section 106 consultation letter was sent January 17, 2012 initiating Section 106 consultation with the California SHPO
- Follow-up telephone calls were made to tribes that received written correspondence March-May 2012 (Table 4.11-1)

Section 106 consultation and government-to-government consultation for this project continued throughout preparation of the EIS (see Appendix A).

Table 4.11-1. Follow-up Phone Calls with Federally and Non-Federally Recognized Tribes

Date	*Tribe*	*Comments*
30 March 2012	Santa Rosa Rancheria Tachi Yokut Tribe	Spoke with Mr. Franco. He did not recall the letter. Copy was emailed to the address provided.
30 March 2012	Table Mountain Rancheria	Mr. Pennell not available; email address provided. Copy of initial letter sent.
2 April 2012	Big Sandy Rancheria of Western Mono Indians	No answer. Left voicemail.
2 April 2012	North Fork Rancheria of Mono Indians	Out of town. Sent a copy of initial correspondence.
3 April 2012	Cold Springs Rancheria of Mono Indians, Tribal Environmental Office	Spoke with Mr. Marquez; tribe has no comment.
3 April 2012	Pechanga Cultural Resources Department	Spoke with Ms. Hoover. The tribe will defer to tribes closer to the project site.
3 April 2012	Cahuilla Band of Mission Indians	Spoke with receptionist. Followed up with a copy of the initial correspondence to Mr. Salgado.
3 April 2012	Morongo Band of Cahuilla Mission Indians	No answer. Left voicemail. 10 May 2012 - Left voicemail.
3 April 2012	Ramona Band of Cahuilla Mission Indians	Directed to call Mr. Gomez cell phone. Tribe is far removed from project site. Emailed a copy of initial correspondence.
4 April 2012	Santa Rosa Band of Cahuilla Indians	Directed to Mr. Steven Estrada. Left message with receptionist and email Mr. Estrada a copy of initial correspondence.
4 April 2012	Soboba Band of Luiseño Indians	No answer. Left voicemail and emailed a copy of the initial correspondence. 10 May 2012 - Spoke with Mr. Ontiveros – "if you didn't hear back, we didn't have concerns."
4 April 2012	Willie J. Pink	Mr. Pink was in China and will return after 15 April 2012. Emailed a copy of the initial correspondence. 24 April 2012: Spoke with Mr. Pink. He indicated no concerns and had no comments.
24 April 2012	Sierra Nevada Native American Coalition	Spoke with Mr. Bill. No immediate concerns but would like a hard copy and CD of the draft EIS. Expressed some concern regarding any excavation and buried artifacts/remains.
2 May 2012	Kings River Choinumni Farm Tribe	No answer. Left voicemail that included telephone and email contact information. 10 May 2012 - No answer, left voicemail.
2 May 2012	Dumna Wo-Wah Tribal Government	Individual answer at home phone and provided cell number to call. No answer. Left voicemail with phone and email contact information. 10 May 2012 - no answer, left voicemail.
10 May 2012	Dunlap Band of Mono Indians	Web search resulted in no contact info.
10 May 2012	Dumna Wo-Wah Tribal Government	Web search resulted in no contact info.
10 May 2012	Chowchilla Tribe of Yokuts	No answer/No voicemail.
10 May 2012	Traditional Choinumni Tribe	No answer/No voicemail.

A formal response was received from the Pechanga Band of Luiseño Mission Indians requesting clarification regarding the project. In addition, responses from the Soboba Band of Luiseño Indians, Pala Band of Mission Indians, and Table Mountain Rancheria Indians were received stating no objection to the Proposed Action.

As a result of implementation of the Preferred Alternative, there would be approximately 2.2 acres of new facility footprint from the proposed facility construction and renovation within the 144 FW installation (Figure 2.3-2). Construction associated with Buildings 121 and 2640 would involve additions to existing facilities. In addition, the existing Aircraft Corrosion Control Hangar (Building 160) would be demolished. The remaining construction projects involve extensions or repair to pavements and aircraft aprons.

Archaeological Resources. Based on previous archaeological surveys that identified no archaeological resources (as reported in the 144 FW Integrated Cultural Resources Management Plan), the installation is considered to have low probability of containing buried archaeological resources (144 FW 2010a). However, archaeological surveys cannot identify all buried archaeological resources, and there is a small possibility that resources may be discovered as the result of ground-disturbing activities. In the unlikely event that archaeological or human remains are identified during construction, the 144 FW would immediately cease all activities in the area of the discovery and contact the 144 FW Environmental Manager who would contact a qualified archaeologist to evaluate the discovery.

Architectural Resources. Nineteen of the 49 structures at the 144 FW have been determined not eligible for listing in the NRHP. Fourteen are unevaluated for NRHP-eligibility. The remaining structures do not require evaluation at this time due to recent construction (post 1989).

Buildings proposed for demolition or alteration (Buildings 160, 121, or 2640) are not eligible for listing in the NRHP due to their recent construction. All three buildings were constructed in the 1990s. All additions to buildings will be in keeping with the overall military construction theme of the 144 FW and therefore would not have an adverse impact on any unevaluated structures.

There would be no anticipated impacts to architectural resources as a result of implementation of the Preferred Alternative.

Traditional Resources. The 144 FW installation contains no known traditional resources. However, tribal consultation for this project is on-going (see Appendix A). Given the extensive development on the installation, it is considered unlikely that there are traditional resources located at the 144 FW.

The Preferred Alternative is not expected to have any impacts on archaeological or architectural resources. Tribal consultation regarding traditional resources is on-going; however, it is

considered unlikely that traditional resources are present on the installation given the extensive development at the 144 FW. Section 106 and tribal government-to-government consultation continued throughout preparation of the EIS.

March Air Reserve Base

There is no planned construction at March ARB, and proposed operations would be consistent with current conditions. As a result, this resource topic will not be discussed further for March ARB.

4.11.2.2 Alternative #2

Fresno-Yosemite International Airport

The same project components would be implemented under Alternative #2 as are proposed under the Preferred Alternative in regard to proposed facility construction and renovation. As such, the impacts related to cultural resources would be similar to those described under the Preferred Alternative. Alternative #2 is not expected to have any impacts on archaeological or architectural resources. Tribal consultation regarding traditional resources is on-going; however, it is considered unlikely that traditional resources are present on the installation given the extensive development at the 144 FW. A determination of effect letter has been submitted to the California SHPO. The NGB is awaiting a response.

March Air Reserve Base

There is no planned construction at March ARB, and proposed operations would be consistent with current conditions. As a result, this resource topic will not be discussed further for March ARB.

4.11.2.3 No Action Alternative

Under the No Action Alternative, the proposed aircraft conversion and associated construction activities at the 144 FW installation and at March ARB would not occur. Baseline cultural resources, as described in Section 3.11.2, would remain unchanged. Therefore, no significant impacts to cultural resources would occur as a result of implementation of the No Action Alternative.

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CHAPTER 5
CUMULATIVE IMPACTS

5.1 CUMULATIVE IMPACTS

Cumulative impacts to environmental resources result from incremental effects of proposed actions when combined with other past, present, and reasonably foreseeable future projects in the ROI. Cumulative impacts can result from individually minor, but collectively substantial, actions undertaken over a period of time by various agencies (federal, state, and local) or individuals. In accordance with NEPA, a discussion of cumulative impacts resulting from projects that are proposed (or anticipated over the foreseeable future) is required.

The 144 FW, Fresno-Yosemite IAP, and March ARB are active, dynamic airfields where operational changes and facility upgrades occur on a frequent basis. Projects that have been identified in the ROI that have the potential to act in a cumulative manner with the Proposed Action are discussed in this section. The ROI for cumulative impacts is generally limited to the 144 FW installation on Fresno-Yosemite IAP, March ARB (as applicable), and the immediately adjacent property because physical impacts related to the proposal are largely confined to these properties. Planning efforts in the ROI include the actions described within this EIS, as well as those other projects that are ongoing, or planned over the short term. Additional projects within the ROI are discussed below.

5.1.1 Current and Reasonably Foreseeable Actions in the ROI

Currently on-going and other proposed activities planned over the next several years are identified in Table 5.1-1.

As military installations, the 144 FW at Fresno-Yosemite IAP and March ARB undergo changes in mission and training requirements in response to defense policies, current threats, and tactical and technological advances, and as such, require new construction, facility improvements, infrastructure upgrades, and ongoing maintenance and repairs on a continual basis. Although some of these known projects are a part of the analysis contained in this section, some future requirements cannot be predicted. As those requirements are identified, future NEPA analysis will be conducted, as necessary.

Table 5.1-1. Current and Reasonably Foreseeable Actions in the ROI
(Page 1 of 3)

Project Name/Descriptions	*Approximate Square Footage (SF)*	*Anticipated Year for Implementation*
144 FW Projects		
Add to Parking Apron – The 144 FW requires an adequately sized and serviceable apron to support the conversion from the F-16 to F-15 aircraft.	22,725	2014
Homeland Response Force Storage Facility – This facility will provide space for five full-time employees and will house the mobile medical elements which provide short duration, pre-hospital emergency medical treatment during National Guard Homeland Response Force hot zone, warm zone, and cold zone response operations.	3,400	2012
Fresno-Yosemite IAP		
Extend Runway 11R-29L 8,008 feet and widen it to 150 feet.	480,600	2011-2012
Extend Runway 11L-29R to 9,539 feet and lengthen to the west 312 feet.	348,480	2013-2014
Rehabilitate Taxiway B, B2, B2-02, B2-03, B4-01 B5, B5-01, B5-03, B6, B8, B8-01, B8-03, B11-01, B11-02, B11-03, B7-01.	-	2013-25
Rehabilitate Concourse Apron – Need sufficient apron space to accommodate approximately 45 aircraft tie-downs.	-	2014-15
Rehabilitate Taxiway C, C4, C10, C12.	-	2016
Reconstruct Airport Traffic Control Tower (FAA project) – will most likely be located within the immediate vicinity of existing tower location since current sight lines to all runway thresholds are adequate.	-	Next 15 years
City of Fresno		
Development of Southeast Growth Area – 2025 Fresno General Plan identifies an area for expansion southeast of the City of Fresno that would provide an additional potential population capacity of 45,000 people. This includes the land area bounded by the Gould Canal on the north, McCall and Highland Avenues on the east, Jensen and North Avenues on the southern edge and Temperance and Locan Avenues along the west.	N/A	Next 14 years
March ARB		
Total Force Integration initiative – The Total Force Integration initiative would align the 912th Air Refueling Squadron of the Air Mobility Command as an "Active Associate" unit to the 452d Air Mobility Wing at March ARB. This action would bring up to 202 active duty personnel to March ARB. The squadron would train alongside the reserve force unit using the KC-135 aircraft already assigned to the 452d Air Mobility Wing. The new squadron would train in the same way as the current squadron at March ARB, adding between 2,100 to 2,200 flying hours to the KC-135 operations. This represents an estimated 60 percent increase over current levels of KC-135 operations. The Total Force Integration would use existing facilities at March ARB with only interior renovations to accommodate new personnel. The 163d Reconnaissance Wing converted to a Remotely Piloted Aircraft mission with ground training conducted at March ARB by the 163d Reconnaissance Wing and with all actual Remotely Piloted Aircraft flight activities conducted at Southern California Logistics Airport (formerly George AFB) in Victorville, California.	N/A	2010

Table 5.1-1. Current and Reasonably Foreseeable Actions in the ROI
(Page 2 of 3)

Project Name/Descriptions	*Approximate Square Footage (SF)*	*Anticipated Year for Implementation*
March Joint Powers Authority		
Meridian Specific Plan Amendment – The Meridian Specific Plan is a 1,290-acre industrial business park located along the western side of I-215, south of Alessandro Boulevard and north of Nandina Avenue. This Amendment to the 2003 Specific Plan reallocated acreage among land use designations to increase Industrial development and to decrease Business Park land uses within a 257-acre area to the north of Van Buren Boulevard.	4.2 million	2012-2020
March LifeCare Campus Specific Plan Amendment – Situated in the northeastern portion of the March Joint Power Authority's jurisdiction, this project would accommodate approximately 3.5 million SF of medical office and other land uses within a 236-acre area located south of Cactus Avenue and west of Heacock Street. This Specific Plan was adopted by the March Joint Powers Authority in November 2009. A Specific Plan Amendment was prepared in June 2011 to incorporate various modifications to the 2009 Specific Plan. These changes include a building height increase from 85 feet to 135 feet for land uses in the northeastern corner of the Specific Plan area (i.e., south of Cactus Avenue, west of Heacock Street, north of John F. Kennedy Drive, and east of 6th Street).	3.5 million	2012-2025
California High Speed Rail – Los Angeles to San Diego Section. A portion of this section would traverse the March Joint Powers Authority along the existing Burlington Northern Santa Fe rail line, which runs parallel to, and west of, I-215. This project is currently in Stage 2, Planning: Alternatives Analysis. Following completion of this stage, preparation of a Draft EIS/Environmental Impact Report would commence. Although station locations have not been fixed, the map suggests that the station would be located to the south of Van Buren Boulevard.	N/A	N/A
Perris Valley Line – The Riverside County Transportation Commission is preparing environmental documentation for a proposed 24-mile extension of MetroLink service from Riverside to Perris. As is the case with the California High Speed Rail, Los Angeles to San Diego Section, this proposed commuter rail service would operate along the Burlington Northern Santa Fe rail line located along the western side of I-215. According to the Final Environmental Impact Report for the Perris Valley Line (Riverside County Transportation Commission 2011), a station would be located in the vicinity of March ARB, to the south of Alessandro Boulevard, east of Meridian Parkway, and north of Cactus Avenue. This station is also planned for in the Meridian Specific Plan.	N/A	Unknown

Table 5.1-1. Current and Reasonably Foreseeable Actions in the ROI (Page 3 of 3)

Project Name/Descriptions	*Approximate Square Footage (SF)*	*Anticipated Year for Implementation*
March Inland Port General Aviation Facilities Development – The March Joint Powers Authority is planning various improvements to the civil portion of the joint use airfield to accommodate general aviation aircraft operations. The proposed general aviation facilities (Proposed Project) would consist of the following elements: • Construction of a 150,000 SF concrete aircraft parking apron; • Construction of a connecting taxi lane to Taxiway A; • Realignment and construction of additional service road to existing on-airport emergency/service road; • Drainage improvements; • Construction of security fence; • Construction of 5,000 SF General Aviation terminal facility; • Construction of two 10,000 SF General Aviation aircraft hangars; • Parking lot and access road construction; • Installation of a 10,000-gallon aboveground aircraft fuel storage tank; and • Demolition of an existing 2,000 SF structure (previously a recreation center for military Strategic Air Command pilots and their families).	167,000	2012

144 FW = 144th Fighter Wing; AFB = Air Force Base; ARB = Air Reserve Base; CA ANG = California Air National Guard; EIS = Environmental Impact Statement; FAA = Federal Aviation Administration; I-215 = Interstate 215; SF = square feet; SY = square yard

Additionally, the U.S. Department of the Navy is in the process of preparing an EIS to evaluate the potential environmental impacts that would result from providing facilities and functions on the West Coast of the U.S. to support homebasing of the F-35C aircraft in the Pacific Fleet. After reviewing the geographic considerations, airfield characteristics, and operational mission compatibility factors, the two installations that best meet Navy requirements for homebasing the F-35C on the West Coast are Naval Air Facility El Centro, Imperial County, California and NAS Lemoore, Kings and Fresno Counties, California. The proposed action and subsequent environmental analysis in this EIS for the West Coast homebasing of the F-35C focuses on aircraft replacement and transition, facility and infrastructure renovation and construction, personnel changes, and aircraft operations at and around proposed homebase airfields. Should NAS Lemoore be the chosen alternative for homebasing of the F-35C, facility development needed to support F-35C homebasing would begin in 2014. The new F-35C aircraft would progressively replace aging FA-18C aircraft beginning in 2015 with the transition to be complete by 2028. The timing of this transition plan also involves the establishment of an F-35C Fleet Replacement Squadron by 2017 to meet the requirements for training naval aviators.

5.1.1.1 Noise

Fresno-Yosemite IAP. Under the Preferred Alternative, the noise contours would expand slightly in all directions from the baseline contours Overall, the number of acres contained within the CNEL 65 dB and greater exposure area would increase by approximately 815 acres, or 41 percent. Approximately 724 of these acres would be off the airport property. Roughly 3,304 persons would be affected by CNEL above 65 dB with 1,873 of these people being newly affected. There would be 19 acres off the airport property that would fall within the 80+ dB noise contour, although none of this land contains residential areas. Implementation of a revised Part 150 Study by the FAA at Fresno-Yosemite IAP would establish mitigation measures that would minimize the impacts of the increase in noise. While there are other projects listed in Table 5.1-1 that have the ability to add noise to the environment at Fresno-Yosemite IAP, most of these are short-term construction projects that would occur in what is otherwise an industrial setting. Noise from implementation of these actions would be localized to the airport environs, and would not be expected to increase the overall noise contours. Further, should NAS Lemoore eventually be selected to convert to the F-35C aircraft, there could be a resulting minor decrease in noise at Fresno-Yosemite IAP as the F-35s would not use the airport for transient operations. Cumulative impacts to the noise environment at Fresno IAP would not be significant.

March ARB. Under the preferred alternative, noise contours at March ARB would retain the same basic shape as the baseline contours; however, the acreage contained within the 65 dB noise contour and greater would increase by 424 acres. Land uses within the expanded 65 dB noise contour includes industrial, public/quasi-public, and rural residential (although no homes are located within the area contained within the 65 dB contour). The noise contours remain relatively unchanged except for the west side of the airfield, where there would be an increase of acreage above CNEL 65 dB approaching I-215 and to the east of the runway approaching Heacock Street. The baseline noise contours already include the additional operations associated with the Total Force Integration Initiative described in Table 5.1-1. Cumulative impacts to noise would be expected to be minor.

5.1.1.2 Air Quality

Fresno-Yosemite IAP. Annual emissions from the preferred alternative (including both construction and airfield operations) would be below the CAA major source thresholds and/or the General Conformity Rule *de minimis* thresholds as set forth in the CAA for all pollutants except NO_x. A Final Conformity Determination has been prepared. The USAF has reviewed and evaluated the conformity determination and documentation, and it has determined that a finding of conformity may be made based on the SJVAPCD's written determination per 40 CFR § 93.158(a)(5)(i)(A). The Final Conformity Determination ensures that the selected action will conform to the requirements of the applicable SIP and will not cause or contribute to a delay in

attainment consistent with 42 USC § 7506(c). The purpose of the general conformity rule is to demonstrate that project emissions, combined with all of the other air basin emissions, would not result in a cumulative impact and thereby delay attainment of the air quality standards. Thus, given that the proposed action has demonstrated conformity, cumulative impacts to air quality would not be significant.

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

March ARB. Emissions from operations would be below the CAA major source thresholds and/or the General Conformity Rule *de minimis* thresholds as set forth in the CAA for all pollutants.

5.1.1.3 Land Use

Fresno-Yosemite IAP. Under the Preferred Alternative, acreage off airport property contained within the 65 dB and greater noise contours would increase by approximately 724 acres. Overall, there would be an estimated increase of 1,873 persons residing within the noise contours.

To the west of the installation, additional industrial, residential, educational, and commercial land uses would be exposed to aircraft CNEL of 65 dB. To the south and east, the additional land exposed would be primarily industrial and open space, with a small portion of residential area. Under the Preferred Alternative there would be three new schools exposed to aircraft CNEL of 65 dB or above. In addition, two additional churches would be impacted by the new noise contours.

Impacts to land use as a result of this action would be adverse, particularly as a result of new residential areas within the noise contours. Implementation of a revised Airport Part 150 Study would establish mitigation measures that would minimize the impacts to land use.

Upon completion and implementation of a revised Part 150 Study for Fresno-Yosemite IAP, in general, land uses at the 144 FW installation would not be adversely affected by the activities described under the Preferred Alternative in concert with those described in Table 5.1-1. The location and function of proposed structures within the Fresno-Yosemite IAP, and development of off-airport property are compatible with the surrounding area. Although future development at Fresno-Yosemite IAP and adjacent areas is anticipated, development would be subject to various planning and land use requirements, including those associated with Fresno-Yosemite

IAP, counties, cities, and other municipalities. Project-specific studies would be performed to determine and address any projects that would result in land use conflicts, such as encroachment of airfield safety zones. Cumulative impacts to land use would not be significant.

March ARB. Under the preferred alternative, there would be an increase of 424 acres exposed to CNEL of 65 dB and greater, with 336 of these acres occurring off the installation. The land uses that are newly contained within these noise contours are within industrial areas; there is no residential area included within these contours. Impacts to land use at March ARB as a result of this alternative would be minimal. In general, land uses at March ARB would not be adversely affected by the activities described under the preferred alternative in concert with those described in Section 5.1.1. Project-specific studies would be performed to determine and address any projects that would result in land use conflicts, such as encroachment of airfield safety zones. Cumulative impacts to land use would not be significant.

5.1.1.4 Socioeconomics and Environmental Justice

Fresno-Yosemite IAP. Of the roughly 3,304 persons that would be affected by CNEL above 65 dB under the Preferred Alternative, approximately 2,424 would be minority (73.4 percent). This is an increase of 2.2 percent of minorities affected. The number of low-income persons affected by CNEL greater than 65 dB would be approximately 733 (an increase of 0.7 percent). Overall, the number of persons affected by CNEL of 65 dB and greater would increase under this alternative, and the percentage of minority and low-income persons affected would increase slightly. Under the Preferred Alternative there would be one new Kindergarten through Grade 12 school exposed to aircraft CNEL between 65 dB and 70 dB or above (Scandinavian Middle School). Economic activity associated with proposed construction activities described as a component of this alternative and those shown in Table 5.1-1, such as employment and materials purchasing, would provide short-term economic benefits to the local economy. However, short-term beneficial impacts resulting from construction payrolls and materials purchased would be negligible on a regional scale. As a result, there would be no disproportionate impacts to minority or low-income populations in the vicinity of Fresno-Yosemite IAP as a result of this action in concert with those activities described in Table 5.1-1.

March ARB. Under the preferred alternative, no construction would occur on March ARB. Therefore, there would be no economic activity associated with proposed construction activities as a result of this action. In addition, there would be no change in personnel numbers for March ARB under this alternative. Therefore, there would be no impact to housing or population. The noise contours at March ARB would increase minimally; however, they would not contain any residential areas. As a result, there would be no disproportionate impacts on minority or low-income populations in the vicinity of March ARB as a result of this action in concert with those activities described in Table 5.1-1.

5.1.1.5 Safety

Fresno-Yosemite IAP. Providing new and renovated facilities for the 144 FW that support operational requirements and are properly sited with adequate space and a modernized supporting infrastructure would generally enhance ground and flight safety during required operations, training, maintenance and support procedures, security functions, and other activities conducted by the 144 FW. AT/FP requirements have also been addressed to the extent practicable in all facility construction projects. The fire and crash response capability currently provided by the 144 FW at Fresno-Yosemite IAP is sufficient to meet all requirements. The aircraft conversion and mission change would not increase the number of daily operations flown by the 144 FW. Risk of a catastrophic event occurring during construction activities described under the Proposed Action or those activities described in Table 5.1-1 is considered to be low, and strict adherence to all applicable occupational safety requirements would further minimize the relatively low risk associated with described construction activities. Additionally, facilities at Fresno-Yosemite IAP would be sited in relation to the proposed munitions storage area addition in accordance with USAF Manual 91-201. Cumulative impacts to safety as a result of these actions would be minor.

March ARB. No construction would occur at March ARB under the preferred alternative or as a result of those activities identified in Table 5.1-1. The fire and crash response capability currently provided by the 144 FW at March ARB is sufficient to meet all requirements. No adverse impacts to ground safety are anticipated at the airfield. There would be a minimal increase in airfield operations at March ARB from those previously analyzed. No increase in the safety risk is expected due to the accident and mishap potential associated with aircraft operations. Cumulative impacts to safety would be negligible.

5.1.1.6 Hazardous Materials and Wastes

Fresno-Yosemite IAP. The type of hazardous materials needed for maintenance and operation of the F-15 would be expected to remain similar to those currently used for maintenance and operation of the F-16 fleet; however, the proposed F-15 aircraft would no longer require the use of hydrazine, a highly toxic and unstable compound. Since the F-15 aircraft is a dual engine aircraft (compared with the single engine F-16 aircraft), the throughput of petroleum substances (e.g., fuels, oils) used during operations would be expected to increase from what is currently used to maintain the F-16 fleet. Additionally, it is expected that short-term increases would be realized in terms of the quantity of fuel stored and used during construction activities for this action as well as those listed in Table 5.1-1. None of the proposed construction projects would occur on or in the vicinity of the existing ERP sites within the 144 FW installation. The 144 FW would continue to operate within its small quantity generator hazardous waste permit conditions. Cumulative impacts as a result of the described activities are expected to be minor.

March ARB. Neither the preferred alternative, nor any of the projects listed in Table 5.1-1, includes any ground disturbance through construction at March ARB, and there is no change to the proposed number of operations or type of hazardous materials and wastes generated or stored at March ARB. However, the throughput of petroleum substances (e.g., fuels, oils) used during operations would be expected to increase from what is currently used for the F-16 operations. Further, all scheduled maintenance on the alert aircraft at March ARB is conducted at Fresno-Yosemite IAP. Cumulative impacts as a result of hazardous materials and wastes are expected to be minor.

5.1.1.7 Infrastructure

Fresno-Yosemite IAP. Demand for electricity and natural gas would be expected to increase slightly as a result of the increase in personnel (22) resulting from the preferred alternative. Further, building space and facilities to be constructed as a component of this action as well as those identified in Table 5.1-1 may require additional electricity. In addition, wastewater, solid waste, demand for potable water, and traffic would temporarily increase during construction, and would increase slightly in the long-term due to increase in personnel. The proposed construction and demolition activities could temporarily affect the quality of stormwater runoff through potential increases in soil erosion. BMPs would be implemented during construction and demolition to minimize runoff. Any new facilities and additions associated with these projects would be implemented with more energy efficient design standards and utility systems than are currently in place. In addition, construction projects would incorporate LEED and sustainable development concepts to achieve optimum resource efficiency, sustainability, and energy conservation. In general, cumulative impacts to installation infrastructure as a result of described activities would be expected to be positive over the long-term.

March ARB. The preferred alternative does not include any construction at March ARB, and there is no change to the proposed number of authorized personnel at March ARB. Therefore, there would be no cumulative impacts to infrastructure at March ARB.

5.1.1.8 Earth Resources

Fresno-Yosemite IAP. In addition to the 2.2 acres of surface disturbance that would result from the Proposed Action described under the preferred alternative, additional surface area would be disturbed in the vicinity over the next several years as a result of the projects described above. Implementation of construction BMPs would be used to limit or eliminate soil movement, stabilize erosion, and control sedimentation. These BMPs would include the use of: well-maintained silt fences; minimizing surficial area disturbed; stabilization of cut/fill slopes; minimization of earth-moving activities during wet weather; and use of temporary detention ponds. Following construction, disturbed areas not covered with impervious surfaces would be

reestablished with appropriate vegetation and managed to minimize future erosion potential. The city would be responsible for management practices required for future development of private and local government undertakings. Given the use of engineering practices that would minimize potential erosion, cumulative impacts to earth resources would be expected to be minor.

March ARB. The preferred alternative does not include any construction or other earth disturbing activities at March ARB. Therefore, there would be no cumulative impacts to earth resources at March ARB.

5.1.1.9 Water Resources

Fresno-Yosemite IAP. In addition to the 1.9 acres of increased impervious surface that would result from the Proposed Action, additional land surface would be disturbed and converted to impervious surface over the next several years as a result of the projects described in Table 5.1-1. It is expected that any construction activities would adhere to NPDES requirements including implementation of BMPs described above. As such, cumulative impacts to water resources would be expected to be minor.

March ARB. The preferred alternative does not include any construction or other earth disturbing activities at March ARB. Therefore, there would be no cumulative impacts to water resources at March ARB.

5.1.1.10 Biological Resources

Fresno-Yosemite IAP. Noise levels are expected to increase from baseline with the conversion to the F-15 aircraft. However, these noise levels from operations and construction are not expected to impact wildlife in the area because they are likely accustomed to elevated noise levels associated with current aircraft and military operations. The opportunity for bird-aircraft strikes to occur, including those with migratory birds, would remain the same as baseline. No threatened and endangered or special status species are currently known to reside on Fresno-Yosemite IAP or within the land area under the projected noise contours. Construction-related impacts to the vegetation at the installation and in the vicinity of projects identified in Table 5.1-1 would be minor due to the lack of sensitive vegetation in the project areas. There are no wetland areas that occur within the 144 FW installation. In general, construction activities at the 144 FW installation and at the Fresno-Yosemite IAP would primarily occur on sites that are already highly altered by man. These impacts would include the removal of some vegetation and associated wildlife habitat. However, wildlife that uses these areas is typical of urban and suburban areas. No impacts to any federally or state threatened, endangered, or special status species is expected as a result of the preferred alternative. Cumulative impacts to biological resources would be minor.

March ARB. The SKR has not been observed at March ARB since 2000, suggesting that this species no longer inhabits this area. The Burrowing Owl, which is listed as a California Species of Concern has been observed within March ARB. However no ground disturbance would occur as a result of the preferred alternative or any of those projects identified in Table 5.1-1. Noise from operations would be expected to increase slightly from baseline; however, these noise levels are not expected to impact wildlife and special status species in the area because they are likely accustomed to elevated noise levels associated with aircraft and military operations. Cumulative impacts to biological resources would be expected to be minor.

5.1.1.11 Cultural Resources

Fresno-Yosemite IAP. As a result of the 2010 Integrated Cultural Resources Management Plan (144 FW 2010a), the 144 FW installation is considered to have no to low probability of containing archaeological resources. In the unlikely event that archaeological or human remains were identified during proposed construction activities associated with the Preferred Alternative or any of the projects listed in Table 5.1-1, activities would immediately cease in the area of the discovery and appropriate personnel would contact a qualified archaeologist to evaluate the discovery. No architectural resources have been identified to date at the 144 FW. Under the Preferred Alternative, none of the buildings proposed for demolition (Building 160) or addition (Buildings 121 and 2640) have been reviewed for NRHP eligibility as they have been too recently constructed, and they were not recommended for survey or evaluation in the 2010 Integrated Cultural Resources Management Plan. As the Southeast Growth Area continues to develop, the City of Fresno would need to complete appropriate consultation. Cumulative impacts to cultural resources would be expected to be minor.

March ARB. There is no proposed surface disturbance/construction at March ARB. The change in noise contours is nominal and does not contain any sensitive areas. There would be no cumulative impacts to cultural resources.

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CHAPTER 6
SPECIAL OPERATING PROCEDURES

To minimize potential environmental effects determined to result from the alternatives presented in this EIS, the following special operating procedures will be completed by knowledgeable, responsible personnel from the 144 FW, Fresno-Yosemite IAP, and/or FAA, working through the appropriate federal, state, and local agencies.

Special Operating Procedures:

- The Final Conformity Determination ensures that the Preferred Alternative conforms to the SIP.
- Based on other non-related actions at Fresno-Yosemite IAP, FAA will initiate an updated Part 150 Study that will determine appropriate mitigation for newly affected areas within the noise contours, if appropriate. The USAF does not have authority to expend appropriated funds on facilities that are not under the control of the USAF. However, Congress provides funding to the FAA for off-airport noise mitigation through Part 150, which was promulgated under the authority of the Aviation Safety and Noise Abatement Act of 1979.
- A NOI must be filed with the USEPA to obtain coverage under the Construction General Permit (General Permit No. CAS000002) prior to implementation of individual projects.
- A site-specific SWPPP and associated BMPs would be prepared for any change in the quality or quantity of wastewater discharge and/or stormwater runoff from construction sites where one or more acres would be disturbed.
- Construction BMPs would be employed during construction activities to minimize soil movement, stabilize runoff, and generally control sedimentation. These BMPs will include, but not be limited to: the development of a project specific SWPPP; regular and documented site inspections; the installation of silt fencing and sediment traps; minimizing surficial area disturbed at any given moment; stabilization of cut/fill slopes; minimization of earth-moving activities during wet weather; use of temporary detention ponds; application of water sprays to keep soil from becoming airborne; and revegetation of disturbed areas as soon as possible, as appropriate.
- The 144 FW would obtain any required permits, approvals, or certifications prior to implementing construction or demolition activities. Any special procedures or methods required by permits or approvals would be implemented.

- Personnel conducting construction and/or demolition activities will strictly adhere to all applicable occupational safety requirements during construction activities.

- If necessary, sampling for ACM and LBP would occur prior to demolition activities for those buildings not previously tested and materials would be handled in accordance with USAF policy. If ACM or LBP are present, the 144 FW would employ appropriately trained and licensed contractors to perform the ACM and/or LBP removal work and would notify the construction contractors of the presence of ACM and/or LBP so that appropriate precautions could be taken to protect the health and safety of the workers.

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Sample IICEP Letter

NATIONAL GUARD BUREAU
3501 FETCHET AVENUE
JOINT BASE ANDREWS MD 20762-5157

NGB/A7AM 12 Jul 11

The Honorable Barbara Boxer
112 Hart Senate Office Building
Washington, DC 20510

Dear Senator Boxer

The National Guard Bureau (NGB) proposes to implement an aircraft conversion for the 144th Fighter Wing (144 FW), California Air National Guard, at Fresno-Yosemite International Airport (IAP) in Fresno, California. The 144 FW currently flies and maintains 18 F-16 Fighting Falcon aircraft. The proposal is to convert the unit from the F-16 Fighting Falcon aircraft and operations to the F-15 Eagle aircraft and operations at Fresno-Yosemite IAP; the proposal would also include Detachment 1 based at March Air Reserve Base (ARB), in Moreno Valley, California. Associated with the proposal, there would be a minor increase of personnel based at the 144 FW installation in Fresno. In addition, the 144 FW would implement construction projects associated with the aircraft conversion and their base master plan. There are currently two action alternatives being evaluated based on the number of F-15 aircraft to be assigned and operated at the installation (18 versus 24). Additionally, the No Action Alternative will be evaluated.

The 144 FW currently provides support for federal, state, and community interests by maintaining highly trained, well-equipped, military forces that provide combat-ready support elements in response to wartime and peacetime tasking; protecting life and property; and preserving peace, order, and public safety. This mission would continue should the proposal be implemented.

The NGB Asset Management Division, Plans and Requirements Branch requires investigation and analysis of environmental issues and potential effects that could result from implementation of this action. As part of the environmental impact analysis process, the NGB and the 144 FW request your comments on this proposal. Preliminary assessment of the airport and surrounding areas suggests there is potential for adverse environmental consequences with respect to elevated noise levels and air quality. Your input on these or other related issues that we have not identified would be appreciated.

Sample IICEP Letter

Page 2

The NGB invites you to attend the public scoping meetings on Tuesday, August 2, 2011 at either 2-4 p.m. or 6-9 p.m. in Fresno, California; and Thursday, August 4, 2011 at 2-4 p.m. or 6-9 p.m. in Moreno Valley, California. For your convenience, the NGB has set aside the 2-4 p.m. sessions for local, state, and federal agencies to attend, although you are also welcome at the 6-9 p.m. session if that meets with your schedule better. The addresses for the public scoping meetings are:

Scoping Meeting #1 **Tuesday, August 2, 2011** **2-4 p.m. and 6-9 p.m.** Piccadilly Inn Grand Californian Ballroom 1515 E. McKinley Avenue Fresno, CA	**Scoping Meeting #2** **Thursday, August 4, 2011** **2-4 p.m. and 6-9 p.m.** TownGate Community Center 13100 Arbor Park Lane Moreno Valley, CA

Thank you for your consideration and I look forward to your reply. My telephone number and email are (301) 836-8859 and Robert.Dogan@ang.af.mil. On or about July 21, 2011 my telephone number will be changing to (240) 612-8859.

Sincerely

ROBERT L. DOGAN, GS-13, REM
Plans and Requirements Branch

Distribution:

The Honorable Barbara Boxer
112 Hart Senate Office Building
Washington, DC 20510

The Honorable Dianne Feinstein
331 Hart Senate Office Building
Washington, DC 20510

The Honorable Joe Baca
2355 Rayburn House Office Building
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Karen Goebel
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Sample IICEP Letter

NATIONAL GUARD BUREAU
3501 FETCHET AVENUE
JOINT BASE ANDREWS MD 20762-5157

NGB/A7AM 29 Aug 11

The Honorable Barbara Boxer
112 Hart Senate Office Building
Washington, DC 20510

Dear Senator Boxer

Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended (42 United States Code [USC] 4321, et seq.), the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations [CFR] Parts 1500-1508), and Air Force policy and procedures (32 CFR Part 989), the National Guard Bureau (NGB) is preparing an Environmental Impact Statement (EIS). The EIS will evaluate the potential environmental consequences that could result from the proposed aircraft conversion for the 144th Fighter Wing (144 FW), California Air National Guard, at Fresno-Yosemite International Airport (IAP) in Fresno, California.

The 144 FW currently flies and maintains 18 F-16 Fighting Falcon aircraft. The proposal is to convert the unit from the F-16 Fighting Falcon aircraft and operations to the F-15 Eagle aircraft and operations at Fresno-Yosemite IAP; the proposal would also include Detachment 1 based at March Air Reserve Base (ARB), in Moreno Valley, California. Associated with the proposal, there would be a minor increase of personnel based at the 144 FW installation in Fresno. In addition, the 144 FW would implement construction projects associated with the aircraft conversion and their base master plan. There are currently two action alternatives being evaluated based on the number of F-15 aircraft to be assigned and operated at the installation (18 versus 24). Additionally, the No Action Alternative will be evaluated.

Included as an attachment with this letter is a CD that contains the first two chapters of the EIS: the purpose and need for the action, and the Description of the Proposed Action and Alternatives (DOPAA). We invite you to review these two chapters and provide comments. Your comments are important to us, in that they will help us to identify potential issues associated with implementation of the proposal.

The NGB previously sent you a letter indicating that the scoping meeting was to be held Tuesday, August 2, 2011 at both 2-4 p.m. and 6-9 p.m. in Fresno, California; and Thursday, August 4, 2011 at 2-4 p.m. and 6-9 p.m. in Moreno Valley, California. This letter also documented that the formal scoping period was July 15 through August 19, 2011. Notices for the scoping meetings were posted and published in the *Fresno Bee*, the *Press Enterprise*, and the *March Air Reserve Base Beacon* newspapers. If you would like the NGB to consider your comments for inclusion in the Draft EIS, please forward your comments to me at NGB/A7AM, Shepperd Hall, 3501 Fetchet Avenue, Joint Base Andrews MD 20762-5157 or email to

Sample IICEP Letter

ang.env.comments@ang.af.mil. Please send your comments to me no later than September 16, 2011.

Thank you for your consideration and I look forward to your reply. My telephone number is (301) 836-8859 (phone number is expected to change in September 2011 to (240) 612-8859).

Sincerely

ROBERT L. DOGAN, GS-13, REM
Plans and Requirements Branch

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NATIONAL GUARD BUREAU
3501 FETCHET AVENUE
JOINT BASE ANDREWS MD 20762-5157

NGB/A7AM 17 Jan 12

Milford Wayne Donaldson, PhD
State Historic Preservation Officer
California Office of Historic Preservation
1725 23rd Street, Suite 100
Sacramento, CA 95816

SUBJECT: SECTION 106 CONSULTATION FOR IMPLEMENTATION OF AIRCRAFT CONVERSION FOR THE 144TH FIGHTER WING, CALIFORNIA AIR NATIONAL GUARD, AT FRESNO-YOSEMITE INTERNATIONAL AIRPORT, IN FRESNO, CALIFORNIA.

Dear Dr. Donaldson

The National Guard Bureau (NGB) is preparing an Environmental Impact Statement (EIS) under the National Environmental Policy Act (NEPA) for the implementation of an aircraft conversion for the 144th Fighter Wing (144 FW), California Air National Guard, at Fresno-Yosemite International Airport (IAP) in Fresno, California (referred to herein as the "Undertaking"). This correspondence is provided to initiate consultation with your office, pursuant to 36 Code of Federal Regulations (CFR) 800.3 for the Undertaking. Section 106 consultation for this project will be parallel to, but conducted separately from the EIS.

The 144 FW currently flies and maintains 18 F-16 Fighting Falcon Aircraft. The proposal is to convert the unit from the F-16 Fighting Falcon to the F-15 Eagle aircraft at Fresno-Yosemite IAP; the proposal would also include Detachment 1 based at March Air Reserve Base (ARB) in Moreno Valley, California. As part of the proposal, there would be a minor increase in personnel at the 144 FW. In addition, the 144 FW would implement construction projects associated with the aircraft conversion, which would be included in the base master plan at Fresno-Yosemite IAP; there is no construction proposed at March ARB. There are currently two action alternatives being evaluated based on the number of F-15 aircraft to be assigned and operated at the installation (18 versus 24). Additionally, the No Action Alternative is also being evaluated.

Proposed construction renovation, and demolition projects would be the same under both action alternatives. Under Alternatives #1 and #2, additions would be constructed onto two existing buildings (121 and 2640) and one building would be demolished (160). None of these buildings are considered eligible for listing on the National Register for Historic Preservation (NRHP) as they are not 50 years in age and are not Cold War-era facilities. Building 121 was constructed in 1993, Building 160 in 1996, and Building 2640 in 1994. Additions to the buildings would have the same appearance as nearby structures. The 144 FW has been surveyed

for archaeological resources and none were encountered. Therefore, there would be no adverse effects to historic properties as a result of implementation of Alternatives #1 and #2.

The NGB is in the process of consulting with federally recognized and non-federally recognized American Indian Tribes concerning the Undertaking (Attachment 1). It is considered unlikely that traditional resources will be identified on the 144 FW installation; however, should traditional resources be identified by any American Indian Tribe or group, an amended consultation letter will be sent to the California Office of Historic Preservation.

Considering that no sites or buildings considered eligible for the NRHP would be affected by the proposed project, the Air Force has determined that the Undertaking would result in "No Historic Properties Affected."

We are also contacting the public and relevant regional Archaeological Society offices both through the NEPA process and through Section 106 of the National Historic Preservation Act (NHPA). All comments we receive, and any concerns expressed to the NGB, will be taken into consideration while planning for this undertaking. Please send your concurrence with this determination to Robert Dogan at the email address listed below.

If you have any questions regarding this consultation please contact me. I can be reached at (240) 612-8859 or Robert.Dogan@ang.af.mil.

Sincerely

ROBERT L. DOGAN, GS-13, REM
Plans and Requirements Branch

Attachment: Federally Recognized and Non-Federally Recognized Tribes

Federally Recognized and Non-Federally Recognized Tribes

Federally Recognized Tribes

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Sample Tribal Letter

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 144TH FIGHTER WING (ACC) (ANG)
FRESNO AIR NATIONAL GUARD BASE CALIFORNIA

18 Jan 12

Ruben Barrios
Chairman
Santa Rosa Rancheria Tachi Yokut Tribe
P.O. Box 8
Lemoore, CA 93245

Dear Mr. Barrios

The National Guard Bureau (NGB) is preparing an Environmental Impact Statement under the National Environmental Policy Act (NEPA) for the implementation of an aircraft conversion for the 144th Fighter Wing (144 FW), California Air National Guard, at Fresno-Yosemite International Airport (IAP) in Fresno, California. The 144 FW currently flies and maintains 18 F-16 Fighting Falcon aircraft. The proposal is to convert the unit from the F-16 Fighting Falcon aircraft to the F-15 Eagle aircraft at Fresno-Yosemite IAP; the proposal would also include replacement of three alert F-16s with three alert F-15 aircraft based at March Air Reserve Base (ARB) in Moreno Valley, California. As part of the proposal, there would be a minor increase in personnel at the 144 FW. In addition, the 144 FW would implement construction projects associated with the aircraft conversion, which would be included in the base master plan at Fresno-Yosemite IAP; there is no construction proposed at March ARB. There are currently two action alternatives being evaluated based on the number of F-15 aircraft to be assigned and operated at the installation (18 versus 24). Additionally, the No Action Alternative is also being evaluated.

Currently, the 144 FW flies approximately 2,600 annual sortie operations in the airspace, of which approximately 90 percent is conducted at high altitude above 5,000 feet above ground level (AGL) and 10 percent conducted below 5,000 AGL, with the largest majority in the Warning Areas overwater and in the Restricted Area at the China Lake Complex. There would be no change to the frequency of use, duration of use, or number of operations conducted in any of the airspace.

In accordance with Executive Order 13175 and Section 106 of the National Historic Preservation Act (NHPA) (36 CFR Parts 800.2, 800.3, and 800.4) the NGB would like to initiate government-to-government consultation regarding the aircraft conversion. The NGB would like to discuss the proposal in detail with you, and to understand and consider any comments, concerns, and suggestions you may have. In particular, the NGB requests your input as to the status of any traditional resources that may be located on the installation (see attached map). The 144 FW has been surveyed for archaeological resources and none have been identified.

Sample Tribal Letter

Page 2

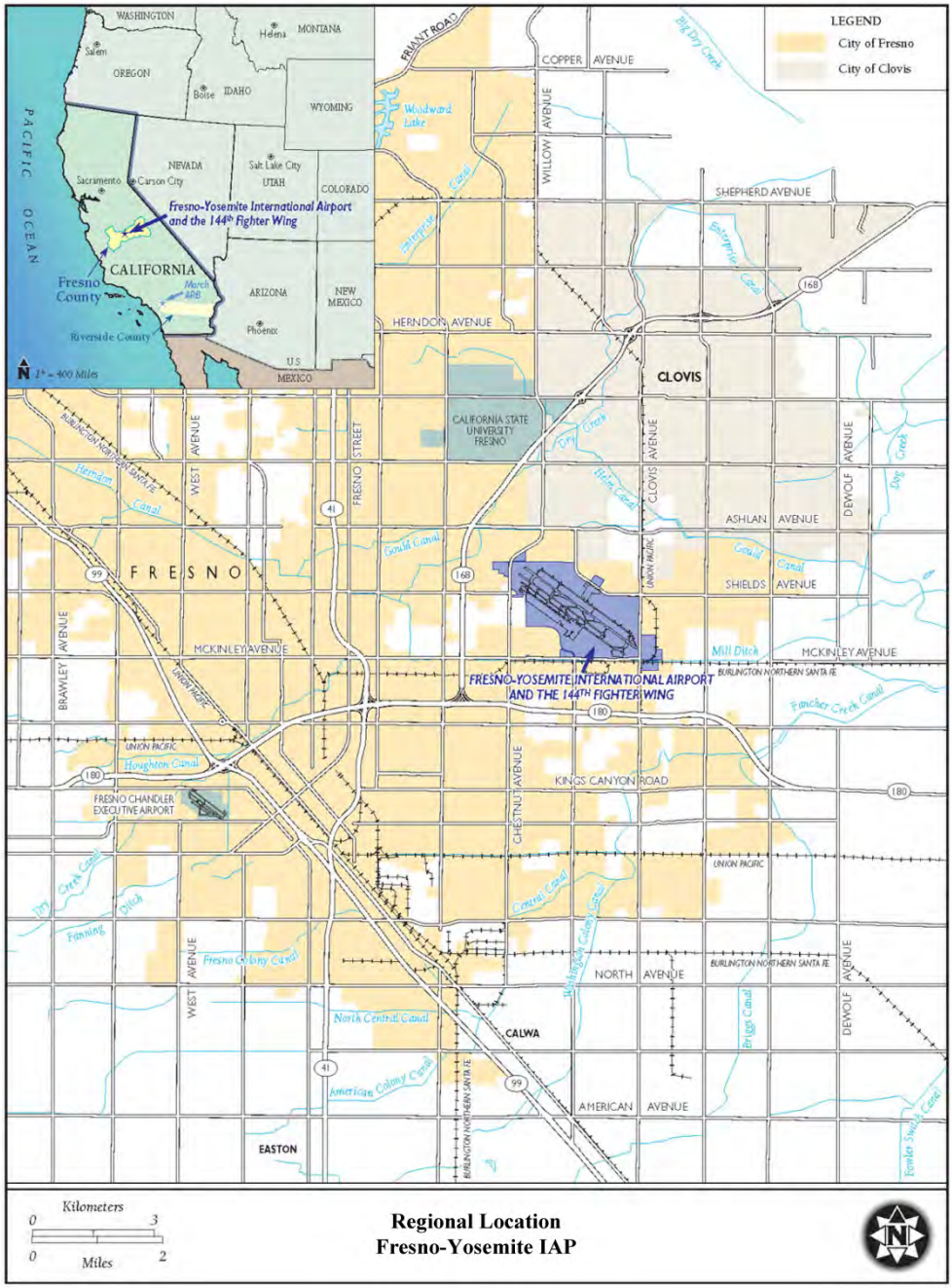
Please let us know when you would like to meet to discuss the aircraft conversion proposal and your expectations on how we will accomplish the consultations. You may contact Capt. Jennifer Piggott at (559) 288-2736 or via email at jennifer.piggott@ang.af.mil. You also may request an individual or group meeting with your Tribe.

We look forward to working with the Santa Rosa Rancheria Tachi Yokut Tribe in the NEPA, NHPA Section 106 and government-to-government consultation processes.

Sincerely,

SAMI D. SAID, Colonel, CA ANG
Commander, 144th Fighter Wing

Sample Tribal Letter



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David Alvarez
Chairperson
Traditional Choinumni Tribe
2415 E Houston Ave
Fresno, CA 93720

Sample Draft EIS Transmittal

NATIONAL GUARD BUREAU
3501 FETCHET AVENUE
JOINT BASE ANDREWS MD 20762-5157

NGB/A7AM 4 May 2012

The Honorable Barbara Boxer
112 Hart Senate Office Building
Washington, DC 20510

Dear Senator Boxer

Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended (42 USC 4321, *et seq.*), the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (40 CFR Parts 1500-1508), and Air Force policy and procedures AFI 32-7061 (as promulgated at 32 CFR Part 989), the National Guard Bureau (NGB) has made available for public review and comment a Draft EIS for the proposed conversion of F-16 Fighting Falcon aircraft and operations to the F-15 Eagle aircraft and operations for the 144th Fighter Wing (144 FW) at Fresno-Yosemite International Airport (IAP) in Fresno, California and the 144 FW Detachment 1 at March Air Reserve Base (ARB) in Moreno Valley, California.

The Draft EIS has evaluated the potential direct, indirect, and cumulative environmental effects associated with noise, air quality, land use, socioeconomics and environmental justice, safety, hazardous materials and wastes, infrastructure, earth resources, water resources, biological resources, and cultural resources. The analysis includes potential environmental consequences associated with two action alternatives: a conversion from 18 F-16 Primary Assigned Aircraft (PAA) to 18 F-15 PAA and a conversion from 18 F-16 PAA to 24 F-15 PAA. The No Action Alternative has also been analyzed.

The NGB would also like to invite you to participate in the public hearings, which will be held on June 5, 2012 at the Moreno Valley Conference and Recreation Center, Grand Valley Ballroom in Moreno Valley from 6 to 9 p.m., and on June 7, 2012 at the Piccadilly Inn Grand Californian Ballroom in Fresno. Notices of the public hearings were also published in the *Fresno Bee*, the *Press Enterprise*, and the *March Air Reserve Base Beacon* newspapers on May 11, 2012 and again on June 3, 2012. If you would like the NGB to consider your comments for inclusion in the Final EIS, please forward your written comments to me at NGB/A7AM, Shepperd Hall, 3501 Fetchet Avenue, Andrews AFB MD 20762-5157 or fax to (240) 612-7696 no later than June 25, 2012.

Sample Draft EIS Transmittal

Page 2

The Executive Summary to the Draft EIS and a compact disk that contains the document in its entirety are included as attachments to this letter. We invite you to review the Draft EIS and provide comments no later than June 25, 2012. Also attached to this letter is a copy of Fact Sheet #3, which explains more about the project and the time and location of the public hearings.

Thank you for your consideration and I look forward to your reply.

Sincerely

ROBERT L. DOGAN, GS-13, REM
Plans and Requirements Branch

Attachments:
Draft Environmental Impact Statement/Executive Summary
Fact Sheet #3

Distribution:

The Honorable Barbara Boxer
112 Hart Senate Office Building
Washington, DC 20510

The Honorable Dianne Feinstein
331 Hart Senate Office Building
Washington, DC 20510

The Honorable Joe Baca
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Ecological Field Services Field Office
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Carlsbad, CA 92011-4219

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San Joaquin Valley Branch Service
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Sacramento District Planning Division
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Governor's Office
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The Honorable Tom Berryhill
California State Senate
State Capitol, Room 3076
Sacramento, CA 95814

The Honorable Bill Emmerson
California State Senate
State Capitol, Room 4082
Sacramento, CA 95814

The Honorable Brian Nestande
California State Assembly
State Capitol, Room 4139
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The Honorable Linda Halderman
California State Assembly
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Sample Tribal Draft EIS Transmittal

NATIONAL GUARD BUREAU
3501 FETCHET AVENUE
JOINT BASE ANDREWS MD 20762-5157

NGB/A7AM 4 May 2012

Robert Pennell
Co-Chairperson
Table Mountain Rancheria
P.O. Box 410
Friant, CA 93626-0177

Dear Mr. Pennell

Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended (42 USC 4321, *et seq*.), the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (40 CFR Parts 1500-1508), and Air Force policy and procedures AFI 32-7061 (as promulgated at 32 CFR Part 989), the National Guard Bureau (NGB) has made available for public review and comment a Draft EIS for the proposed conversion of F-16 Fighting Falcon aircraft and operations to the F-15 Eagle aircraft and operations for the 144th Fighter Wing (144 FW) at Fresno-Yosemite International Airport (IAP) in Fresno, California and the 144 FW Detachment 1 at March Air Reserve Base (ARB) in Moreno Valley, California.

The Draft EIS has evaluated the potential direct, indirect, and cumulative environmental effects associated with noise, air quality, land use, socioeconomics and environmental justice, safety, hazardous materials and wastes, infrastructure, earth resources, water resources, biological resources, and cultural resources. The analysis includes potential environmental consequences associated with two action alternatives: a conversion from 18 F-16 Primary Assigned Aircraft (PAA) to 18 F-15 PAA and a conversion from 18 F-16 PAA to 24 F-15 PAA. The No Action Alternative has also been analyzed.

In accordance with NEPA, Section 106 of the National Historic Preservation Act (NHPA) (16 U.S.C. 470, Title 36, Code of Federal Regulations, Part 800); Executive Order 13175, *Consultation and Coordination with Indian Tribal Governments;* and U.S. Department of Defense (DoD) Instruction 4710.02, *DoD Interactions with Federally-Recognized Tribes* the NGB desires to discuss the proposal in detail with you to understand and consider comments, concerns, and suggestions you may have as a result of government-to-government consultation regarding this aircraft conversion.

Sample Tribal Draft EIS Transmittal

Page 2

The NGB would also like to invite you to participate in the public hearings, which will be held on June 5, 2012 at the Moreno Valley Conference and Recreation Center, Grand Valley Ballroom in Moreno Valley from 6 to 9 p.m., and on June 7, 2012 at the Piccadilly Inn Grand Californian Ballroom in Fresno. If you would like the NGB to consider your comments for inclusion in the Final EIS, please forward your written comments to me at NGB/A7AM, Shepperd Hall, 3501 Fetchet Avenue, Andrews AFB MD 20762-5157 or fax to (240) 612-7696 no later than June 25, 2012. In addition, should you wish to meet with us, we would be available during the day on June 5 and June 7, 2012.

The Executive Summary to the Draft EIS and a compact disk that contains the document in its entirety are included as attachments to this letter. We invite you to review the Draft EIS and provide comments no later than June 25, 2012**.** Also attached to this letter is Fact Sheet #3, which explains more about the project and the time and location of the public hearings. Please let us know when you would like to meet to discuss the aircraft conversion proposal and your expectations on how we will accomplish the consultations. You may contact me at (240) 612-8859 or via email at Robert.Dogan@ang.af.mil. You also may request an individual or group meeting with your Tribe.

Should you not be able to meet with us to express your concerns at this time, you may submit your written comments and they will be considered in preparation of the Final EIS. You may also follow the progress of the process on the website at www.eis144fw.com. Please let us know if you wish to have a copy of the Final EIS for your files.

We look forward to working with the Table Mountain Rancheria Tribe in the NEPA, NHPA Section 106, and government-to-government consultation processes. Thank you for your consideration and I look forward to your reply.

Sincerely

ROBERT L. DOGAN, GS-13, REM
Plans and Requirements Branch

Attachments:
Draft Environmental Impact Statement/Executive Summary
Fact Sheet #3

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Pala Band Of
Mission Indians

Cupa Cultural Center

PMB 445
35008 Pala Temecula Road
Pala, CA 92059

Tel. (760) 891-3590
Fax (760) 742-4543

July 27, 2011

Robert Dogam
National Guard Bureau
3501 Fetchet Ave
Joint Base Andrews MD 20762-5157

Re: Scoping Meeting Fresno- Yosemite International Airport

Dear Mr. Dogam,

The Pala Band of Mission Indians Tribal Historic Preservation Office has received your notification of the project referenced above. This letter constitutes our response on behalf of Robert Smith, Tribal Chairman.

We have consulted our maps and determined that the project as described is not within the boundaries of the recognized Pala Indian Reservation. The project is also beyond the boundaries of the territory that the tribe considers its Traditional Use Area (TUA). Therefore, we have no objection to the continuation of project activities as currently planned and we defer to the wishes of Tribes in closer proximity to the project area.

We appreciate involvement with your initiative and look forward to working with you on future efforts. If you have questions or need additional information, please do not hesitate to contact me by telephone at 760-891-3515 or by e-mail at sgaughen@palatribe.com.

Sincerely,

Shasta C. Gaughen, PhD
Tribal Historic Preservation Officer
Pala Band of Mission Indians

ATTENTION: THE PALA TRIBAL HISTORIC PRESERVATION OFFICE IS RESPONSIBLE FOR ALL REQUESTS FOR CONSULTATION. PLEASE ADDRESS CORRESPONDENCE TO **SHASTA C. GAUGHEN** AT THE ABOVE ADDRESS. IT IS NOT NECESSARY TO ALSO SEND NOTICES TO PALA TRIBAL CHAIRMAN ROBERT SMITH.

San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT

HEALTHY AIR LIVING™

July 28, 2011

Robert Dogan
National Guard Bureau
3501 Fetchet Avenue
Joint Base Andrews, MD 20762-5157

Project: Aircraft conversion for the 144th Fighter Wing (144 FW), California Air National Guard, Fresno, CA

District CEQA Reference No: 20110284

Dear Mr. Dogan:

The San Joaquin Valley Unified Air Pollution Control District (District) has reviewed the project referenced above consisting of the 144th Fighter Wing of the California Air National Guards' aircraft conversion from F-16 Fighting Falcon aircraft to F-15 Eagle aircraft at Fresno-Yosemite International Airport in Fresno, CA. The District has no comment at this time. However, the District looks forwards to reviewing the project when more information is available.

If you have any questions or require further information, please call Georgia Stewart at (559) 230-5937.

Sincerely,

David Warner
Director of Permit Services

Georgia Stewart

for Arnaud Marjollet
Permit Services Manager

DW: gs

Cc: File

Seyed Sadredin
Executive Director/Air Pollution Control Officer

Northern Region
4800 Enterprise Way
Modesto, CA 95356-8718
Tel: (209) 557-6400 FAX: (209) 557-6475

Central Region (Main Office)
1990 E. Gettysburg Avenue
Fresno, CA 93726-0244
Tel: (559) 230-6000 FAX: (559) 230-6061

Southern Region
34946 Flyover Court
Bakersfield, CA 93308-9725
Tel: 661-392-5500 FAX: 661-392-5585

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CITY OF RIVERSIDE

Community Development
Department
Planning Division

July 29, 2011

Robert Dogan, GS-13, REM
Plans and Requirements Branch
National Guard Bureau
3501 Fetchet Avenue
Joint Base Andrews, MD 20762-5157

SUBJECT: National Guard Bureau (NGB) 144th Fighter Wing Aircraft Conversion at the Fresno International Airport (IAP) including Detachment 1 at March Air Reserve Base (MARB)

Dear Mr. Dogan:

Thank you for the opportunity to comment on the National Guard's proposal to implement aircraft conversion for the 144th Fighter Wing (144 FW), California Air National Guard, at Fresno-Yosemite International Airport (IAP) in Fresno, CA and which also includes conversion of Detachment 1 at March Air Reserve Base (MARB). The proposal is to convert eighteen existing F-16 Fighting Falcon aircraft and operations to the F-15 Eagle aircraft. City staff is aware that there are two action alternatives being evaluated based on number of aircraft to be assigned and operated at the installation (18 versus 24 aircraft) as well as a "no action" alternative.

The July 12, 2011, National Guard Bureau letter notifying the City of the proposal states that "the preliminary assessment of the airport and surrounding areas suggests there is potential for adverse environmental consequences with respect to elevated noise levels and air quality." It is not clear in the letter what type of environmental document will be prepared but after further inquiry, our understanding is that it will be an Environmental Impact Statement (EIS) per the National Environmental Policy Act (NEPA)). Based on this preliminary analysis, City staff offers the following comments to be addressed in the forthcoming environmental analysis specifically concerning the environmental impacts associated with the conversion of Detachment 1 at MARB:

- A complete and clear project description of the conversion of Detachment 1 at the MARB is currently unavailable yet it is vital information needed to even begin analyzing the environmental impacts to surrounding areas. The forthcoming environmental document needs to clearly indicate the nature of the existing Detachment 1 operations at MARB in terms of location, number of planes, type of planes, personnel, operations and facilities as they currently exist and clearly and specifically state what will be changing. If the project is simply a change in the type of aircraft, how many aircraft? Will there be additional aircraft, more operations, more flights, etc.?

3900 Main Street • Riverside, CA 92522 • 951.826.5371 • fax 951.826.5981 • www.riversideca.gov

- Noise and air quality impacts to the City of Riverside, especially impacts to nearby residents and other sensitive receptors need to be fully analyzed and impacts need to be mitigated or avoided. The noise study needs to adequately show how noise contours will change with the proposal comparing existing noise contours to new noise contours based on change in aircraft.

- The proposed environmental document needs to carefully evaluate how potential land use conflicts and incompatibilities due to changes in operations at the MARB will impact the long term economic viability of the MARB and surrounding areas.

City staff appreciates your consideration of these comments and looks forward to future collaboration on this issue. Please forward any subsequent documents related to this project to the City of Riverside Planning Division for review. Should you have any questions regarding this letter, please feel free to contact Doug Darnell, Senior Planner, at (951) 826-5219 or ddarnell@riversideca.gov.

Sincerely,

Ken Gutierrez, AICP
Planning Director

c: Ronald Loveridge, Mayor
Riverside City Council Members
Brad Hudson, City Manager
Deanna Lorson, Assistant City Manager
Belinda Graham, Assistant City Manager
Kristi Smith, Supervising Deputy City Attorney
Scott Barber, Community Development Director

G:\GENPLAN\Agency Comments\Airports\March\National Guard 144th Fighter Wing Conversion\Comment Letter.doc

From: Dogan, Robert L CIV USAF ANG NGB/A7AM [mailto:robert.dogan@ang.af.mil]
Sent: Monday, August 08, 2011 12:31 PM
To: 'Anna Hoover'
Subject: RE: Project notice for implementation of 144FW (rcvd11728)

Ms. Hoover

Please pardon the delay in responding. I have been out of the office since July 28, 2011.

We do not anticipate any increase in personnel at the 144th Fighter Wing (144 FW), Detachment 1 (Det 1) located on March ARB near Moreno Valley, CA. Maintenance on 144 FW aircraft is accomplished at the home station in Fresno, CA. The Det 1 aircraft are on alert at March AFB. The Det 1 aircraft are periodically rotated out and replace with other 144 FW aircraft when maintenance is required.

Please email or call if you have additional questions or would to discuss aspects of the proposed action.

Respectfully yours,

ROBERT L. DOGAN, REM
Voice/Fax: (301) 836-8859 or DSN 278-8859
*****EXPECTED TO CHANGE IN SEPTEMBER 2011 TO TO*****
(240) 612-8859 or DSN 612-8859

From: Anna Hoover [mailto:ahoover@pechanga-nsn.gov]
Sent: Friday, July 29, 2011 2:09 PM
To: Dogan, Robert L CIV USAF ANG NGB/A7AM
Subject: Project notice for implementation of 144FW (rcvd11728)

Mr. Dogan,
The Pechanga Tribe has received a copy of the notice of the above named Project and appreciates being notified of the actions being taken. The notice indicates that there will be an increase in base personnel and implementation of construction projects associated with the base conversion in Fresno but it is not clear whether this will also be occurring in Moreno Valley. Can you please clarify? Thank you!

Anna M. Hoover
Cultural Analyst
Pechanga Band of Luiseno Mission Indians
P.O. Box 2183
Temecula, CA 92593

951-770-8104 (O)
951-694-0446 (F)
951-757-6139 (C)
ahoover@pechanga-nsn.gov

MARCH JOINT POWERS AUTHORITY

August 8, 2011

Robert Dogan, NGB/A7AM
Shepperd Hall
3501 Fletchet Avenue
Joint Base Andrews, Maryland 20762-5157

SUBJECT: Comments on the NOI to Prepare an EIS for the Proposed Conversion to the F-15 Aircraft for the 144th Fighter Wing, California Air National Guard at Fresno-Yosemite International Airport, Fresno, CA.

Dear Mr. Dogan:

The March Joint Powers Authority (March JPA) appreciates the opportunity to review and respond to the above-referenced NOI to prepare an EIS for the proposed conversion of the F-16 Fighting Falcon aircraft to the F-15 Eagle aircraft for the 144th Fighter of the Air National Guard, stationed at Fresno-Yosemite International Airport and March Air Reserve Base. March JPA staff attended the August 4th public meeting in Moreno Valley, and had the opportunity to meet with Mr. William Wear of the environmental consulting team working on the EIS.

The March JPA is the federally recognized base re-use authority for the former active duty March Air Force Base. March JPA has entered into a Joint Use Agreement with the US Air Force for the use of certain flying facilities at March ARB. March JPA is currently processing a project and associated Environmental Impact Report (EIR) for the development of a new general aviation facility on March JPA property located at the south end of the runway that will also utilize March ARB flying facilities.

As staff discussed with Mr. Wear, the March JPA is requesting that the environmental consultants preparing the EIS for the F-15 Conversion coordinate with our March JPA consultant on information regarding our general aviation project as it affects the EIS preparation. The contact for our March JPA consultant is Steve Alverson, National Director of ESA Airports located in Sacramento. His contact information is as follows:

Steve R. Alverson, National Director
ESA Airports
2600 Capitol Avenue
Sacramento, CA 95816
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E-MAIL: invest@marchjpa.com ★ WEBSITE: www.marchjpa.com

Again, we thank you for the opportunity to meet with your consultants regarding this project, and should you have any further questions do not hesitate to contact me at 951-656-7000 or fairbanks@marchjpa.com.

Sincerely,

Dan Fairbanks, AICP
Planning Director

Cc: William Wear, Senior Project Manager

Mark Scott
City Manager

August 19, 2011

Robert Dogan, NGB/A7AM
Shepperd Hall
3510 Fetchet Avenue
Joint Base Andrews, MD 20762-5157

Re: Notice of Intent for the Environmental Impact Statement for 144th Fighter Wing F15 Conversion at Fresno Yosemite International Airport

Dear Mr. Dogan:

The City of Fresno has reviewed the U.S. Department of Defense, Notice of Intent to prepare an Environmental Impact Statement for the proposed conversion to F-15 aircraft for the 144th Fighter Wing (Proposed Action). Please find our comments below, for consideration in the EIS. As with all significant impacts, the EIS should include a discussion of the means to adequately mitigate these adverse environmental impacts at and around Fresno Yosemite International Airport (FYI) as required by NEPA.

NOISE

1. FYI/Federal Aviation Administration (FAA) sponsored Noise Compatibility Program (NCP)

Since 1990 the City of Fresno has implemented a FAA approved Noise Compatibility Program (NCP), which was updated most recently in 2008 through Title 14 of the Code of Federal Regulations Part 150 (14 CFR Part 150). The NCP includes a number of noise abatement measures and land use elements, including acoustic treatment of homes and schools, known as the Sound Mitigation Acoustic Remedy Treatment (SMART) Program, to improve land use compatibility around FYI. Currently the implementation of the NCP measures are constrained to the areas defined by noise exposure contours provided in the FAA approved Noise Exposure Map (NEM) for the year of 2009. A NEM does not represent noise that is actually heard. Instead, it represents a weighted average of noise over a 24 hour period based on annual aircraft operations at the Airport, and is used to define, (i) compatible land use, and, (ii) federal funding limits related to NCP implementation, which includes the SMART Program.

2. California Air National Guard (CANG) Environmental Impact Statement (EIS)

The CANG EIS evaluating the potential impacts of the proposed replacement of the F-16 aircraft with F-15 aircraft needs to identify the incremental noise difference due to the Proposed Action as compared to No Action. We strongly encourage the noise contours developed for the Proposed Action and No Action be prepared in accordance with 14 CFR

City of Fresno
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Part 150 so that the results can be compared to the current FAA-approved NEM. If the Proposed Action shows an increase in noise as compared to the No Action per FAA National Environmental Policy Act (NEPA) Implementing Instructions for Airport Projects, 5050.4B, the ANG Bureau/CANG will need to mitigate the impacts to the satisfaction of the City and the communities surrounding FYI. The following list provides our expectations in terms of mitigation required as a result of replacing the F-16 aircraft with F-15 aircraft (this list may change as a result of the EIS generated contours for the Proposed Action and No Action):

a. The EIS will need to identify and recommend new operational procedures to mitigate noise. Noise abatement measures in the FAA approved NCP identify operational procedures for the F-16, which will no longer be applicable with the Proposed Action. The following are anticipated impacts related to changing operational procedures due to the Proposed Action.

   i. Update the FAA approved NCP as it relates to operational procedures.
   ii. Financial impact to FYI. Refer to the Financial Impact section below.

b. The EIS will need to identify and recommend mitigation for noise related monitoring, complaints by the public, and have programs in place to address deviations from established operational procedures when they occur. The current NCP addresses some methods for noise monitoring and noise complaint procedures, however, the Proposed Action may necessitate additional initiatives. Currently approximately 95% of the noise complaints received by FYI are military related and this number is expected to increase with the Proposed Action. Mitigation for the increase in noise may involve the following.

   i. Update the FAA approved NCP as it relates to noise monitoring, including a noise monitoring system at and around FYI.
   ii. Financial impact to FYI. Refer to the Financial Impact section below.

c. The Proposed Action may trigger an update of the NEM and/or NCP via 14 CFR Part 150 as the FAA may require the City to update the NEM for it to continue to obtain federal funds to implement the NCP measures, including the SMART Program. A change in aircraft from the F-16 to the F-15, assuming the same number of operations and similar flight procedures, is equal to approximately a 3-dB increase due to doubling the number of engines on the aircraft. Also, a change in operations (increase or decrease) will affect the noise contours.

   In addition, the following mitigation may be required if the Proposed Action varies significantly from the current FAA-approved NEM for FYI:

   i. 65 Community Noise Equivalent Level (CNEL) boundary change. An enlarged 65 CNEL noise contour will increase the number of residences and possibly schools that are eligible for participation in the SMART program.
   ii. 70 CNEL boundary change. Developed properties inside the 70 CNEL noise contour cannot be feasibly treated acoustically to a level acceptable to FAA regulations. Acquisition and relocation will be necessary for those properties located within or touching an expanded 70 CNEL contour boundary. This may also include a school. Also, homes located outside of the current 70 CNEL noise contour that have been previously acoustically treated will need to be acquired if they will be inside the new 70 CNEL noise contour.
   iii. Fresno County Airport Land Use Commission (ALUC) Compatibility Land Use Plan (CLUP) impact. Any changes to noise contours depicted in the Adopted CLUP will

require the Plan to be updated, reviewed, and approved by the ALUC. It should be noted that this is not a simple process.

iv. City of Fresno FYI CLUP impact. Any changes to noise contours depicted in the Adopted FYI CLUP will require the Plan to be updated.

v. Financial impact to FYI. Refer to the Financial Impact section below.

3. Noise that is actually heard by the public.

As mentioned above, the FAA approved NEM does not represent the noise that is actually heard by the public. The F-15 is a two engine aircraft as compared to the F-16, which is a one engine aircraft. It is also heavier and larger than the F-16. The quality of life in Fresno for certain people will be affected by the additional noise. FAA Order 1050.1E, Environmental Impacts: Policies and Procedures, incorporates FICON's 1992 recommendations on noise metrics for airport noise analysis and states, "...DNL analysis may optionally be supplemented on a case-by-case basis to characterize specific noise effects." The EIS needs to clearly indentify the single event noise (what people actually hear) for the Proposed Action as compared to the existing F-16 operations such that the public fully comprehends the increase in noise that they will hear and the potential effects of the increase. Mitigation needs to be identified as it relates to quality of life.

Assuming the same operations as currently flown by the F-16's, Airports Department had its consultant prepare an F-15 single event noise contour map to identify the magnitude of the noise difference between the two aircraft types that actually will be heard in the community. Refer to Exhibit A. However, identifying the magnitude of the noise difference does not provide sufficient information as to what people will perceive the noise to be when an F-15 flies overhead. To facilitate a better understanding FYI suggests that noise stations be set up for the public to actually hear the difference between the F-16's and F-15's or CANG actually provide live demonstrations of the flight operations of both aircraft as flown and expected to be flown at FYI.

COMPATIBLE LAND USE

Adopted airport compatibility land use plans at various levels will need to be updated due to the Proposed Action. The adoption processes will, (i) include environmental (CEQA) findings and planning actions at various governmental and local agency levels, and, (ii) have substantial fees associated with the respective processes. The EIS needs to address how the update process for all affected airport compatibility land use plans will be mitigated. The specific impacts include but may not be limited to the following.

1. Update of the Fresno County Airport Land Use Commission CLUP. The State of California, Division of Aeronautics requires each public use airport to have on file a ALUC adopted CLUP. The latest update of FYI's ALUC CLUP occurred in October 2010. The Proposed Action will require the ALUC CLUP to be updated due to any change in noise contours. The update process must include noise contours that are consistent with, (i) a FAA approved NEM, and, (ii) City of Fresno's Adopted FYI CLUP. The ALUC CLUP update must be supported by an appropriate CEQA finding.

2. Update of the City of Fresno's Adopted FYI Compatibility Land Use Plan. The State of California, Division of Aeronautics requires that the City of Fresno's FYI CLUP be consistent with the Adopted ALUC CLUP. The latest update of the City's FYI CLUP occurred on May 1, 2011. The Proposed Action will require the City's FYI CLUP to be updated due to any change in noise contours. The update process must include noise contours that are

developed using the same methodology as, (i) an FAA approved NEM, and, (ii) ALUC's Adopted FYI CLUP. The City's FYI CLUP update must be supported by an appropriate CEQA finding.

3. In addition to the City of Fresno Airports Department, agencies involved with the review and/or approval processes for these updates include, but are not limited to, Fresno County Council of Governments, County of Fresno, City of Fresno Planning Commission, City of Fresno Department of Development and Resource Management, and City of Fresno City Council.

4. Financial impact. FYI does not have any funding source for the required update of these plans. Refer to the Financial Impact section below.

In addition, the City of Fresno Development and Resource Management Department offers the following Planning and Land Use comments:

Based upon preliminary information provided by the Air National Guard for the public scoping meeting, the calculated Community Noise Equivalent Level (CNEL) contours for alternative one (18 aircraft) and alternative two (24 aircraft) appears to expand marginally to the northwest but substantially to the southeast along the extended runway alignment of Fresno Yosemite International Airport. Information provided by the National Guard Bureau has only included the projected 65 CNEL and higher noise contours. As the City of Fresno's airport land use noise compatibility criteria also apply to areas exposed to 60 CNEL and higher noise levels, additional analysis with illustrative mapping should be provided to document the extent of these project contours. It would seem likely that a substantial portion of the City of Fresno's designated Southeast Growth Area (SEGA) would be impacted by the expanded 60 and 65 CNEL noise exposure contours.

State of California's Aeronautics Act (Public Utilities Code, Section 21670 et seq) sets forth the requirements for the adoption of an airport land use compatibility plan. State law further specifies the authority of county airport land use commissions versus the responsibility and authority of municipalities with respect to implementation of an airport compatibility plan. The City of Fresno's FYI Compatibility Land Use Plan defines an Airport Influence Area (AIA) within which certain land use proposals must be referred to the Fresno County Airport Land Use Commission for a determination of consistency. The AIA includes the 60 CNEL noise contour prepared in 2009. A substantial enlargement of the 60 CNEL noise contour as a result of the Proposed Action must be considered with respect to the attendant potential land use regulatory constraints.

Additional opportunities and more extensive public noticing should be provided to solicit the participation of property owners and residents within the potentially noise impacted areas to participate in informational and comment meetings regarding the Proposed Action. These meetings should include actual simulated noise demonstrations which might be very instructive for the average person who may have little knowledge of, or points of reference, to appreciate differences in noise levels.

Will contemplated changes in aircraft or landing approach and take-off protocols result in any recommended modification of the City's adopted Airport Land Use

Safety Compatibility Zones? Information should be provided with respect to the safety considerations of military aircraft operations.

AIR QUALITY

The Proposed Action may have an air quality impact. If the impact exceeds the threshold that requires mitigation, then the mitigation must directly benefit FYI and the surrounding community and the cost of compliance should be borne by the CANG.

AIRFIELD IMPACT

The CANG currently meets the "substantial" impact definition under FAA Grant Assurance No. 27 for based aircraft and number of movements, and, in the opinion of airport management does not pay its required proportional amount to operate and maintain the airfield. The Proposed Action will increase the operating and maintenance costs of the airfield at FYI and we expect the CANG to step up to this additional cost.

FINANCIAL IMPACT AND FEDERAL OBLIGATIONS

FYI is a federally obligated airport and is required to comply with FAA Grant Assurances. Refer to Exhibit B. Specifically, the following grant assurances are directly related to the Proposed Action.

1. Grant Assurance No. 3, Sponsor Fund Availability. Funds must be available to, (i) pay that portion of a project not paid by the FAA, and, (ii) operate and maintain the airport.
2. Grant Assurance No. 21, Compatible Land Use. Appropriate action must be taken to adopt land use regulations.
3. Grant Assurance No. 24, Fee and Rental Structure. Required to make the airport, "self-sustaining".
4. Grant Assurance No. 27, Use by Government Aircraft. The United States government is required to pay for their proportional use of the airport as it relates to the cost of operating and maintaining the facilities they use. The CANG exceeds the minimum trigger criteria of this Grant Assurance.

It is required that FYI be operated on a self-sustaining basis. If funds are expended by FYI as a result of the Proposed Action then CANG must reimburse FYI for 100% of those costs. Costs associated with the Proposed Action that may be incurred by FYI include, and is not limited to, the following:

1. Any action that is required by federal, state or local agencies, and
2. Any mitigation identified in the EIS

As mentioned above, FYI does not have a funding source to, (i) comply with federal, state or local agency requirements or actions associated with the Proposed Action, and, (ii) mitigate the military's impacts due to the Proposed Action. The total financial impact from the Proposed Action cannot not be determined at this time; however, initial estimates related to some of the anticipated required actions are as follows.

Note: **At this time the FAA has not yet indicated if they will financially participate in any costs associated with the Proposed Action. The financial impact to FYI will be, (i) 100% if FAA does not participate, or, (ii) the equivalent to the**

FAA AIP grant match (at the time grants are issued) plus associated FYI administrative costs.

1. NCP/NEM update. Estimate: $875,000 or higher.
2. 65 CNEL noise contour changes – additional homes or schools that will need to be acoustically treated. Estimate: Quantity and cost unknown. Cost per home (including soft costs) is currently approximately $25,000. Cost to acoustically treat a school varies with its size, age, and construction type.
3. 70 CNEL noise contour changes – homes previously acoustically treated and other properties where acoustic treatment is not feasible will need to be acquired and a relocation program instituted. Estimate: Quantity and cost unknown. Cost to acquire a home and relocate the occupants can vary. If a school is impacted by the 70 CNEL this cost can be substantial.
4. Implementation of noise monitoring, complaint processing/ resolution, and/or other required mitigation associated with either the FAA's NCP and/or mitigation from the Proposed Action. Estimate: Cost of a noise monitoring system varies widely. Cost of noise complaint management may be between $50,000 and $100,000 per year or higher. We prefer that the CANG handle complaint management and noise monitor system installation, operation, and maintenance this mitigation directly and with their own resources.
5. CEQA and NEPA study costs associated with Plan updates. Estimate: $150,000 or higher.
6. Processing of both ALUC and City CLUP updates. Estimate: $100,000 or higher.
7. Air quality impact. Estimate: To be determined.
8. Increased cost to maintain the airfield. Estimate: To be determined.

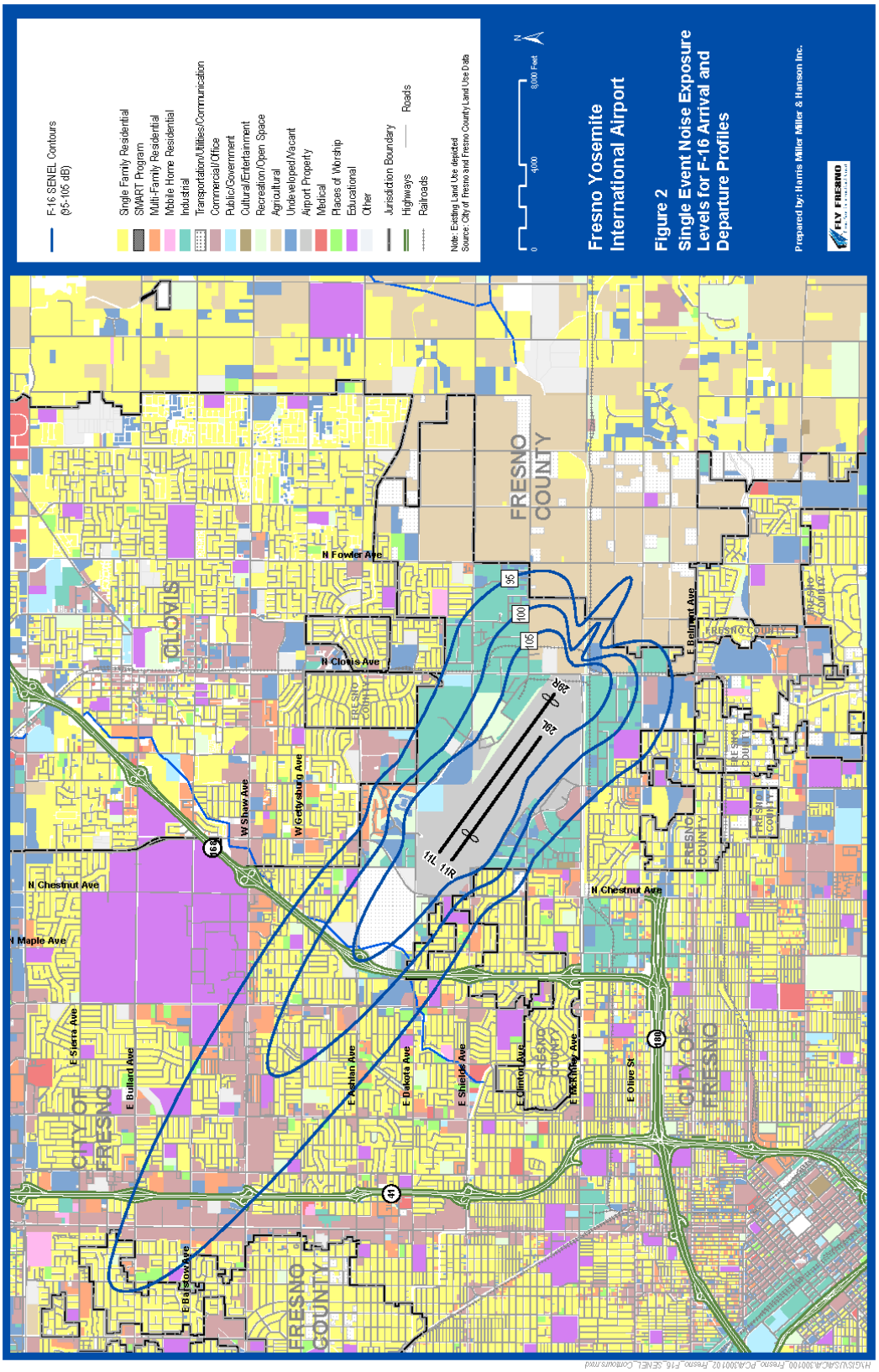
We appreciate the opportunity to provide these scoping comments and look forward to reviewing the Draft EIS. If you have any questions or comments regarding our input on this Proposed Action, please contact Kevin Meikle, Assistant Director of Aviation (Interim), by phone (559) 621-4536, or email at Kevin.Meikle@fresno.gov

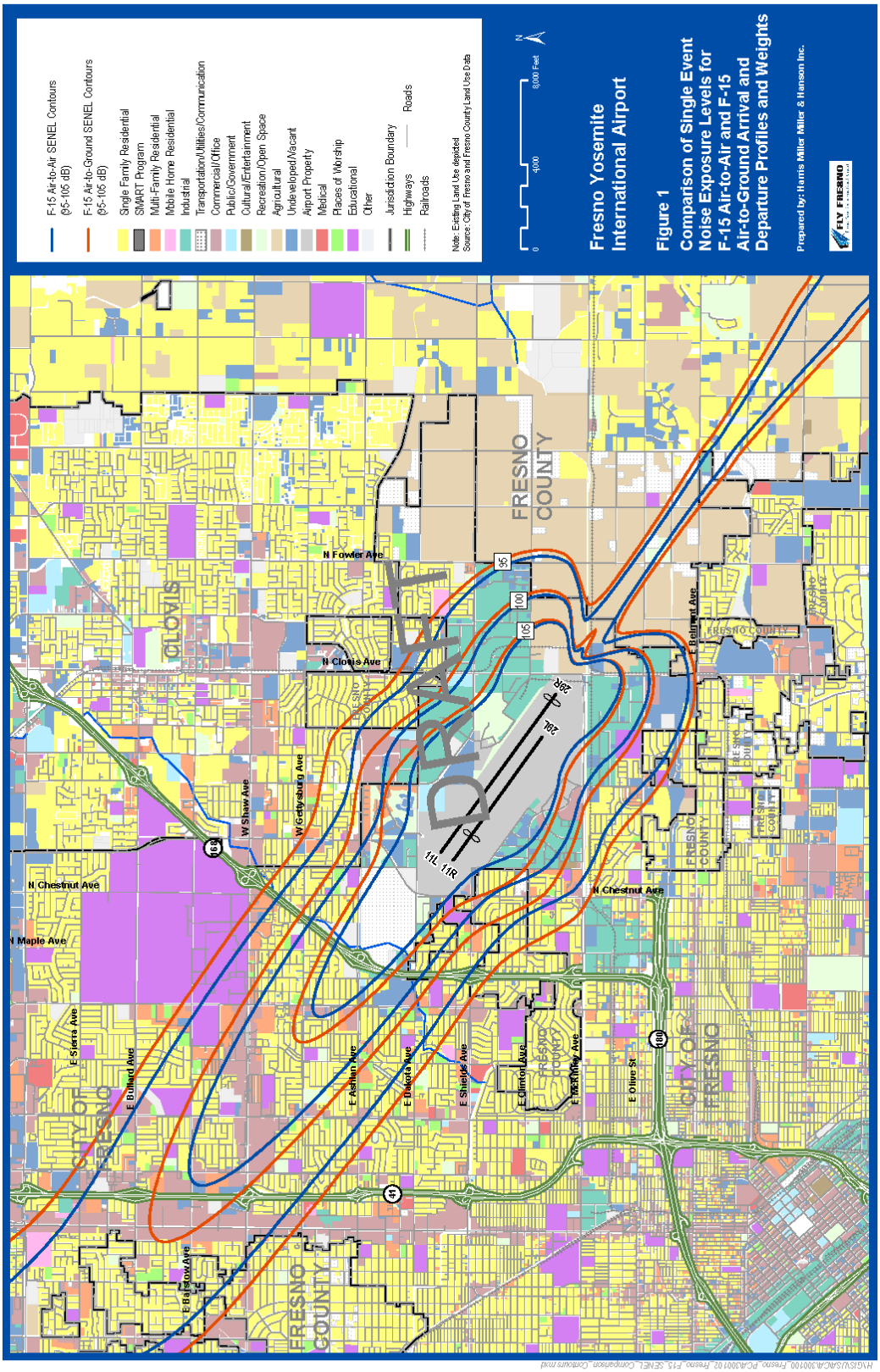
Respectfully Submitted,

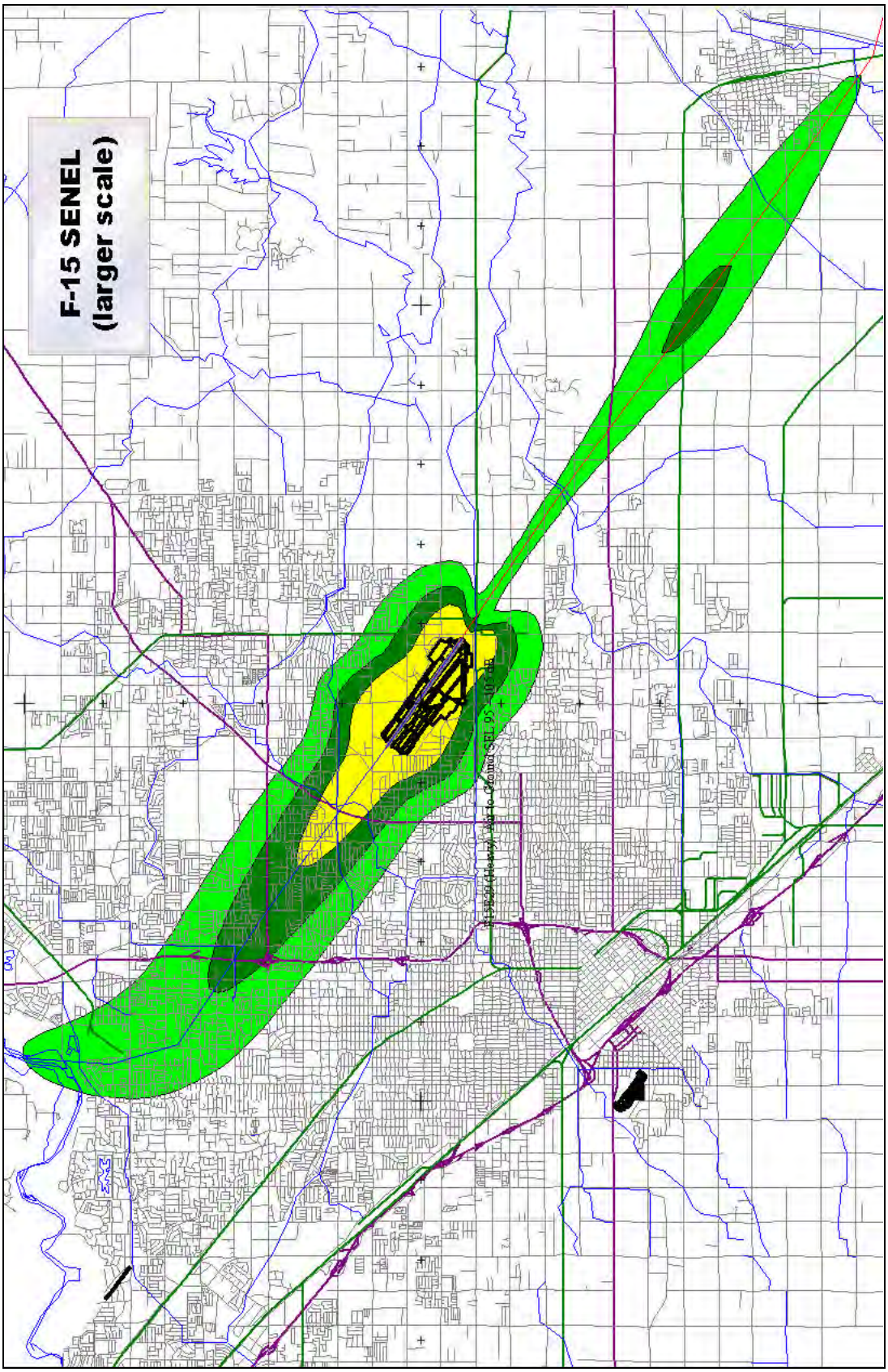
Mark Scott

Mark Scott
City Manager

cc: Bruce Rudd, Assistant City Manager
Russell C. Widmar, Director of Aviation, AAE
Keith Bergthold, Assistant Director of Development and Resource Management Dept.
Kevin Meikle, Assistant Director of Airports Department


F-16 SENEL Contours
(95-105 dB)
Single Family Residential
SMART Program
Multi-Family Residential
Mobile Home Residential
Industrial
Transportation/Utilities/Communication
Commercial/Office
Public/Government
Cultural/Entertainment
Recreation/Open Space
Agricultural
Undeveloped/Vacant
Airport Property
Medical
Places of Worship
Educational
Other
Jurisdiction Boundary
Highways
Railroads
Roads
Note: Existing Land Use depicted
Source: City of Fresno and Fresno County Land Use Data
0
4000
8000 Feet
N
Fresno Yosemite International Airport
Figure 2
Single Event Noise Exposure Levels for F-16 Arrival and Departure Profiles
Prepared by: Harris Miller Miller & Hanson Inc.
FLY FRESNO
95
100
105
29R
29L
11L
11R
FRESNO COUNTY
CLOVIS
CITY OF FRESNO
N Fowler Ave
N Clovis Ave
W Shaw Ave
W Gettysburg Ave
N Chestnut Ave
N Maple Ave
E Sierra Ave
E Bullard Ave
E Bedford Ave
E Dakota Ave
E Shields Ave
E Clinton Ave
E Olive St
E Belmont Ave
E Barstow Ave
99
41
180


F-15 Air-to-Air SENEL Contours (95-105 dB)
F-15 Air-to-Ground SENEL Contours (95-105 dB)
Single Family Residential
SMART Program
Multi-Family Residential
Mobile Home Residential
Industrial
Transportation/Utilities/Communication
Commercial/Office
Public/Government
Cultural/Entertainment
Recreation/Open Space
Agricultural
Undeveloped/Vacant
Airport Property
Medical
Places of Worship
Educational
Other
Jurisdiction Boundary
Highways
Roads
Railroads
Note: Existing Land Use depicted
Source: City of Fresno and Fresno County Land Use Data
0
4000
8000 Feet
N
Fresno Yosemite International Airport
Figure 1
Comparison of Single Event Noise Exposure Levels for F-15 Air-to-Air and F-15 Air-to-Ground Arrival and Departure Profiles and Weights
Prepared by: Harris Miller Miller & Hanson Inc.
FLY FRESNO
FRESNO COUNTY
CLOVIS
CITY OF FRESNO
N Fowler Ave
N Clovis Ave
W Shaw Ave
W Gettysburg Ave
N Chestnut Ave
N Maple Ave
E Sierra Ave
E Bullard Ave
E Barstow Ave
E Ashlan Ave
E Dakota Ave
E Shields Ave
E Clinton Ave
E Olive St
E Belmont Ave
95
100
105
11L
11R
29L
29R
41
180


F-15 SENEL
(larger scale)
Fresno Chandler Airport Cumul SEL 95 - 100 dB

May 2011

U.S. Department
of Transportation
Federal Aviation
Administration

Terms and Conditions Of Accepting Airport Improvement Program Grants

Sponsor: City of Fresno

Airport: Fresno-Yosemite International

This document contains the terms and conditions of accepting Airport Improvement Program (AIP) grants from the Federal Aviation Administration (FAA) for the purpose of carrying out the provisions of Title 49, United States Code. These terms and conditions become applicable when the sponsor accepts a Grant Offer from the FAA that references this document. The terms and conditions may be unilaterally amended by the FAA, by notification in writing, and such amendment will only apply to grants accepted after notification.

Definitions:

A. Sponsor - An agency that is legally, financially, and otherwise able to assume and carry out the certifications, representations, warranties, assurances, covenants and other obligations required in this document and in the accepted grant agreement.

B. Project – Work as identified in this grant agreement.

C. Primary Airport – A commercial service airport the Secretary determines to have more than 10,000 passengers boarding each year.

D. "this grant" – In this document, the term "this grant" refers to the applicable grant agreement or grant agreements that incorporate(s) these terms and conditions as part of the grant agreement.

I. Certifications

Section 47105(d), Title 49 of the United States Code authorizes the Secretary to require certification from sponsors that they will comply with statutory and administrative requirements. The following list of certified items includes major requirements for this aspect of project implementation. However, the list is not comprehensive, nor does it relieve sponsors from fully complying with all applicable statutory and administrative standards. In accepting a grant, the sponsor certifies that each of the following items will be complied with in the performance of grant agreements. If a certification cannot be met for a specific project, the sponsor must fully explain in an attachment to the project application.

A. Sponsor Certification for Selection of Consultants

General procurement standards for consultant services within Federal grant programs are described in 49 CFR 18.36. Sponsors may use other qualifications-based procedures provided they are equivalent to specific standards in 49 CFR 18 and Advisory Circular 150/5100-14.

1. All advertisements will be placed to ensure fair and open competition from a wide area of interest.

2. For any and all contracts over $100,000, consultants will be selected using competitive procedures based on qualifications, experience, and disadvantaged business enterprise requirements with the fee determined through negotiation.

3. An independent cost analysis will be performed, and a record of negotiations will be prepared reflecting the considerations involved in the establishment of fees for all engineering contracts with basic service fees exceeding $100,000.

4. If any services are to be performed by sponsor force account personnel prior approval must be obtained from FAA.

5. All consultant services contracts will clearly establish the scope of work and delineate the division of responsibilities between all parties engaged in carrying out elements of the project.

6. All costs associated with work ineligible for AIP funding will be clearly identified and separated from eligible items.

7. All mandatory contract provisions for grant-assisted contracts will be included in all consultant services contracts.

8. If any contract is awarded without competition, pre-award review and approval will be obtained from FAA.

9. Cost-plus-percentage-of-cost methods of contracting prohibited under Federal standards will not be used.

10. If services being procured cover more than a single grant project the scope of work will be specifically described in the advertisement, and future work will not be initiated beyond five years.

B. Sponsor Certification for Project Plans and Specifications

General AIP standards are described in Advisory Circulars 150/5100-6, 150/5100-15, and 150/5100-16. A list of current advisory circulars with specific standards for design or construction of airports and procurement or installation of airport equipment and facilities is referenced in Section III.C.34.

1. All plans and specifications will be developed in accordance with all current applicable Federal standards and requirements, or state standard specifications developed under a Federal grant, and no deviation from or modification to standards set forth in the advisory circulars will be allowed without prior approval of the FAA.

2. All equipment specifications will rely on the national standards as contained in the Advisory Circulars, without deviations, to the maximum extent possible. Specifications for the procurement of equipment for which there is no Federal specification or standard, will not be proprietary nor written to restrict competition. If there is no national standard, or if the national standard provides for a choice to be made, at least two manufacturers will assure that they can meet the specification. A deviation from the national standard will require FAA approval of the design standard modification.

3. All development to be included in any plans is depicted on an Airport Layout Plan approved by FAA.

4. All development which is ineligible for AIP funding will either be omitted from the plans and specifications or costs associated with ineligible or AIP non-participating items will be separated and noted as non-AIP work and deducted from AIP project reimbursement requests.

5. Process control and acceptance tests required for any and all projects by standards contained in Advisory Circular 150/5370-10 will be included in the project specifications.

6. If a value engineering clause is incorporated into any contract, concurrence will be obtained from FAA.

7. All plans and specifications will incorporate applicable requirements and recommendations set forth in the Federally approved environmental finding.

8. For all construction activities within or near aircraft operational areas, the applicable requirements contained in Advisory Circular 150/5370-2 will be discussed with FAA and incorporated into the specifications. A safety/phasing plan will be prepared, and prior FAA concurrence will be obtained.

9. All projects will be physically completed without Federal participation in costs that are due to errors or omissions in the plans and specifications that were foreseeable at the time of project design.

10. All Airport Layout Plan (ALP) revisions and proposals for facility construction clearance will include coordinates that are either surveyed or based on reference coordinates previously found acceptable to FAA. The coordinates will be verified and found consistent with the dimensions shown on the project sketch/ALP. The coordinates will be in terms of the North American Vertical Datum of 1988) NAD88.

11. All site elevations on Airport Layout Plan (ALP) revisions and proposals for construction clearance will be within +/-0.1 foot vertically and the vertical datum will be in terms of the National Geodetic Vertical Datum of 1929.

C. Sponsor Certification for Equipment/Construction Contracts

Standards for advertising and awarding equipment and construction contracts within Federal grant programs are described in 49 CFR 18.36. Sponsors may use their procurement procedures reflecting State and local laws or regulations provided procurements conform to specific standards in 49 CFR 18 and Advisory Circulars 150/5100-6, 150/5100-15, and 150-5100-16.

1. A code or standard of conduct will be in effect governing the performance of the sponsor's officers, employees, or agents in soliciting and awarding procurement contracts.

2. Qualified personnel will be engaged to perform contract administration, engineering supervision, and construction inspection and testing on all projects.

3. All procurement will be publicly advertised using the competitive sealed bid method of procurement. If procurement is less than $100,000, project may use three (3) quote method.

4. All requests for bids will clearly and accurately describe all administrative and other requirements of the equipment and/or services to be provided.

5. Concurrence will be obtained from FAA prior to contract award under any of the following circumstances:

   a. Only one qualified person/firm submits a responsive bid,

b. The contract is to be awarded to other than the lowest responsive and responsible bidder,

c. Life cycle costing is a factor in selecting the lowest responsive bidder,

d. Proposed contract prices are more than 10% over the sponsor's cost estimate.

6. All contracts exceeding $100,000, require a bid guarantee of 5%, a performance bond of 100%, and a payment bond of 100%.

7. All contracts exceeding $100,000 will contain provisions or conditions specifying administrative, contractual, and legal remedies, including contract termination, for those instances in which contractors violate or breach contract terms. They also will contain provisions requiring compliance with applicable standards and requirements issued under Section 306 of the Clean Air Act (42 USC 1857(h)), Section 508 of the Clean Water Act (33 USC 1368), Executive Order 11738, and environmental protection regulations (40 CFR Part 15).

8. All construction contracts involving labor will contain provisions insuring that in the employment of labor preference will be given to honorably discharged Vietnam era veterans and disabled veterans.

9. All construction contracts exceeding $2,000 will contain provisions requiring compliance with the Davis-Bacon Act and bid solicitations will contain a copy of the current Federal wage rate determination. Provisions requiring compliance with Sections 103 and 107 of the Contract Work Hours and Safety Standards Act (40 USC 327-330) and the Copeland "Anti-Kick Back" Act will be included.

10. All construction contracts exceeding $10,000 will contain appropriate clauses from 41 CFR part 60 for compliance with Equal Employment Opportunity Executive Order 11246.

11. All construction, professional service, and equipment contracts exceeding $250,000 will contain clauses required from Title VI Civil Rights Assurances and 49 CFR 26 for Disadvantaged Business Enterprises.

12. Appropriate checks will be made to assure that contracts or subcontracts are not awarded to those individuals or firms suspended, debarred, or voluntarily excluded from doing business with any DOT element and appearing on the DOT Unified List.

D. Sponsor Certification for Real Property Acquisition

Requirements on real property acquisition and relocation assistance are in 49 CFR 24 and the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Uniform Act).

1. Good and sufficient title will be held on property in any and all projects. The sponsor's attorney or other official will prepare and have on file title evidence on the property.

2. If defects and/or encumbrances exist in the title, which adversely impact the sponsor's intended use of property in the project, they will be extinguished, modified, or subordinated.

3. If property for airport development will be leased, the term is for 20 years or the useful life of the project. The lessor is a public agency and the lease contains no provisions, which prevent full compliance with the grant agreement.

4. Property will be in conformance with the current Exhibit A (property map). The property map is based on deeds, title opinions, land surveys, the approved Airport Layout Plan, and project documentation.

5. For any and all acquisition of property interest in noise sensitive approach zones and related areas, property interest will be obtained to ensure land is used for purposes compatible with noise levels associated with operation of the airport.

6. For all acquisition of property interest in runway protection zones and areas related to FAR Part 77 surfaces, property interest will be obtained for the right of flight, right of ingress and egress to remove obstructions, right to make noise associated with aircraft operations, and to restrict the establishment of future obstructions.

7. All appraisals will include valuation data to estimate the current market value for the property interest acquired on each parcel and will be prepared by qualified real estate appraisers hired by the sponsor. An opportunity will be provided the property owner or their representative to accompany appraisers during inspections.

8. All appraisals will be reviewed by a qualified review appraiser to recommend an amount for the offer of just compensation. All written appraisals and review appraisal will be available to FAA for review.

9. A written offer to acquire property will be presented to the property owner for not less than the approved amount of just compensation.

10. Every effort will be made to acquire property through negotiation with no coercive action to induce agreement. If negotiation is successful, project files will contain supporting documents for settlements.

11. If a negotiated settlement is not reached, condemnation will be initiated and a court deposit not less than the just compensation will be made prior to possession of the property. Project files will contain supporting documents for awards.

12. If displacement of persons, businesses, farm operations, or nonprofit organizations is involved, a relocation assistance program will be established. Displaced persons will receive general information in writing on the relocation program, notice of relocation eligibility, and a 90 day notice to vacate.

13. Relocation assistance services, comparable replacement housing, and payment of necessary relocation expenses will be provided within a reasonable time period for displaced occupant in accordance with the Uniform Act.

E. Sponsor Certification for Construction Project Final Acceptance

General requirements for final acceptance and close-out of Federally funded construction projects are in 49 CFR 18.50. The sponsor shall determine that project costs are accurate and proper in accordance with specific requirements of the Grant Agreement and contract documents.

1. All personnel engaged in project administration, engineering supervision, and construction inspection and testing will be determined to be qualified and competent to perform the work.

2. All daily construction records will be kept by the resident engineer/construction inspector. These records document work in progress, quality and quantity of materials delivered, test locations and results, instructions provided the contractor, weather, equipment use, labor requirements, safety problems, and changes required.

3. All weekly payroll records and statements of compliance will be submitted by the prime contractor and reviewed by the sponsor for Federal labor and civil rights requirements (Advisory Circular 150/5100-6 and 150/5100-15).

4. All complaints regarding the mandated Federal provisions set forth in the contract documents will be submitted to the Department of Labor.

5. All tests specified in the plans and specifications will be performed and the test results documented. A summary of test results will be available to FAA.

6. For all test results outside allowable tolerances, appropriate corrective actions will be taken.

7. All payments to the contractor will be made in compliance with contract provisions and verified by the sponsor's internal audit of contract records kept by the resident engineer. If appropriate, all pay reduction factors required by the specifications will be applied in computing final payments and a summary of pay reductions will be available to FAA.

8. All projects will be accomplished without significant deviations, changes, or modifications from the developed plans and specifications, except where approval will be obtained from FAA.

9. All final project inspections will be conducted with representatives of the sponsor and the contractor. Project files will contain documentation of the final inspection.

10. All work in the Grant Agreement will be physically completed and corrective actions required as a result of the final inspection will be completed to the satisfaction of the construction contract and the sponsor.

11. As-built plans and an equipment inventory, if applicable, will be maintained as sponsor records. If requested, a revised Airport Layout Plan will be made available to FAA prior to start of development.

12. All applicable close-out financial reports will be submitted to FAA within four (4) years of the date of grant.

F. Sponsor Certification for Seismic Design and Construction

49 CFR Part 41 sets forth the requirements in the design and construction of the building(s) to be financed with the assistance of the Federal Aviation Administration. Compliance will be met by adhering to at least one of the following accepted standards:

1. Model codes found to provide a level of seismic safety substantially equivalent to that provided by use of the 1988 National Earthquake Hazards Reduction Program (NEHRP) including:

   a. The 1991 International Conference of Building Officials (IBCO) Uniform Building Code, published by the International Conference of Building Officials, 5360 South Workman Mill Road, Whittier, California 90601.

   b. The 1992 Supplement to the Building Officials and Code Administration International (BOCA) National Building Code, published by the Building Officials and Code Administrators, 4051 West Flossmoor Road, Country Club Hills, Illinois 60478-5795.

   c. The 1992 Amendments to the Southern Building Code Congress (SBCC) Standard Building Code, published by the Southern Building Code Congress International, 900 Montclair Road, Birmingham, Alabama 35213-1206.

2. Revisions to the model codes listed above that are substantially equivalent or exceed the then current or immediately preceding edition of the NEHRP recommended provisions, as it is updated, may be approved by the DOT Operating Administration to meet the requirements of 49 CFR Part 41.

3. State, county, local, or other jurisdictional building ordinances adopting and enforcing the model codes, listed above, in their entirety, without significant revisions or changes in the direction of less seismic safety, meet the requirement of 49 CFR Part 41.

G. Sponsor Certification for Drug-Free Workplace

1. The sponsor certifies that it will continue to provide a drug-free workplace by:

   a. Publishing a statement notifying employees that the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance is prohibited in the sponsor's workplace and specifying the actions that will be taken against employees for violations of such prohibitions.

   b. Establishing an ongoing drug-free awareness program to inform employees about:

      (1) The dangers of drug abuse in the workplace.

      (2) The grantee's policy of maintaining a drug-free workplace.

      (3) Any available drug counseling, rehabilitation, and employee assistance programs.

      (4) The penalties that may be imposed upon employees for drug abuse violations occurring in the workplace.

   c. Making it a requirement that each employee to be engaged in the performance of a grant be given a copy of the statement required by paragraph a.

   d. Notifying the employee in the statement required by paragraph a that, as a condition of employment under a grant, the employee will:

      (1) Abide by the terms of the statement.

      (2) Notify the employer in writing of his or her conviction for a violation of a criminal drug statue occurring in the workplace no later than five calendar days after such conviction.

   e. Notifying the agency in writing, within ten calendar days after receiving notice under paragraph d(2) from an employee or otherwise receiving actual notice of such conviction. Employers of convicted employees must provide notice including position title, to every grant officer or other designee on whose grant activity the convicted employee was working, unless the Federal agency has designated a central point for the receipt of such notices. Notices shall include the identification number(s) of each affected grant.

   f. Taking one of the following actions, within 30 calendar days of receiving notice under paragraph d(2) with respect to any employee who is so convicted:

      (1) Taking appropriate personnel action against such an employee, up to and including termination, consistent with the requirements of the Rehabilitation Act of 1973, as amended.

      (2) Requiring such employee to participate satisfactorily in a drug abuse assistance or rehabilitation program approved for such purposes by a Federal, State or local health, law enforcement, or other appropriate agency.

      (3) Making a good faith effort to continue to maintain a drug-free workplace through implementation of paragraphs (a), (b), (c), (d), (e), and (f).

2. The sponsor may insert in the space provided below the site(s) for the performance of work done in connection with grants:

Place of Performance (street address, city, county, state, zip code)

_____

_____

_____

II. General Conditions

A. The allowable costs of all AIP funded project shall not include any costs determined by the FAA to be ineligible for consideration under the Title 49 U.S.C.

B. Payment of the United States' share of all allowable project costs will be made pursuant to and in accordance with the provisions of such regulations and procedures as the Secretary shall prescribe. Final determinations of the United States' share will be based upon the final audits of the total amount of allowable project costs, and settlement will be made for any upward or downward adjustments to the Federal share of costs.

C. The sponsor shall carry out and complete all AIP funded projects without undue delays and in accordance with the terms hereof, and such regulations and procedures as the Secretary shall prescribe.

D. The FAA reserves the right to amend or withdraw a grant offer at any time prior to its acceptance by the sponsor.

E. A grant offer will expire, and the United States shall not be obligated to pay any part of the costs of the project unless the grant offer has been accepted by the sponsor on or before 60 days after the grant offer but no later than September 30 of the Federal fiscal year the grant offer was made, or such subsequent date as may be prescribed in writing by the FAA.

F. The FAA reserves the right to unilaterally terminate this grant if the sponsor fails to perform projects without undue delay or seek timely reimbursement for work completed. If the scope of work approved in the grant has not been accomplished, FAA may seek recovery of the grant.

G. The sponsor agrees to monitor progress on the work to be accomplished by this grant and make payments only for work that has been satisfactorily completed. The sponsor further agrees that ten percent (10%) of the total contract value will not be paid until acceptable final project documentation is provided.

H. The sponsor shall take all steps, including litigation if necessary, to recover Federal funds spent fraudulently, wastefully, or in violation of Federal antitrust statutes, or misused in any manner in any project upon which Federal funds have been expended. For the purposes of this grant agreement, the term "Federal funds" means funds however used or disbursed by the sponsor that were originally paid pursuant to this or any other Federal grant agreement. It shall obtain the approval of the Secretary as to any determination of the amount of the Federal share of such funds. It shall return the recovered Federal share, including funds recovered by settlement, order or judgment, to the Secretary. It shall furnish to the Secretary, upon request, all documents and records pertaining to the determination of the amount of the Federal share or to any settlement, litigation, negotiation, or other efforts taken to recover such funds. All settlements or other final positions of the sponsor, in court or otherwise, involving the recovery of such Federal share shall be approved in advance by the Secretary.

I. The United States shall not be responsible or liable for damage to property or injury to persons, which may arise from, or be incident to, compliance with a grant agreement.

J. If, during the life of an AIP funded project, the FAA determines that a grant amount exceeds the expected needs of the sponsor by $25,000 or five percent (5%), whichever is greater, a grant amount can be unilaterally reduced by letter from FAA advising of the budget change. Conversely, with the exception of planning projects, if there is an overrun in the eligible project costs, FAA may increase a grant to cover the amount of the overrun not to exceed the statutory fifteen (15%) percent limitation for primary airports. For non-primary airports, with the exception of planning projects, FAA may increase a grant to cover the amount of overrun by not more than fifteen percent (15%) of the original grant amount for development and not more than fifteen (15%) percent of the original grant portion pertaining to land or by an amount not to exceed twenty-five percent (25%) of the total increase in allowable project costs attributable to the acquisition of land or interests in land, whichever is greater, based on current credible appraisals or a court award in a condemnation proceeding. FAA will advise the sponsor by letter of the increase. Planning projects will not be increased above the planning portion of the maximum obligation of the United States shown in the grant agreement. Upon issuance of either of the aforementioned letters, the maximum obligation of the United States is adjusted to the amount specified. In addition, the sponsor's officially designated representative, is authorized to request FAA concurrence in revising the project description and grant amount within statutory limitations. A letter from the FAA concurring in the said requested revision to the project work description and/or grant amount shall constitute an amendment to a Grant Agreement.

K. If requested by the sponsor and authorized by the FAA, the letter of credit method of payment may be used. It is understood and agreed that the sponsor agrees to request cash withdrawals on the letter of credit only when actually needed for its disbursements and to timely reporting of such disbursements as required. It is understood that failure to adhere to this provision may cause the letter of credit to be revoked.

L. Unless otherwise approved by the FAA, it will not acquire or permit any contractor or subcontractor to acquire any steel or manufactured products produced outside the United States to be used for any project for airport development or noise compatibility for which funds are provided under this grant. The sponsor will include in every contract a provision implementing this condition.

M. If this grant agreement includes pavement work that equals or exceeds $250,000, the Sponsor will perform the following:

1. Furnish a construction management program to FAA prior to the start of construction which shall detail the measures and procedures to be used to comply with the quality control provisions of the construction contract, including, but not limited to, all quality control provisions and tests required by the Federal specifications. The program shall include as a minimum:

   - The name of the person representing the Sponsor who has overall responsibility for contract administration for the project and the authority to take necessary actions to comply with the contract.
   - Names of testing laboratories and consulting engineer firms with quality control responsibilities on the project, together with a description of the services to be provided.
   - Procedures for determining that testing laboratories meet the requirements of the American Society of Testing Materials standards on laboratory evaluation, referenced in the contract specifications (D3666, C1077).
   - Qualifications of engineering supervision and construction inspection personnel.
   - A listing of all tests required by the contract specifications, including the type and frequency of tests to be taken, the method of sampling, the applicable test standard, and the acceptance criteria or tolerances permitted for each type of test.

- Procedures for ensuring that the tests are taken in accordance with the program, that they are documented daily, that the proper corrective actions, where necessary, are undertaken.

2. Submit at completion of the project, a final test and quality control report documenting the results of all tests performed, highlighting those tests that failed or did not meet the applicable test standard. The report shall include the pay reductions applied and reasons for accepting any out-of-tolerance material. An interim test and quality control report shall be submitted, if requested by the FAA.

3. Failure to provide a complete report as described in paragraph 2, or failure to perform such tests, shall, absent any compelling justification, result in a reduction in Federal participation for costs incurred in connection with construction of the applicable pavement. Such reduction shall be at the discretion of the FAA and will be based on the type or types of required tests not performed or not documented and will be commensurate with the proportion of applicable pavement with respect to the total pavement constructed under this grant agreement.

4. The FAA, at its discretion, reserves the right to conduct independent tests and to reduce grant payments accordingly if such independent tests determine that Sponsor tests results are inaccurate.

N. For a project to replace or reconstruct pavement at the airport, the Sponsor shall implement an effective airport pavement maintenance management program as is required by Airport Sponsor Assurance Number 11. The Sponsor shall use such program for the useful life of any pavement constructed, reconstructed, or repaired with Federal financial assistance at the airport. As a minimum, the program must conform with the following provisions:

Pavement Maintenance Management Program

An effective pavement maintenance management program is one that details the procedures to be followed to assure that proper pavement maintenance, both preventive and repair, is performed. An airport sponsor may use any form of inspection program it deems appropriate. The program must, as a minimum, include the following:

1. Pavement Inventory. The following must be depicted in an appropriate form and level of detail:
   a. Location of all runways, taxiways, and aprons;
   b. Dimensions;
   c. Type of pavement, and;
   d. Year of construction or most recent major rehabilitation.

   For compliance with the Airport Improvement Program (AIP) assurances, pavements that have been constructed, reconstructed, or repaired with federal financial assistance shall be so depicted.

2. Inspection Schedule.
   a. Detailed Inspection. A detailed inspection must be performed at least once a year. If a history of recorded pavement deterioration is available; i.e., Pavement Condition Index (PCI) survey as set forth in Advisory Circular 150/5380-6, "Guidelines and Procedures for Maintenance of Airport Pavements," the frequency of inspections may be extended to three years.
   b. Drive-By Inspection. A drive-by inspection must be performed a minimum of once per month to detect unexpected changes in the pavement condition.

3. Record Keeping. Complete information on the findings of all detailed inspections and on the maintenance performed must be recorded and kept on file for a minimum of five years. The types of distress, their locations, and remedial action, scheduled or performed, must be documented. The minimum information to be recorded is listed below:
   a. Inspection date;

b. Location;
c. Distress types; and
d. Maintenance scheduled or performed.

For drive-by inspections, the date of inspection and any maintenance performed must be recorded.

4. Information Retrieval. An airport Sponsor may use any form of record keeping it deems appropriate, so long as the information and records produced by the pavement survey can be retrieved to provide a report to the FAA as may be required.

5. Reference. Refer to Advisory Circular 150/5380-6, "Guidelines and Procedures for Maintenance of Airport Pavements," for specific guidelines and procedures for maintaining airport pavements and establishing an effective maintenance program. Specific types of distress, their probable causes, inspection guidelines, and recommended methods of repair are presented.

O. **Takeover of Instrument Landing System and Associated Equipment in Project**. If this grant includes an instrument landing system and associated equipment and the FAA has agreed to takeover the system and equipment, the Sponsor must check the facility prior to its commissioning to assure it meets the operational standards. The Sponsor must also remove, relocate, or lower each obstruction on the approach, or provide for the adequate lighting or marking of the obstruction if any aeronautical study conducted under FAR part 77 determines that to be acceptable, and mark and light the runway, as appropriate.

P. **Airport-Owned Visual or Electronic NAVAIDS In Project.** If this grant includes a visual or electronic navigational aid, the Sponsor must provide for the continuous operation and maintenance of any navigational aid funded under the AIP during the useful life of the equipment and check the facility prior to its commissioning to assure it meets the operational standards. The Sponsor must also remove, relocate, or lower each obstruction on the approach or provide for the adequate lighting or marking of the obstruction if any aeronautical study conducted under FAR Part 77 determines that to be acceptable, and mark and light the runway, as appropriate. The FAA will not take over the ownership, operation, or maintenance of any sponsor-acquired equipment other than an AIP-funded instrument landing system and associated equipment where FAA agrees to take over the system and equipment.

Q. **Non-AIP Work in Application.** It is understood and agreed by and between the parties hereto that notwithstanding the fact that a Project Application may include therein the construction of work not included in this grant agreement project description, said work shall not be a part of this project and, if or to the extent accomplished by the Sponsor, such accomplishment shall be without any participation in the costs thereof by the United States under this project. It is further understood and agreed that, in the event the work which is excluded from the project is accomplished by the Sponsor, the Sponsor shall maintain as a portion of the cost records covering this project, separable cost records pertaining to the above-identified work excluded from Federal participation under this project, which records shall be made available for inspection and audit by the FAA to the end that the cost of the excluded work may be definitely determined. It is further understood and agreed that the Sponsor will submit a Program Statement/cost estimate depicting the excluded costs or a cost estimate depicting only those costs eligible for Federal participation in this project.

R. **Utility Relocation in Project.** It is understood and agreed by and between the parties hereto that the United States shall not participate in the cost of any utility relocation unless and until the Sponsor has submitted evidence satisfactory to the FAA that the Sponsor is legally responsible for payment of such costs. FAA participation will be limited to those utilities located on private right-of-way or utilities that exclusively serve the Airport.

S. **Revenue from Real Property – Land in Project**. The Sponsor agrees that all net revenues produced from real property purchased in part with Federal funds in this grant shall be used on the

airport for airport planning, development or operating expenses, except that all income from real property purchased for noise compatibility purposes or for future aeronautical use be used only to fund projects which would be eligible for grants under the Act. Income from noise or future use property may not be used for the Sponsor's matching share of any airport grant. Airport fiscal and accounting records shall clearly identify actual sources and uses of these funds.

T. **Future Development Land.** If this grant includes acquisition of land for future development, the Sponsor agrees to implement within five years of such grant the airport development that requires this land acquisition, unless the FAA agrees to a different duration. Furthermore, the Sponsor agrees not to dispose of the land by sale or lease without prior consent and approval of the FAA. In the event the land is not used within ten years for the purpose for which it was acquired, the Sponsor will refund the Federal share of acquisition cost or the current fair market value of the land, whichever is greater, unless the FAA agrees to a different duration.

U. **Runway Protection Zones.** The Sponsor agrees to take the following actions to maintain and/or acquire a property interest, satisfactory to the FAA, in the Runway Protection Zones:

1. Existing Fee Title Interest in the Runway Protection Zone: The Sponsor agrees to prevent the erection or creation of any structure or place of public assembly in the Runway Protection Zone, except for NAVAIDS that are fixed by their functional purposes or any other structure approved by the FAA. Any existing structures or uses within the Runway Protection Zone will be cleared or discontinued unless approved by the FAA.

2. Existing Easement Interest in the Runway Protection Zone: The Sponsor agrees to take any and all steps necessary to ensure that the owner of the land within the designated Runway Protection Zone will not build any structure in the Runway Protection Zone that is a hazard to air navigation or which might create glare or misleading lights or lead to the construction of residences, fuel handling and storage facilities, smoke generating activities, or places of public assembly, such as churches, schools, office buildings, shopping centers, and stadiums.

3. Future Interest in the Runway Protection Zone: The Sponsor agrees that it will acquire fee title or less-than-fee interest in the Runway Protection Zones that presently are not under its control under an agreed schedule with the FAA. Said interest shall provide the protection noted in above Subparagraphs 1 and 2.

V. **Noise Projects on Privately Owned Property.** No payment shall be made under the terms of this grant agreement for work accomplished on privately owned land until the Sponsor submits the agreement with the owner of the property required by Assurance 5d of the *ASSURANCES Airport Sponsors*, and such agreement is determined to be satisfactory. As a minimum, the agreement with the private owner must contain the following provisions:

1. The property owner shall subject the construction work on the project to such inspection and approval during the construction or installation of the noise compatibility measures and after completion of the measures as they may reasonably be requested by the Secretary or the Sponsor.

2. The property owner shall assume the responsibility for maintenance and operation of the items installed, purchased, or constructed under this grant agreement. Neither the FAA nor the Sponsor bears any responsibility for the maintenance and operation of these items.

3. If Federal funds for the noise compatibility measures are transferred by the Sponsor to the owner of the private property, or the owner's agent, the property owner shall agree to maintain and make available to the Secretary or the Sponsor, upon reasonable request, records disclosing the amount of funds received and the disposition of those funds.

4. The property owner's right to sue the owner of the noise-impacting Airport for adverse noise impacts will be abrogated if the property owner deliberately or willfully acts to reduce or destroy

the effectiveness of the noise compatibility measures during the useful life of such measures. This obligation shall remain in effect throughout the useful life of the noise compatibility measures, but not to exceed 20 years from the date of the Sponsor's acceptance of federal aid for the project.

W. **Update Approved Exhibit "A" For Land in Project.** It is understood and agreed by and between the parties hereto that notwithstanding the fact that this grant offer is made and accepted upon the basis of the current Exhibit "A" Property Map, the Sponsor hereby covenants and agrees that upon completion of an AIP funded land acquisition project, it will update said Exhibit "A" Property Map to standards satisfactory to the FAA and submit said documentation in final form to the FAA. It is further mutually agreed that the reasonable cost of developing said Exhibit "A" Property Map is an eligible administrative cost for participation within the scope of this project.

X. **Friction Measuring Devices.** If this grant includes acquisition of friction measuring devices, the Sponsor assures that it will properly calibrate, operate, and maintain the friction measuring equipment in accordance with the manufacturer's guidelines and instructions and Advisory Circular 150/5320-12. The friction measuring equipment and tow vehicle (if applicable) shall not be used for any other purpose other than for conducting friction measuring tests on airport pavement surfaces and directly related activities, such as training and calibration.

Y. **Low Emission Systems.** If this grant includes low emission systems work, the Sponsor agrees to the following conditions under the Voluntary Airport Low Emission (VALE) program:

1. Vehicles and equipment purchased with assistance from this grant shall be maintained and used for their useful life at the airport for which they were purchased. Moreover, any vehicles or equipment replaced under this program shall not be transferred to another airport or location within the same or any other nonattainment or maintenance area. No airport-owned vehicles or equipment may be transferred to, taken to, or used at another airport without the consent of the FAA in consultation with the United States Environmental Protection Agency and State air quality agency.

2. All vehicles and equipment purchased with assistance from this grant shall be clearly labeled using the VALE program emblem designed by the FAA.

3. The Sponsor shall maintain annual reporting records of all vehicles and equipment purchased with assistance from this grant. These public records shall contain detailed information involving individual vehicles and equipment, project expenditures, cost effectiveness, and emission reductions.

   The Sponsor certifies that it shall replace any disabled or seriously damaged vehicle or equipment purchased with assistance from this grant, at any time during its useful life, with an equivalent vehicle or unit that produces an equal or lower level of emissions. The Sponsor assumes all financial responsibility for replacement costs. The Sponsor also certifies that it shall fulfill this replacement obligation, beyond the useful life of the affected vehicle or equipment, for the possible longer life of Airport Emission Reduction Credits that were granted to the Sponsor for this vehicle or equipment.

Z. **Trafficking in Persons**

a. Provisions applicable to a recipient that is a private entity.

1. You as the recipient, your employees, subrecipients under this award, and subrecipients' employees may not—

i. Engage in severe forms of trafficking in persons during the period of time that the award is in effect;

ii. Procure a commercial sex act during the period of time that the award is in effect; or

iii. Use forced labor in the performance of the award or subawards under the award.

2. We as the Federal awarding agency may unilaterally terminate this award, without penalty, if you or a subrecipient that is a private entity –

i. Is determined to have violated a prohibition in paragraph a.1 of this award term; or

ii. Has an employee who is determined by the agency official authorized to terminate the award to have violated a prohibition in paragraph a.1 of this award term through conduct that is either —

A. Associated with performance under this award; or

B. Imputed to you or the subrecipient using the standards and due process for imputing the conduct of an individual to an organization that are provided in 2 CFR part 180, "OMB Guidelines to Agencies on Governmentwide Debarment and Suspension (Nonprocurement)," as implemented by our agency at 49 CFR Part 29.

b. Provision applicable to a recipient other than a private entity. We as the Federal awarding agency may unilaterally terminate this award, without penalty, if a subrecipient that is a private entity--

1. Is determined to have violated an applicable prohibition in paragraph a.1 of this award term; or

2. Has an employee who is determined by the agency official authorized to terminate the award to have violated an applicable prohibition in paragraph a.1 of this award term through conduct that is either —

i. Associated with performance under this award; or

ii. Imputed to the subrecipient using the standards and due process for imputing the conduct of an individual to an organization that are provided in 2 CFR part 180, "OMB Guidelines to Agencies on Governmentwide Debarment and Suspension (Nonprocurement)," as implemented by our agency at *49 CFR Part 29*.

c. Provisions applicable to any recipient.

1. You must inform us immediately of any information you receive from any source alleging a violation of a prohibition in paragraph a.1 of this award term.

2. Our right to terminate unilaterally that is described in paragraph a.2 or b of this section:

i. Implements section 106(g) of the Trafficking Victims Protection Act of 2000 (TVPA), as amended (22 U.S.C. 7104(g)), and

ii. Is in addition to all other remedies for noncompliance that are available to us under this award.

3. You must include the requirements of paragraph a.1 of this award term in any subaward you make to a private entity.

d. Definitions. For purposes of this award term:

1. "Employee" means either:

i. An individual employed by you or a subrecipient who is engaged in the performance of the project or program under this award; or

ii. Another person engaged in the performance of the project or program under this award award and not compensated by you including, but not limited to, a volunteer or individual whose services are contributed by a third party as an in-kind contribution toward cost sharing or matching requirements.

2. "Forced labor" means labor obtained by any of the following methods: the recruitment, harboring, transportation, provision, or obtaining of a person for labor or services, through the use of force, fraud, or coercion for the purpose of subjection to involuntary servitude, peonage, debt bondage, or slavery.

3. "Private entity":

i. Means any entity other than a State, local government, Indian tribe, or foreign public entity, as those terms are defined in 2 CFR 175.25.

ii. Includes:

A. A nonprofit organization, including any nonprofit institution of higher education, hospital, or tribal organization other than one included in the definition of Indian tribe at 2 CFR 175.25(b).

B. A for-profit organization.

4. "Severe forms of trafficking in persons," "commercial sex act," and "coercion" have the meanings given at section 103 of the TVPA, as amended (22 U.S.C. 7102).

AA. **Acquisition of Noise Land:** The Sponsor hereby agrees that upon completion of the land acquisition in this project, it will prepare a Noise Land Inventory Map and Reuse Plan to standards satisfactory to the Federal Aviation Administration (FAA) and submit said documentation in final form to the FAA. It is further mutually agreed that the reasonable cost of developing said Noise Land Inventory Map and Disposal Plan is an eligible administrative cost for participation within the scope of this project.

III. Assurances

A. General.

1. These assurances shall be complied with in the performance of grant agreements for airport development, airport planning, and noise compatibility program grants for airport sponsors.

2. These assurances are required to be submitted as part of the project application by sponsors requesting funds under the provisions of Title 49, U.S.C., subtitle VII, as amended. As used herein, the term "public agency sponsor" means a public agency with control of a public-use airport; the term "private sponsor" means a private owner of a public-use airport; and the term "sponsor" includes both public agency sponsors and private sponsors.

3. Upon acceptance of the grant offer by the sponsor, these assurances are incorporated in and become part of the grant agreement.

B. Duration and Applicability.

1. Airport development or Noise Compatibility Program Projects Undertaken by a Public Agency Sponsor. The terms, conditions and assurances of the grant agreement shall remain in full force and effect throughout the useful life of the facilities developed or equipment acquired for an airport development or noise compatibility program project, or throughout the useful life of the project items installed within a facility under a noise compatibility program project, but in any event not to exceed twenty (20) years from the date of acceptance of a grant offer of Federal funds for the project. However, there shall be no limit on the duration of the assurances regarding Exclusive Rights and Airport Revenue so long as the airport is used as an airport. There shall be no limit on the duration of the terms, conditions, and assurances with respect to real property acquired with Federal funds. Furthermore, the duration of the Civil Rights assurance shall be specified in the assurances.

2. Airport Development or Noise Compatibility Projects Undertaken by a Private Sponsor. The preceding paragraph 1 also applies to a private sponsor except that the useful life of project items installed within a facility or the useful life of the facilities developed or equipment acquired under an airport development or noise compatibility program project shall be no less than ten (10) years from the date of acceptance of Federal aid for the project.

3. Airport Planning Undertaken by a Sponsor. Unless otherwise specified in the grant agreement, only Assurances 1, 2, 3, 5, 6, 13, 18, 30, 32, 33, and 34 in section IIIC apply to planning projects. The terms, conditions, and assurances of the grant agreement shall remain in full force and effect during the life of the project.

C. Sponsor Certification. The sponsor hereby assures and certifies, with respect to this grant that:

1. **General Federal Requirements**. It will comply with all applicable Federal laws, regulations, executive orders, policies, guidelines, and requirements as they relate to the application, acceptance and use of Federal funds for this project including but not limited to the following:

Federal Legislation

a. Title 49, U.S.C., subtitle VII, as amended.
b. Davis-Bacon Act - 40 U.S.C. 276(a), et seq.[1]
c. Federal Fair Labor Standards Act - 29 U.S.C. 201, et seq.
d. Hatch Act - 5 U.S.C. 1501, et seq.[2]
e. Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 Title 42 U.S.C. 4601, et seq.[1,2]
f. National Historic Preservation Act of 1966 - Section 106 - 16 U.S.C. 470(f).[1]

g. Archeological and Historic Preservation Act of 1974 - 16 U.S.C. 469 through 469c.[1]
h. Native Americans Grave Repatriation Act - 25 U.S.C. Section 3001, et seq.
i. Clean Air Act, P.L. 90-148, as amended.
j. Coastal Zone Management Act, P.L. 93-205, as amended.
k. Flood Disaster Protection Act of 1973 - Section 102(a) - 42 U.S.C. 4012a.[1]
l. Title 49 ,U.S.C., Section 303, (formerly known as Section 4(f))
m. Rehabilitation Act of 1973 - 29 U.S.C. 794.
n. Civil Rights Act of 1964 - Title VI - 42 U.S.C. 2000d through d-4.
o. Age Discrimination Act of 1975 - 42 U.S.C. 6101, et seq.
p. American Indian Religious Freedom Act, P.L. 95-341, as amended.
q. Architectural Barriers Act of 1968 -42 U.S.C. 4151, et seq.[1]
r. Power plant and Industrial Fuel Use Act of 1978 - Section 403- 2 U.S.C. 8373.[1]
s. Contract Work Hours and Safety Standards Act - 40 U.S.C. 327, et seq.[1]
t. Copeland Antikickback Act - 18 U.S.C. 874. [1]
u. National Environmental Policy Act of 1969 – U.S.C. 4321 et seq.[1]
v. Wild and Scenic Rivers Act, P.L. 90-542, as amended.
w. Single Audit Act of 1984 - 31 U.S.C. 7501, et seq.[2]
x. Drug-Free Workplace Act of 1988 - 41 U.S.C. 702 through 706.

Executive Orders

a. Executive Order 11246 - Equal Employment Opportunity1
b. Executive Order 11990 - Protection of Wetlands
c. Executive Order 11998 – Flood Plain Management
d. Executive Order 12372 - Intergovernmental Review of Federal Programs.
e. Executive Order 12699 - Seismic Safety of Federal and Federally Assisted New Building Construction1
f. Executive Order 12898 - Environmental Justice

Federal Regulations

a. 14 CFR Part 13 - Investigative and Enforcement Procedures.
b. 14 CFR Part 16 - Rules of Practice For Federally Assisted Airport Enforcement Proceedings.
c. 14 CFR Part 150 - Airport noise compatibility planning.
d. 29 CFR Part 1 - Procedures for predetermination of wage rates.[1]
e. 29 CFR Part 3 - Contractors and subcontractors on public building or public work financed in whole or part by loans or grants from the United States.[1]
f. 29 CFR Part 5 - Labor standards provisions applicable to contracts covering federally financed and assisted construction (also labor standards provisions applicable to non-construction contracts subject to the Contract Work Hours and Safety Standards Act).[1]
g. 41 CFR Part 60 - Office of Federal Contract Compliance Programs, Equal Employment Opportunity, Department of Labor (Federal and federally assisted contracting requirements).[1]
h. 49 CFR Part 18 - Uniform administrative requirements for grants and cooperative agreements to state and local governments.[3]
i. 49 CFR Part 20 - New restrictions on lobbying.
j. 49 CFR Part 21 - Nondiscrimination in federally-assisted programs of the Department of Transportation - effectuation of Title VI of the Civil Rights Act of 1964.
k. 49 CFR Part 23 - Participation by Disadvantage Business Enterprise in Airport Concessions.
l. 49 CFR Part 24 - Uniform relocation assistance and real property acquisition for Federal and federally assisted programs.[1,2]

m. 49 CFR Part 26 – Participation By Disadvantaged Business Enterprises in Department of Transportation Programs.
n. 49 CFR Part 27 - Nondiscrimination on the basis of handicap in programs and activities receiving or benefiting from Federal financial assistance.[1]
o. 49 CFR Part 29 – Government wide debarment and suspension (non-procurement) and government wide requirements for drug-free workplace (grants).
p. 49 CFR Part 30 - Denial of public works contracts to suppliers of goods and services of countries that deny procurement market access to U.S. contractors.
q. 49 CFR Part 41 - Seismic safety of Federal and federally assisted or regulated new building construction.1.

Office of Management and Budget Circulars

a. A-87 - Cost Principles Applicable to Grants and Contracts with State and Local Governments.
b. A-133 - Audits of States, Local Governments, and Non-Profit Organizations

[1] These laws do not apply to airport planning sponsors.

[2] These laws do not apply to private sponsors.

[3] 49 CFR Part 18 and OMB Circular A-87 contain requirements for State and Local Governments receiving Federal assistance. Any requirement levied upon State and Local Governments by this regulation and circular shall also be applicable to private sponsors receiving Federal assistance under Title 49, United States Code.

Specific assurances required to be included in grant agreements by any of the above laws, regulations or circulars are incorporated by reference in the grant agreement.

2. **Responsibility and Authority of the Sponsor.**

a. **Public Agency Sponsor**: It has legal authority to apply for the grant, and to finance and carry out the proposed project; that a resolution, motion or similar action has been duly adopted or passed as an official act of the applicant's governing body authorizing the filing of the application, including all understandings and assurances contained therein, and directing and authorizing the person identified as the official representative of the applicant to act in connection with the application and to provide such additional information as may be required.

b. **Private Sponsor**: It has legal authority to apply for the grant and to finance and carry out the proposed project and comply with all terms, conditions, and assurances of this grant agreement. It shall designate an official representative and shall in writing direct and authorize that person to file this application, including all understandings and assurances contained therein; to act in connection with this application; and to provide such additional information as may be required.

3. **Sponsor Fund Availability**. It has sufficient funds available for that portion of the project costs which are not to be paid by the United States. It has sufficient funds available to assure operation and maintenance of items funded under the grant agreement which it will own or control.

4. **Good Title.**

a. It, a public agency or the Federal government, holds good title, satisfactory to the Secretary, to the landing area of the airport or site thereof, or will give assurance satisfactory to the Secretary that good title will be acquired.

b. For noise compatibility program projects to be carried out on the property of the sponsor, it holds good title satisfactory to the Secretary to that portion of the property upon which Federal funds will be expended or will give assurance to the Secretary that good title will be obtained.

5. **Preserving Rights and Powers**.

a. It will not take or permit any action which would operate to deprive it of any of the rights and powers necessary to perform any or all of the terms, conditions, and assurances in the grant agreement without the written approval of the Secretary, and will act promptly to acquire, extinguish or modify any outstanding rights or claims of right of others which would interfere with such performance by the sponsor. This shall be done in a manner acceptable to the Secretary.

b. It will not sell, lease, encumber, or otherwise transfer or dispose of any part of its title or other interests in the property shown on Exhibit A to this application or, for a noise compatibility program project, that portion of the property upon which Federal funds have been expended, for the duration of the terms, conditions, and assurances in the grant agreement without approval by the Secretary. If the transferee is found by the Secretary to be eligible under Title 49, United States Code, to assume the obligations of the grant agreement and to have the power, authority, and financial resources to carry out all such obligations, the sponsor shall insert in the contract or document transferring or disposing of the sponsor's interest, and make binding upon the transferee all of the terms, conditions, and assurances contained in this grant agreement.

c. For all noise compatibility program projects which are to be carried out by another unit of local government or are on property owned by a unit of local government other than the sponsor, it will enter into an agreement with that government. Except as otherwise specified by the Secretary, that agreement shall obligate that government to the same terms, conditions, and assurances that would be applicable to it if it applied directly to the FAA for a grant to undertake the noise compatibility program project. That agreement and changes thereto must be satisfactory to the Secretary. It will take steps to enforce this agreement against the local government if there is substantial non-compliance with the terms of the agreement.

d. For noise compatibility program projects to be carried out on privately owned property, it will enter into an agreement with the owner of that property which includes provisions specified by the Secretary. It will take steps to enforce this agreement against the property owner whenever there is substantial non-compliance with the terms of the agreement.

e. If the sponsor is a private sponsor, it will take steps satisfactory to the Secretary to ensure that the airport will continue to function as a public-use airport in accordance with these assurances for the duration of these assurances.

f. If an arrangement is made for management and operation of the airport by any agency or person other than the sponsor or an employee of the sponsor, the sponsor will reserve sufficient rights and authority to insure that the airport will be operated and maintained in accordance Title 49, United States Code, the regulations and the terms, conditions and assurances in the grant agreement and shall insure that such arrangement also requires compliance therewith.

g. It will not permit or enter into any arrangement that results in permission for the owner or tenant of a property used as a residence, or zoned for residential use, to taxi an aircraft between that property and any location on airport.

6. **Consistency with Local Plans**. The project is reasonably consistent with plans (existing at the time of submission of this application) of public agencies that are authorized by the State in which the project is located to plan for the development of the area surrounding the airport.

7. **Consideration of Local Interest**. It has given fair consideration to the interest of communities in or near where the project may be located.

8. **Consultation with Users**. In making a decision to undertake any airport development project under Title 49, United States Code, it has undertaken reasonable consultations with affected parties using the airport at which project is proposed.

9. **Public Hearings**. In projects involving the location of an airport, an airport runway, or a major runway extension, it has afforded the opportunity for public hearings for the purpose of considering the economic, social, and environmental effects of the airport or runway location and its consistency with goals and objectives of such planning as has been carried out by the community and it shall, when requested by the Secretary, submit a copy of the transcript of such hearings to the Secretary. Further, for such projects, it has on its management board either voting representation from the communities where the project is located or has advised the communities that they have the right to petition the Secretary concerning a proposed project.

10. **Air and Water Quality Standards**. In projects involving airport location, a major runway extension, or runway location it will provide for the Governor of the state in which the project is located to certify in writing to the Secretary that the project will be located, designed, constructed, and operated so as to comply with applicable air and water quality standards. In any case where such standards have not been approved and where applicable air and water quality standards have been promulgated by the Administrator of the Environmental Protection Agency, certification shall be obtained from such Administrator. Notice of certification or refusal to certify shall be provided within sixty days after the project application has been received by the Secretary.

11. **Pavement Preventive Maintenance**. With respect to a project approved after January 1, 1995, for the replacement or reconstruction of pavement at the airport, it assures or certifies that it has implemented an effective airport pavement maintenance-management program and it assures that it will use such program for the useful life of any pavement constructed, reconstructed or repaired with Federal financial assistance at the airport. It will provide such reports on pavement condition and pavement management programs as the Secretary determines may be useful.

12. **Terminal Development Prerequisites**. For projects which include terminal development at a public use airport, as defined in Title 49, it has, on the date of submittal of the project grant application, all the safety equipment required for certification of such airport under section 44706 of Title 49, United States Code, and all the security equipment required by rule or regulation, and has provided for access to the passenger enplaning and deplaning area of such airport to passengers enplaning and deplaning from aircraft other than air carrier aircraft.

13. **Accounting System, Audit, and Record Keeping Requirements**.

    a. It shall keep all project accounts and records which fully disclose the amount and disposition by the recipient of the proceeds of the grant, the total cost of the project in connection with which the grant is given or used, and the amount or nature of that portion of the cost of the project supplied by other sources, and such other financial records

pertinent to the project. The accounts and records shall be kept in accordance with an accounting system that will facilitate an effective audit in accordance with the Single Audit Act of 1984.

b. It shall make available to the Secretary and the Comptroller General of the United States, or any of their duly authorized representatives, for the purpose of audit and examination, any books, documents, papers, and records of the recipient that are pertinent to the grant. The Secretary may require that an appropriate audit be conducted by a recipient. In any case in which an independent audit is made of the accounts of a sponsor relating to the disposition of the proceeds of a grant or relating to the project in connection with which the grant was given or used, it shall file a certified copy of such audit with the Comptroller General of the United States not later than six (6) months following the close of the fiscal year for which the audit was made.

14. **Minimum Wage Rates**. It shall include, in all contracts in excess of $2,000 for work on any projects funded under the grant agreement which involve labor, provisions establishing minimum rates of wages, to be predetermined by the Secretary of Labor, in accordance with the Davis-Bacon Act, as amended (40 U.S.C. 276a-276a-5), which contractors shall pay to skilled and unskilled labor, and such minimum rates shall be stated in the invitation for bids and shall be included in proposals or bids for the work.

15. **Veteran's Preference**. It shall include in all contracts for work on any project funded under the grant agreement which involve labor, such provisions as are necessary to insure that, in the employment of labor (except in executive, administrative, and supervisory positions), preference shall be given to Veterans of the Vietnam era and disabled veteran as defined in Section 47112 of Title 49, United States Code. However, this preference shall apply only where the individuals are available and qualified to perform the work to which the employment relates.

16. **Conformity to Plans and Specifications**. It will execute the project subject to plans, specifications, and schedules approved by the Secretary. Such plans, specifications, and schedules shall be submitted to the Secretary prior to commencement of site preparation, construction, or other performance under this grant agreement, and, upon approval of the Secretary, shall be incorporated into this grant agreement. Any modification to the approved plans, specifications, and schedules shall also be subject to approval of the Secretary, and incorporated into the grant agreement.

17. **Construction Inspection and Approval**. It will provide and maintain competent technical supervision at the construction site throughout the project to assure that the work conforms to the plans, specifications, and schedules approved by the Secretary for the project. It shall subject the construction work on any project contained in an approved project application to inspection and approval by the Secretary and such work shall be in accordance with regulations and procedures prescribed by the Secretary. Such regulations and procedures shall require such cost and progress reporting by the sponsor or sponsors of such project as the Secretary shall deem necessary.

18. **Planning Projects**. In carrying out planning projects:

    a. It will execute the project in accordance with the approved program narrative contained in the project application or with the modifications similarly approved.

    b. It will furnish the Secretary with such periodic reports as required pertaining to the planning project and planning work activities.

    c. It will include in all published material prepared in connection with the planning project a notice that the material was prepared under a grant provided by the United States.

d. It will make such material available for examination by the public, and agrees that no material prepared with funds under this project shall be subject to copyright in the United States or any other country.

e. It will give the Secretary unrestricted authority to publish, disclose, distribute, and otherwise use any of the material prepared in connection with this grant.

f. It will grant the Secretary the right to disapprove the sponsor's employment of specific consultants and their subcontractors to do all or any part of this project as well as the right to disapprove the proposed scope and cost of professional services.

g. It will grant the Secretary the right to disapprove the use of the sponsor's employees to do all or any part of the project.

h. It understands and agrees that the Secretary's approval of this project grant or the Secretary's approval of any planning material developed as part of this grant does not constitute or imply any assurance or commitment on the part of the Secretary to approve any pending or future application for a Federal airport grant.

19. **Operation and Maintenance.**

a. The airport and all facilities which are necessary to serve the aeronautical users of the airport, other than facilities owned or controlled by the United States, shall be operated at all times in a safe and serviceable condition and in accordance with the minimum standards as may be required or prescribed by applicable Federal, state and local agencies for maintenance and operation. It will not cause or permit any activity or action thereon which would interfere with its use for airport purposes. It will suitably operate and maintain the airport and all facilities thereon or connected therewith, with due regard to climatic and flood conditions. Any proposal to temporarily close the airport for non-aeronautical purposes must first be approved by the Secretary. In furtherance of this assurance, the sponsor will have in effect arrangements for-

(1) Operating the airport's aeronautical facilities whenever required;

(2) Promptly marking and lighting hazards resulting from airport conditions, including temporary conditions; and

(3) Promptly notifying airmen of any condition affecting aeronautical use of the airport.

Nothing contained herein shall be construed to require that the airport be operated for aeronautical use during temporary periods when snow, flood or other climatic conditions interfere with such operation and maintenance. Further, nothing herein shall be construed as requiring the maintenance, repair, restoration, or replacement of any structure or facility which is substantially damaged or destroyed due to an act of God or other condition or circumstance beyond the control of the sponsor.

b. It will suitably operate and maintain noise compatibility program items that it owns or controls upon which Federal funds have been expended.

20. **Hazard Removal and Mitigation**. It will take appropriate action to assure that such terminal airspace as is required to protect instrument and visual operations to the airport (including established minimum flight altitudes) will be adequately cleared and protected by removing, lowering, relocating, marking, or lighting or otherwise mitigating existing airport hazards and by preventing the establishment or creation of future airport hazards.

21. **Compatible Land Use**. It will take appropriate action, to the extent reasonable, including the adoption of zoning laws, to restrict the use of land adjacent to or in the immediate vicinity of the

airport to activities and purposes compatible with normal airport operations, including landing and takeoff of aircraft. In addition, if the project is for noise compatibility program implementation, it will not cause or permit any change in land use, within its jurisdiction, that will reduce its compatibility, with respect to the airport, of the noise compatibility program measures upon which Federal funds have been expended.

22. **Economic Nondiscrimination**.

a. It will make the airport available as an airport for public use on reasonable terms and without unjust discrimination to all types, kinds and classes of aeronautical activities, including commercial aeronautical activities offering services to the public at the airport.

b. In any agreement, contract, lease, or other arrangement under which a right or privilege at the airport is granted to any person, firm, or corporation to conduct or to engage in any aeronautical activity for furnishing services to the public at the airport, the sponsor will insert and enforce provisions requiring the contractor to:

(1) furnish said services on a reasonable, and not unjustly discriminatory, basis to all users thereof, and

(2) charge reasonable, and not unjustly discriminatory, prices for each unit or service, provided that the contractor may be allowed to make reasonable and nondiscriminatory discounts, rebates, or other similar types of price reductions to volume purchasers.

c. Each fixed-based operator at the airport shall be subject to the same rates, fees, rentals, and other charges as are uniformly applicable to all other fixed-based operators making the same or similar uses of such airport and utilizing the same or similar facilities.

d. Each air carrier using such airport shall have the right to service itself or to use any fixed-based operator that is authorized or permitted by the airport to serve any air carrier at such airport.

e. Each air carrier using such airport (whether as a tenant, nontenant, or subtenant of another air carrier tenant) shall be subject to such nondiscriminatory and substantially comparable rules, regulations, conditions, rates, fees, rentals, and other charges with respect to facilities directly and substantially related to providing air transportation as are applicable to all such air carriers which make similar use of such airport and utilize similar facilities, subject to reasonable classifications such as tenants or nontenants and signatory carriers and nonsignatory carriers. Classification or status as tenant or signatory shall not be unreasonably withheld by any airport provided an air carrier assumes obligations substantially similar to those already imposed on air carriers in such classification or status.

f. It will not exercise or grant any right or privilege which operates to prevent any person, firm, or corporation operating aircraft on the airport from performing any services on its own aircraft with its own employees [including, but not limited to maintenance, repair, and fueling] that it may choose to perform.

g. In the event the sponsor itself exercises any of the rights and privileges referred to in this assurance, the services involved will be provided on the same conditions as would apply to the furnishing of such services by commercial aeronautical service providers authorized by the sponsor under these provisions.

h. The sponsor may establish such reasonable, and not unjustly discriminatory, conditions to be met by all users of the airport as may be necessary for the safe and efficient operation of the airport.

i. The sponsor may prohibit or limit any given type, kind or class of aeronautical use of the airport if such action is necessary for the safe operation of the airport or necessary to serve the civil aviation needs of the public.

23. **Exclusive Rights**. It will permit no exclusive right for the use of the airport by any person providing, or intending to provide, aeronautical services to the public. For purposes of this paragraph, the providing of the services at an airport by a single fixed-based operator shall not be construed as an exclusive right if both of the following apply:

    a. It would be unreasonably costly, burdensome, or impractical for more than one fixed-based operator to provide such services, and

    b. If allowing more than one fixed-based operator to provide such services would require the reduction of space leased pursuant to an existing agreement between such single fixed-based operator and such airport.

    It further agrees that it will not, either directly or indirectly, grant or permit any person, firm, or corporation, the exclusive right at the airport to conduct any aeronautical activities, including, but not limited to charter flights, pilot training, aircraft rental and sightseeing, aerial photography, crop dusting, aerial advertising and surveying, air carrier operations, aircraft sales and services, sale of aviation petroleum products whether or not conducted in conjunction with other aeronautical activity, repair and maintenance of aircraft, sale of aircraft parts, and any other activities which because of their direct relationship to the operation of aircraft can be regarded as an aeronautical activity, and that it will terminate any exclusive right to conduct an aeronautical activity now existing at such an airport before the grant of any assistance under Title 49, United States Code.

24. **Fee and Rental Structure**. It will maintain a fee and rental structure for the facilities and services at the airport which will make the airport as self-sustaining as possible under the circumstances existing at the particular airport, taking into account such factors as the volume of traffic and economy of collection. No part of the Federal share of an airport development, airport planning or noise compatibility project for which a grant is made under Title 49, United States Code, the Airport and Airway Improvement Act of 1982, the Federal Airport Act or the Airport and Airway Development Act of 1970 shall be included in the rate basis in establishing fees, rates, and charges for users of that airport.

25. **Airport Revenues**.

    a. All revenues generated by the airport and any local taxes on aviation fuel established after December 30, 1987, will be expended by it for the capital or operating costs of the airport; the local airport system; or other local facilities which are owned or operated by the owner or operator of the airport and which are directly and substantially related to the actual air transportation of passengers or property; or for noise mitigation purposes on or off the airport. Provided, however, that if covenants or assurances in debt obligations issued before September 3, 1982, by the owner or operator of the airport, or provisions enacted before September 3, 1982, in governing statutes controlling the owner or operator's financing, provide for the use of the revenues from any of the airport owner or operator's facilities, including the airport, to support not only the airport but also the airport owner or operator's general debt obligations or other facilities, then this limitation on the use of all revenues generated by the airport (and, in the case of a public airport, local taxes on aviation fuel) shall not apply.

    b. As part of the annual audit required under the Single Audit Act of 1984, the sponsor will direct that the audit will review, and the resulting audit report will provide an opinion concerning, the use of airport revenue and taxes in paragraph (a), and indicating whether funds paid or transferred to the owner or operator are paid or transferred in a manner

consistent with Title 49, United States Code and any other applicable provision of law, including any regulation promulgated by the Secretary or Administrator.

c. Any civil penalties or other sanctions will be imposed for violation of this assurance in accordance with the provisions of Section 47107 of Title 49, United States Code.

26. **Reports and Inspections.** It will:

a. submit to the Secretary such annual or special financial and operations reports as the Secretary may reasonably request and make such reports available to the public; make available to the public at reasonable times and places a report of the airport budget in a format prescribed by the Secretary;

b. for airport development projects, make the airport and all airport records and documents affecting the airport, including deeds, leases, operation and use agreements, regulations and other instruments, available for inspection by any duly authorized agent of the Secretary upon reasonable request;

c. for noise compatibility program projects, make records and documents relating to the project and continued compliance with the terms, conditions, and assurances of the grant agreement including deeds, leases, agreements, regulations, and other instruments, available for inspection by any duly authorized agent of the Secretary upon reasonable request; and

d. in a format and time prescribed by the Secretary, provide to the Secretary and make available to the public following each of its fiscal years, an annual report listing in detail:

(1) all amounts paid by the airport to any other unit of government and the purposes for which each such payment was made; and

(2) all services and property provided by the airport to other units of government and the amount of compensation received for provision of each such service and property.

27. **Use by Government Aircraft**. It will make available all of the facilities of the airport developed with Federal financial assistance and all those usable for landing and takeoff of aircraft to the United States for use by Government aircraft in common with other aircraft at all times without charge, except, if the use by Government aircraft is substantial, charge may be made for a reasonable share, proportional to such use, for the cost of operating and maintaining the facilities used. Unless otherwise determined by the Secretary, or otherwise agreed to by the sponsor and the using agency, substantial use of an airport by Government aircraft will be considered to exist when operations of such aircraft are in excess of those which, in the opinion of the Secretary, would unduly interfere with use of the landing areas by other authorized aircraft, or during any calendar month that-

a. Five (5) or more Government aircraft are regularly based at the airport or on land adjacent thereto; or

b. The total number of movements (counting each landing as a movement) of Government aircraft is 300 or more, or the gross accumulative weight of Government aircraft using the airport (the total movement of Government aircraft multiplied by gross weights of such aircraft) is in excess of five million pounds.

28. **Land for Federal Facilities**. It will furnish without cost to the Federal Government for use in connection with any air traffic control or air navigation activities, or weather-reporting and communication activities related to air traffic control, any areas of land or water, or estate therein, or rights in buildings of the sponsor as the Secretary considers necessary or desirable for construction, operation, and maintenance at Federal expense of space or facilities for such

purposes. Such areas or any portion thereof will be made available as provided herein within four months after receipt of a written request from the Secretary.

29. **Airport Layout Plan**.

    a. It will keep up to date at all times an Airport Layout Plan of the airport showing (1) boundaries of the airport and all proposed additions thereto, together with the boundaries of all offsite areas owned or controlled by the sponsor for airport purposes and proposed additions thereto; (2) the location and nature of all existing and proposed airport facilities and structures (such as runways, taxiways, aprons, terminal buildings, hangars and roads), including all proposed extensions and reductions of existing airport facilities; and (3) the location of all existing and proposed non-aviation areas and of all existing improvements thereon. Such Airport Layout Plans and each amendment, revision, or modification thereof, shall be subject to the approval of the Secretary which approval shall be evidenced by the signature of a duly authorized representative of the Secretary on the face of the Airport Layout Plan. The sponsor will not make or permit any changes or alterations in the airport or any of its facilities which are not in conformity with the Airport Layout Plan as approved by the Secretary and which might, in the opinion of the Secretary, adversely affect the safety, utility or efficiency of the airport.

    b. If a change or alteration in the airport or the facilities is made which the Secretary determines adversely affects the safety, utility, or efficiency of any federally owned, leased, or funded property on or off the airport and which is not in conformity with the Airport Layout Plan as approved by the Secretary, the owner or operator will, if requested, by the Secretary (1) eliminate such adverse effect in a manner approved by the Secretary; or (2) bear all costs of relocating such property (or replacement thereof) to a site acceptable to the Secretary and all costs of restoring such property (or replacement thereof) to the level of safety, utility, efficiency, and cost of operation existing before the unapproved change in the airport or its facilities.

30. **Civil Rights**. It will comply with such rules as are promulgated to assure that no person shall, on the grounds of race, creed, color, national origin, sex, age, or handicap be excluded from participating in any activity conducted with or benefiting from funds received from this grant. This assurance obligates the sponsor for the period during which Federal financial assistance is extended to the program, except where Federal financial assistance is to provide, or is in the form of personal property or real property or interest therein or structures or improvements thereon in which case the assurance obligates the sponsor or any transferee for the longer of the following periods: (a) the period during which the property is used for a purpose for which Federal financial assistance is extended, or for another purpose involving the provision of similar services or benefits, or (b) the period during which the sponsor retains ownership or possession of the property.

31. **Disposal of Land**.

    a. For land purchased under a grant for airport noise compatibility purposes, it will dispose of the land, when the land is no longer needed for such purposes, at fair market value, at the earliest practicable time. That portion of the proceeds of such disposition which is proportionate to the United States' share of acquisition of such land will, at the discretion of the Secretary, 1) be paid to the Secretary for deposit in the Trust Fund, or 2) be reinvested in an approved noise compatibility project as prescribed by the Secretary, including the purchase of nonresidential buildings or property in the vicinity of residential buildings or property previously purchased by the airport as part of a noise compatibility program.

    b. For land purchased under a grant for airport development purposes (other than noise compatibility), it will, when the land is no longer needed for airport purposes, dispose of such land at fair market value or make available to the Secretary an amount equal to the United States' proportionate share of the fair market value of the land. That portion of the

proceeds of such disposition which is proportionate to the United States' share of the cost of acquisition of such land will, (a) upon application to the Secretary, be reinvested in another eligible airport improvement project or projects approved by the Secretary at that airport or within the national airport system, or (b) be paid to the Secretary for deposit in the Trust Fund if no eligible project exists.

c. Land shall be considered to be needed for airport purposes under this assurance if (a) it may be needed for aeronautical purposes (including runway protection zones) or serve as noise buffer land, and (b) the revenue from interim uses of such land contributes to the financial self-sufficiency of the airport. Further, land purchased with a grant received by an airport operator or owner before December 31, 1987, will be considered to be needed for airport purposes if the Secretary or Federal agency making such grant before December 31, 1987, was notified by the operator or owner of the uses of such land, did not object to such use, and the land continues to be used for that purpose, such use having commenced no later than December 15, 1989.

d. Disposition of such land under (a), (b) or (c) will be subject to the retention or reservation of any interest or right therein necessary to ensure that such land will only be used for purposes which are compatible with noise levels and safety associated with operation of the airport.

32. **Engineering and Design Services**. It will award each contract, or sub-contract for program management, construction management, planning studies, feasibility studies, architectural services, preliminary engineering, design, engineering, surveying, mapping or related services with respect to the project in the same manner as a contract for architectural and engineering services is negotiated under Title IX of the Federal Property and Administrative Services Act of 1949 or an equivalent qualifications-based requirement prescribed for or by the sponsor of the airport.

33. **Foreign Market Restrictions**. It will not allow funds provided under this grant to be used to fund any project which uses any product or service of a foreign country during the period in which such foreign country is listed by the United States Trade Representative as denying fair and equitable market opportunities for products and suppliers of the United States in procurement and construction.

34. **Policies, Standards, and Specifications**. It will carry out the project in accordance with policies, standards, and specifications approved by the Secretary including but not limited to the most current version, at the time the grant is signed, of the advisory circulars listed under the following table titled "Current FAA Advisory Circulars for AIP Projects", and in accordance with applicable state policies, standards, and specifications approved by the Secretary.

CURRENT FAA ADVISORY CIRCULARS REQUIRED FOR USE IN AIP FUNDED AND PFC APPROVED PROJECTS

Dated: 6/2/2010

View the most current versions of these ACs and any associated changes at:
http://www.faa.gov/airports_airtraffic/airports/resources/advisory_circulars

NUMBER	TITLE
70/7460-1K	Obstruction Marking and Lighting
150/5000-13A	Announcement of Availability—RTCA Inc., Document RTCA-221, Guidance and Recommended Requirements for Airports Surface Movement Sensors
150/5020-1	Noise Control and Compatibility Planning for Airports
150/5070-6B Change 1	Airport Master Plans
150/5070-7	The Airport System Planning Process
150/5200-28D	Notices to Airmen (NOTAMS) for Airport Operators
150/5200-30C	Airport Winter Safety and Operations
150/5200-33B	Hazardous Wildlife Attractants On or Near Airports
150/5210-5D	Painting, Marking and lighting of Vehicles Used on an Airport
150/5210-7D	Aircraft Fire and Rescue Communications
150/5210-13B	Water Rescue Plans, Facilities, and Equipment
150/5210-14B	Airport Fire and Rescue Personnel Protective Clothing
150/5210-15A	Airport Rescue & Firefighting Station Building Design
150/5210-18A	Systems for Interactive Training of Airport Personnel
150/5210-19A	Driver's Enhanced Vision System (DEVS)
150/5220-4B	Water Supply Systems for Aircraft Fire and Rescue Protection
150/5220-13B	Runway Surface Condition Sensor Specification Guide
150/5220-16C	Automated Weather Observing Systems for Non-Federal Applications
150/5220-17A And Change 1	Design Standards for Aircraft Rescue Firefighting Training Facility

NUMBER	TITLE
150/5220-18A	Buildings for Storage and Maintenance of Airport Snow and Ice Control Equipment and Materials
150/5220-20 and Change 1	Airport Snow and Ice Control Equipment
150/5220-21B	Guide Specification for Lifts Used to Board Airline Passengers With Mobility Impairments
150/5220-22A	Engineered Materials Arresting System (EMAS) for Aircraft Overruns
150/5220-23	Frangible Connections
150/5220-24	Foreign Object Detection Equipment
150/5300-13 and Changes 1 –15	Airport Design
150/5300-14B	Design of Aircraft Deicing Facilities
150/5300-16A	General Guidance and Specifications for Aeronautical Surveys: Establishment of Geodetic Control and Submission to the National Geodetic Survey
150/5300-17B	General Guidance and Specifications for Aeronautical Survey Airport Imagery Acquisition
150/5300-18B	General Guidance and Specifications for Submission of Aeronautical Surveys to NGS: Field Data Collection and Geographic Information System (GIS) Standards
150/5320-5C and Changes 1	Surface Drainage Design
150/5320-6E	Airport Pavement Design and Evaluation
150/5320-12C and Changes 1 through 8	Measurement, Construction, and Maintenance of Skid Resistant Airport Pavement Surfaces
150/5320-14	Airport Landscaping for Noise Control Purposes
150/5320-15A	Management of Airport Industrial Waste
150/5325-4B	Runway Length Requirements for Airport Design
150/5335-5A	Standardized Method of Reporting Pavement Strength PCN
150/5340-1J and Changes 2	Standards for Airport Markings (Change 1&2)
150/5340-5C	Segmented Circle Airport Marker System
150/5340-18E	Standards for Airport Sign Systems

NUMBER	TITLE
150/5340-30D	Design and Installation Details for Airport Visual Aids
150/5345-3F	Specification for L821 Panels for Control of Airport Lighting
150/5345-5B	Circuit Selector Switch
1505345-7E	Specification for L824 Underground Electrical Cable for Airport Lighting Circuits
150/5345-10F	Specification for Constant Current Regulators Regulator Monitors
150/5345-12E	Specification for Airport and Heliport Beacon
150/5345-13B	Specification for L841 Auxiliary Relay Cabinet Assembly for Pilot Control of Airport Lighting Circuits
150/5345-26D	Specification for L823 Plug and Receptacle, Cable Connectors
150/5345-27D	Specification for Wind Cone Assemblies
150/5345-28F	Precision Approach Path Indicator (PAPI) Systems
150/5345-39C	FAA Specification L853, Runway and Taxiway Retroreflective Markers
150/5345-42F	Specification for Airport Light Bases, Transformer Housings, Junction Boxes and Accessories
150/5345-43F	Specification for Obstruction Lighting Equipment
150/5345-44H	Specification for Taxiway and Runway Signs
150/5345-45C	Low-Impact Resistant (LIR) Structures
150/5345-46D	Specification for Runway and Taxiway Light Fixtures
150/5345-47B	Specifications for Series to Series Isolation Transformers for Airport Lighting System
150/5345-49C	Specification L854, Radio Control Equipment
150/5345-50B	Specification for Portable Runway and Taxiway Lights
150/5345-51A	Specification for Discharge-Type Flasher Equipment
150/5345-52A	Generic Visual Glideslope Indicators (GVGI)
150/5345-53C	Airport Lighting Equipment Certification Program

NUMBER	TITLE
150/5345-54B	Specification for L-1884, Power and Control Unit for Land and Hold Short
150/5345-55A	Specification for L893, Lighted Visual Aid to Indicate Temporary Runway Closure
150/5345-56A	Specification for L-890 Airport Lighting Control and Monitoring System (ALCMS)
150/5360-9	Planning and Design of Airport Terminal Facilities at NonHub Locations
150/5360-12E	Airport Signing and Graphics
150/5360-13 and Change 1	Planning and Design Guidance for Airport Terminal Facilities
150/5370-2E	Operational Safety on Airports During Construction
150/5370-10E	Standards for Specifying Construction of Airports
150/5370-11A	Use of Nondestructive Testing Devices in the Evaluation of Airport Pavement
150/5380-6B	Guidelines and Procedures for Maintenance of Airport Pavements
150/5390-2B	Heliport Design
150/5390-3	Vertiport Design
150/5395-1	Seaplane Bases

THE FOLLOWING ADDITIONAL APPLY TO AIP PROJECTS ONLY
DATED: 6/2/2010

NUMBER	TITLE
150/5100-14D	Architectural, Engineering, and Planning Consultant Services for Airport Grant Projects
150/5100-15A	Civil Rights Requirements for the Airport Improvement Program
150/5100-17 and Changes 1 through 6	Land Acquisition and Relocation Assistance for Airport Improvement Program Assisted Projects
150/5200-37	Introduction to Safety Management Systems (SMS) for Airport Operators
150/5300-15A	Use of Value Engineering for Engineering Design of Airports Grant Projects
150/5320-17	Airfield Pavement Surface Evaluation and Rating (PASER) Manuals
150/5370-6D Change 1-4	Construction Progress and Inspection Report – Airport Grant Program
150/5370-12A	Quality Control of Construction for Airport Grant Projects
150/5370-13A	Offpeak Construction of Airport Pavements Using Hot-Mix Asphalt
150/5380-7A	Airport Pavement Management Program
150/5380-8A	Handbook for Identification of Alkali-Silica Reactivity in Airfield Pavements

THE FOLLOWING ADDITIONAL APPLY TO PFC PROJECTS ONLY
DATED: 6/2/2010

NUMBER	TITLE
150/5000-12	Announcement of Availability – Passenger Facility Charge (PFC) Application (FAA Form 5500-1)

35. **Relocation and Real Property Acquisition**. (1) It will be guided in acquiring real property, to the greatest extent practicable under State law, by the land acquisition policies in Subpart B of 49 CFR Part 24 and will pay or reimburse property owners for necessary expenses as specified in Subpart B. (2) It will provide a relocation assistance program offering the services described in Subpart C and fair and reasonable relocation payments and assistance to displaced persons as required in Subpart D and E of 49 CFR Part 24. (3) It will make available within a reasonable period of time prior to displacement, comparable replacement dwellings to displaced persons in accordance with Subpart E of 49 CFR Part 24.

36. **Access By Intercity Buses**. The airport owner or operator will permit, to the maximum extent practicable, intercity buses or other modes of transportation to have access to the airport; however, it has no obligation to fund special facilities for intercity buses or for other modes of transportation.

37. **Disadvantaged Business Enterprises.** The recipient shall not discriminate on the basis of race, color, national origin or sex in the award and performance of any DOT-assisted contract or in the administration of its DBE program or the requirements of 49 CFR Part 26. The Recipient shall take all necessary and reasonable steps under 49 CFR Part 26 to ensure non discrimination in the award and administration of DOT-assisted contracts. The recipient's DBE program, as required by 49 CFR Part 26, and as approved by DOT, is incorporated by reference in this agreement. Implementation of this program is a legal obligation and failure to carry out its terms shall be treated as a violation of this agreement. Upon notification to the recipient of its failure to carry out its approved program, the Department may impose sanctions as provided for under Part 26 and may, in appropriate cases, refer the matter for enforcement under 18 U.S.C. 1001 and/or the Program Fraud Civil Remedies Act of 1986 (31 U.S.C. 3801).

38. **Hangar Construction.** If the airport owner or operator and a person who owns an aircraft agree that a hangar is to be constructed at the airport for the aircraft at the aircraft's owner's expense, the airport owner or operator will grant to the aircraft owner for the hangar a long term lease that is subject to such terms and conditions on the hangar as the airport owner or operator may impose.

39. **Competitive Access.**

    a. If the airport owner or operator of a medium or large hub airport (as defined in section 47102 of title 49, U.S.C.) has been unable to accommodate one or more requests by an air carrier for access to gates or other facilities at that airport in order to allow the air carrier to provide service to the airport or to expand service at the airport, the airport owner or operator shall transmit a report to the Secretary that:

        (1) Describes the requests;

        (2) Provides an explanation as to why the requests could not be accommodated; and

        (3) Provides a time frame within, if any, the airport will be able to accommodate requests.

    b. Such report shall be due on either February 1 or August 1 of each year if the airport has been unable to accommodate the request(s) in the six month period prior to the applicable due date.

IV. Standard DOT Title VI Assurances

The sponsor hereby agrees that as a condition to receiving Federal financial assistance from the Department of Transportation (DOT), it will comply with Title VI of the Civil Rights Act of 1964 (42 U.S.C. 2000d et seq.) and all requirements imposed by 49 CFR Part 21, - Nondiscrimination in Federally Assisted Programs of the Department of Transportation -- Effectuation of Title VI of the Civil Rights Act of 1964

(hereinafter referred to as the "Regulations") to the end that no person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity for which the applicant receives Federal financial assistance and will immediately take any measures necessary to effectuate this agreement. Without limiting the above general assurance, the sponsor agrees concerning this grant that:

A. Each "program" and "facility" (as defined in Sections 21.23(e) and 21.23 (b)) will be conducted or operated in compliance with all requirements of the Regulations.

B. It will insert the following clauses in every contract subject to the Act and the Regulations:

"During the performance of this contract, the contractor, for itself, its assignees and successors in interest (hereinafter referred to as the "contractor") agrees as follows:

1. Compliance with Regulations. The contractor shall comply with the Regulations relative to nondiscrimination in federally assisted programs of the Department of Transportation (hereinafter, "DOT") Title 49, Code of Federal Regulations, Part 21, as they may be amended from time to time (hereinafter referred to as the Regulations), which are herein incorporated by reference and made a part of this contract.

2. Nondiscrimination. The contractor, with regard to the work performed by it during the contract, shall not discriminate on the grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials and leases of equipment. The contractor shall not participate either directly or indirectly in the discrimination prohibited by section 21.5 of the Regulations, including employment practices when the contract covers a program set forth in Appendix B of the Regulations.

3. Solicitations for Subcontracts, Including Procurements of Materials and Equipment. In all solicitations either by competitive bidding or negotiation made by the contractor for work to be performed under a subcontract, including procurements of materials or leases of equipment, each potential subcontractor or supplier shall be notified by the contractor of the contractor's obligations under this contract and the Regulations relative to nondiscrimination on the grounds of race, color, or national origin.

4. Information and Reports. The contractor shall provide all information and reports required by the Regulations or directives issued pursuant thereto and shall permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the sponsor or the Federal Aviation Administration (FAA) to be pertinent to ascertain compliance with such Regulations, orders, and instructions. Where any information required of a contractor is in the exclusive possession of another who fails or refuses to furnish this information, the contractor shall so certify to the sponsor or the FAA, as appropriate, and shall set forth what efforts it has made to obtain the information.

5. Sanctions or Noncompliance. In the event of the contractor's noncompliance with the nondiscrimination provisions of this contract, the sponsor shall impose such contract sanctions as it or the FAA may determine to be appropriate, including, but not limited to:

a. Withholding of payments to the contractor under the contract until the contractor complies, and/or

b. Cancellation, termination, or suspension of the contract, in whole or in part.

6. Incorporation of Provisions. The contractor shall include the provisions of paragraphs 1 through 5 in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Regulations or directives issued pursuant thereto. The contractor shall take such action with respect to any subcontract or procurement as the sponsor."

C. Where Federal financial assistance is received to construct a facility, or part of a facility, the assurance shall extend to the entire facility and facilities operated in connection therewith.

D. Where Federal financial assistance is in the form or for the acquisition of real property or an interest in real property, the assurance shall extend to rights to space on, over, or under such property.

E. It will include the following clauses, as appropriate:

"1. The (grantee, licensee, lessee, permitee, etc., as appropriate) for himself, his heirs, personal representatives, successors in interest, and assigns, as a part of the consideration hereof, does hereby covenant and agree (in the case of deeds and leases add "as a covenant running with the land") that in the event facilities are constructed, maintained, or otherwise operated on the said property described in this (deed, license, lease, permit, etc.) for a purpose for which a DOT program or activity is extended or for another purpose involving the provision of similar services or benefits, the (grantee, licensee, leasee, permitee, etc.) shall maintain and operate such facilities and services in compliance with all other requirements imposed pursuant to 49 CFR Part 21, Nondiscrimination in Federally Assisted Programs of the Department of Transportation, and as said Regulations may be amended.

2. The (grantee, licensee, lessee, permitee, etc., as appropriate) for himself, his personal representatives, successors in interest, and assigns, as a part of the consideration hereof, does hereby covenant and agree (in the case of deeds and leases add "as a covenant running with the land") that: (1) no person on the grounds of race, color, or national origin shall be excluded from participation in, denied the benefits of, or be otherwise subjected to discrimination in the use of said facilities, (2) that in the construction of any improvements on, over, or under such land and the furnishing of services thereon, no person on the grounds of race, color, or national origin shall be excluded from participation in, denied the benefits of, or otherwise be subjected to discrimination, (3) that the (grantee, licensee, lessee, permittee, etc.) shall use the premises in compliance with all other requirements imposed by or pursuant to 49 CFR Part 21, Nondiscrimination in Federally Assisted Programs of the Department of Transportation, and as said Regulations may be amended, of the FAA may direct as a means of enforcing such provisions including sanctions or noncompliance. Provided, however, that in the event a contract becomes involved in, or is threatened with, litigation with a subcontractor or supplier as a result of such direction, the contractor may request the sponsor to enter into such litigation to protect the interests of the sponsor and, in addition, the contractor may request the United States to enter into such litigation to protect the interests of the United States."

as a covenant running with the land, in any future deeds, leases, permits, licenses, and similar agreements entered into by the sponsor with other parties:

1. for the subsequent transfer of real property acquired or improved with Federal financial assistance under this Project; and

2. for the construction or use of or access to space on, over, or under real property acquired or improved with Federal financial assistance under this Project.

F. This assurance obligates the sponsor for the period during which Federal financial assistance is extended to the program, except where the Federal financial assistance is to provide, or is in the form of personal property or real property or interest therein or structures or improvements thereon, in which case the assurance obligates the sponsor or any transferee for the longer of the following periods.

1. the period during which the property is used for a purpose for which Federal financial assistance is extended, or for another purpose involving the provision of similar services or benefits, or

2. the period during which the sponsor retains ownership or possession of the property.

G. It will provide for such methods of administration for the program as are found by the Secretary of Transportation or the official to whom he delegates specific authority to give reasonable guarantee that it, other sponsors, subgrantees, contractors, subcontractors, transferees, successors in interest, and other participants or Federal financial assistance under such program will comply with all requirements imposed or pursuant to the Act, the Regulations, and this assurance.

H. It agrees that the United States has a right to seek judicial enforcement with regard to any matter arising under the Act, the Regulations, and this assurance.

This assurance is given in consideration of and for the purpose of obtaining Federal financial ACE-1450 Standard DOT Title VI Assurance 8/29/96 assistance for this Project and is binding on its contractors, the sponsor, subcontractors, transferees, successors in interest and other participants in the Project. The person or persons whose signatures appear below are authorized to sign this assurance on behalf of the sponsor.

V. Sponsor Acceptance of Terms and Conditions

I certify that, for any and all projects with federal participation to be undertaken by the Sponsor, the Sponsor agrees to accomplish the projects within the terms and conditions contained herein.

City of Fresno
Name of Sponsor

_____
Signature Sponsor's Designated Official Representative

_____
Title

_____
Dated

STATE OF CALIFORNIA Edmund G. Brown, Jr., *Governor*

NATIVE AMERICAN HERITAGE COMMISSION
915 CAPITOL MALL, ROOM 364
SACRAMENTO, CA 95814
(916) 653-6251
Fax (916) 657-5390
Web Site www.nahc.ca.gov
e-mail: ds_nahc@pacbell.net

August 31, 2011

Mr. Robert L. Dogan, GS-13, REM
Planning and Requirements Branch
United States Department of Defense
National Guard Bureau
3501 Fetchet Avenue
Joint Base Andrews, MD 20762-5157

Re: Request for a Sacred Lands File Inventory Search and Native American Contacts List for the **"Aircraft Conversion for the 144th Fighter Wing (144 FW), California Air National Guard Facility Project;"** located at the Fresno-Yosemite International Airport (IAP) in the City of Fresno; Fresno County, California.

Dear Mr. Dogan:

The Native American Heritage Commission (NAHC) is the California State 'Trustee Agency' pursuant to Public Resources Code §21070 for the protection of California's Native American Cultural Resources. The NAHC is also a 'reviewing agency' for environmental documents prepared under the National Environmental Policy Act (NEPA; 42 U.S.C. 4321 *et seq*), 36 CFR Part 800.3, .5 and are subject to the Tribal and interested Native American consultation as required by the National Historic Preservation Act, as amended (Section 106) (16 U.S.C. 470; Section 106 [f] 110 [f] [k], 304). The provisions of the Native American Graves Protection and Repatriation Act (NAGPRA) (25 U.S.C. 3001-3013) and its implementation (43 CFR Part 10.2), and California Government Code §27491 may apply to this project if Native American human remains are inadvertently discovered.

The NAHC is of the opinion that the federal standards, pursuant to the above-referenced Acts and the Council on Environmental Quality (CSQ; 42 U.S.C. 4371 *et seq*) are similar to and in many cases more stringent with regard to the 'significance' of historic, including Native American items, and archaeological, including Native American items at least equal to the California Environmental Quality Act (CEQA.). In most cases, federal environmental policy require that any project that causes a substantial adverse change in the significance of an historical resource, that includes archaeological resources, is a 'significant effect' requiring the preparation of an Environmental Impact Statement (EIS).

The NAHC Sacred Lands File (SLF) Inventory contains numerous Native American cultural resources and some burial sites within the 'area of potential effect' (APE), or project area identified in the Draft EIS and CDCA Plan Amendment document. This area is known to the NAHC as being very culturally sensitive; therefore, careful, sensitive planning is advised as well as quality consultation with the Native American on the attached list who may provide detailed information of their concerns.

The NAHC Sacred Lands File Inventory of the Native American Heritage Commission is established by the California Legislature pursuant to California Public Resources Code §§5097.94(a) and 5097.96. The NAHC, pursuant to Appendix B of the Guidelines to the

California Environmental Quality Act (CEQA) is designated as the agency with expertise in the areas of issues of religious significance to California Native American communities, cultural resources and burial grounds.

Culturally affiliated tribes are to be consulted to determine possible project impacts pursuant to the National Historic Preservation Act, as amended. Early consultation with Native American tribes in your area is the best way to avoid unanticipated discoveries once a project is underway. The NAHC recommends as part of 'due diligence', that you also contact the nearest Information Center of the California Historical Resources Information System (CHRIS) of the State Historic Preservation Office (SHPO) for other possible recorded sites in or near the APE (contact the Office of Historic Preservation at 916-445-7000).

Attached is a list of Native American contacts is attached to assist you that may have knowledge of cultural resources in the project area. It is advisable to contact the persons listed and seek to establish a 'trust' relationship with them; if they cannot supply you with specific information about the impact on cultural resources, they may be able to refer you to another tribe or person knowledgeable of the cultural resources in or near the affected project area.

Lack of surface or subsurface evidence of archeological resources does not preclude the existence of archeological resources. Lead agencies should consider avoidance, in the case of cultural resources that are discovered. A tribe or Native American individual may be the only source of information about a cultural resource; this is consistent with the NHPA (16 U.S.C. 470 *et seq* Sections. 106, 110, and 304) Section 106 Guidelines amended in 2009. Also, federal Executive Orders Nos. 11593 (preservation of cultural environment), 13175 (coordination & consultation) and 13007 (Sacred Sites) are helpful

NEPA regulations provide for provisions for accidentally discovered archeological resources during construction and mandate the processes to be followed in the event of an accidental discovery of any human remains in a project location other than a 'dedicated cemetery. Even though a discovery may be in federal property, California Government Code §27460 should be followed in the event of an accidental discovery of human remains during any groundbreaking activity; in such cases California Government Code §27491 and California Health & Safety Code §7050.5 may apply.

If you have any questions about this response to your request, please do not hesitate to contact me at (916) 653-6251.

Sincerely,

Dave Singleton
Program Analyst

Cc: State Clearinghouse

Attachment: Native American Contacts list for Consultation

California Native American Contact List
Fresno County
August 31, 2011

Big Sandy Rancheria of Mono Indians
Liz Hutchins Kipp, Chairperson
P.O. Box 337 / 37302 — Western Mono
Auberry , CA 93602
(559) 855-4003
ck@bigsandyrancheria.com
(559) 855-4129 Fax

Sierra Nevada Native American Coalition
Lawrence Bill, Interim Chairperson
P.O. 125 — Mono
Dunlap , CA 93621 — Foothill Yokuts
(559) 338-2354 — Choinumni

Cold Springs Rancheria of Mono Indians
Robert Marquez, Chairperson
P.O. Box 209 — Mono
Tollhouse , CA 93667
(559) 855-5043
559-855-4445 - FAX

Table Mountain Rancheria
Bob Pennell, Cultural Resources Director
P.O. Box 410 — Yokuts
Friant , CA 93626-0177
(559) 325-0351
(559) 217-9718 - cell
(559) 325-0394 FAX

North Fork Mono Tribe
Ron Goode, Chairperson
13396 Tollhouse Road — Mono
Clovis , CA 93619
rwgoode911@hotmail.com
(559) 299-3729 Home
(559) 355-1774 - cell

Kings River Choinumni Farm Tribe
John Davis, Chairman
1064 Oxford Avenue — Foothill Yokuts
Clovis , CA 93612-2211 — Choinumni
(669) 307-6430

Dumna Wo-Wah Tribal Goverment
Keith F. Turner, Tribal Contact
P.O. Box 306 — Dumna/Foothill
Auberry , CA 93602 — Mono
t'si-akimcorr@at.net
(559) 855-3128 Home
(559) 696-0191 (Cell)

Dunlap Band of Mono Historical Preservation Soc
Mandy Marine, Board Chairperson
P.O Box 18 — Mono
Dunlap , CA 93621
mandy_marine@hotmail.com
559-274-1705
559-252-0198 - fax

This list is current only as of the date of this document.
Distribution of this list does not relieve any person of the statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is applicable for contacting local Native Americans with regard to cultural resources for the proposed Aircraft Conversion Project for the 144th Fighter Wing (144 FW) of the California Air National Guard; located at the Fresno-Yosemite International Airport; City of Fresno; Fresno County, California.

California Native American Contact List
Fresno County
August 31, 2011

Dumna Wo-Wah Tribal Government
Jim Redmoon - Cultural Resources Representative
724 W. Fountain
Fresno , CA 93705
559-824-0265
redmoonrising@att.net
559-243-9926 -home

Dumna/Foothill
Choinumni

Chowchilla Tribe of Yokuts
Jerry Brown
10553 N. Rice Road
Fresno , CA 93720
559-434-3160

North Valley Yokuts

Traditional Choinumni Tribe
David Alvarez, Chairperson
2415 E. Houston Avenue
Fresno , CA 93720
davealvarez@sbcglobal.net

(559) 323-6231
(559) 292-5057 FAX

Choinumni

Santa Rosa Tachi Rancheria
Lalo Franco, Cultural Coordinator
P.O. Box 8
Lemoore , CA 93245
(559) 924-1278 - Ext. 5
(559) 924-3583 - FAX

Tachi
Tache
Yokut

This list is current only as of the date of this document.
Distribution of this list does not relieve any person of the statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is applicable for contacting local Native Americans with regard to cultural resources for the proposed Aircraft Conversion Project for the 144th Fighter Wing (144 FW) of the California Air National Guard; located at the Fresno-Yosemite International Airport; City of Fresno; Fresno County, California.

FRESNO YOSEMITE
INTERNATIONAL AIRPORT

City of Fresno Airports Department

September 13, 2011

Robert Dogan, NGB/A7AM
Shepperd Hall
3510 Fetchet Avenue
Joint Base Andrews, MD 20762-5157

Re: Comments on the "Final Description of the Proposed Action and Alternatives" for the F-15 Aircraft Conversion EIS – 144th Fighter Wing based at Fresno Yosemite International Airport

Dear Mr. Dogan:

The City of Fresno Airports Department (Airport) appreciates the opportunity to review the "Final Description of the Proposed Action and Alternatives", Chapters 1 and 2 of the F-15 Aircraft Conversion Environmental Impact Statement (EIS) for the California Air National Guard (CANG) 144th Fighter Wing at Fresno Yosemite International Airport (FYI). As a continuation of our effort to assist the National Guard Bureau (NGB) to identify potential issues associated with implementation of the Proposed Action, please consider the following comments to supplement those we submitted previously.

1. Siting Criteria

Chapter 2, Section 2.2 states that FYI "...is the only viable alternative, and there were no reasonable locational alternatives to this (NGB 2011)." From a legal perspective, the draft EIS could be strengthened by at least a brief sentence or two as to why bases in Nevada and Oregon, for example, would not be reasonable alternatives due to training airspace proximity, available airfield infrastructure, etc. Addressing this may reduce the likelihood of a successful challenge by a third party.

2. Airfield Operations

Tables 2.3-1 and 2.4-1 list current and projected activity levels for FYI military aircraft operations only. To accurately assess the potential impact of replacing the F-16 Fighting Falcon aircraft currently in operation at FYI with F-15 Eagle aircraft, the EIS must compare the noise exposure associated with total activity at the airport with the F-16 compared to the exposure with the F-15 replacement aircraft (for both the 18 and 24 based aircraft alternatives). This assessment can only be prepared accurately if the EIS considers up-to-date projections of civil aircraft operations at FYI.

Using out-of-date civil aircraft activity would most likely understate the impact of the aircraft conversion, since the level of civil aircraft activity has been decreasing over the past several years. In addition, the civil aircraft fleet continues to transition to quieter aircraft types overall, compared to the operations projections contained in the most recent (2004) FYI Part 150 Noise Exposure Map (NEM) update, which included operations forecasts for 2004 and 2009,

based on data collection completed in 2003 and 2004. Therefore, the conversion to louder F-15 aircraft will represent a greater increase over current baseline noise exposure, compared to the NEM baseline exposure levels.

In summary the EIS evaluation should include the following operational scenarios:

- Base case: 2011 FYI aircraft operations with 18 based F-16 aircraft
- Alternative #1: 2011 FYI aircraft operations with 18 based F-15 aircraft
- Alternative #2: 2011 FYI aircraft operations with 24 based F-15 aircraft

The Airport can assist the NGB by providing up-to-date operations data, since we are in the process of conducting a NEPA review for Runway Safety Area (RSA) improvements on Runway 11L/29R. We expect to complete the development of the existing aircraft operations data for that study shortly and can provide them to you as soon as possible.

In addition to the Airport's request to use current data on civil aircraft operations, Section 2.3.2.1 and Table 2.3-1 include some apparently inaccurate and contradictory information regarding military activity.

The statement that "military flights accounted for approximately 9,500 annual operations, of which approximately half were from the 144 FW" contradicts the actual Part 150 study, which modeled 9,724 F-16 operations and 1,200 F-18 operations for a total of 10,924 military operations (transient military operations in other aircraft types were too limited to consider). Based on information obtained from the CANG in 2003/2004, the NEM assumed these activity levels would be the same in 2009. Furthermore, the 7,190 total military operations listed in Table 2.3-1 are inconsistent with both the 9,500 and 10,924 totals. We do not understand the source of the "Other" operations contained in Table 2.3-1 as the 2004 Part 150 reported 163,298 non-military operations for 2004 and projected 178,216 operations for 2009. Neither of these reported levels concurs with the 166,122 reported in Table 2.3-1.

From the Airport's point of view, it appears that CANG activity has dropped significantly from 2004. Most important is the reduction in annual F-16 operations from 9,724 annual to 4,680. In terms of the Community Noise Equivalent Level (CNEL), the metric the FAA uses to determine land use compatibility around California airports, the increase in CNEL due to the louder F-15 may be substantially offset by a reduction in CANG operations. The Airport requests that the EIS carefully validate and clearly present information on prior, current, and forecast activity levels, to ensure that the noise exposure computations properly reflect actual and projected changes.

We also request that the EIS use only the year 2004 when referring to the FYI Part 150 because that is the year in which the Airport submitted the NEM update to the FAA and received the FAA's acceptance of the NEM. As written Section 2.3.2 refers to years 2007 and 2009.

3. Stormwater Runoff

Table 2.3-3 indicates 17,465 square feet (approximately 0.4 acres) of additional impervious surfaces on the CANG leasehold associated with the Proposal and 78,300 square feet (approximately 1.8 acres) of additional impervious surfaces on the airfield. The additional impervious surfaces and its potential impact to existing storm water drainage systems must

Robert Dogan, NGB/A7AM
September 13, 2011
Page 3

meet the requirements set forth in the Airport master storm drain plan. The Airport will make this plan available upon request.

4. Arm and Dearm Pad

The cost of increasing the size of B12 hold pad for CANG Arm/Dearm activities must be funded by the NGB and comply with FAA design standards for airports. This work must be coordinated with the Airport RSA project.

The Airport does not have sufficient space available for the NGB to construct earthen revetments on the airfield. The EIS should study alternatives (such as is consistent with current operations) to the Arm/Dearm activity that does not involve constructing earthen revetments.

5. Munitions storage Addition

The EIS should provide blast/safety zone criteria for the munitions storage area and evaluate the on and off airfield impact to the proposed expansion. The increase in the blast/safety zones will need to be mitigated such that the public to the north (Dakota Ave.) and airfield operations (surrounding tenants and taxiway circulation areas) are not impacted by this Proposal.

6. Increase in Airfield Use

The increased use of the airfield due to Alternate #1 (increased weight) and Alternate #2 (increase in both weight and number of operations) will have an operations and maintenance impact to the Airport. The EIS should quantify the impact and identify how this will be mitigated.

The construction of all work associated with the Proposal is subject to, (i) compliance with FAA regulations, (ii) advance FAA approvals where applicable, (iii) review and advance approval by the Airport, and, (iv) the terms and conditions in the NGB Lease and Joint Use Agreement.

We appreciate the opportunity to provide these comments with respect to Final Description of the Proposed Action and Alternatives. The City is assuming the complete copy of the draft EIS will be provided at a later date, and reserves its right to comment on the draft EIS in its entirety as appropriate. If you have any questions or comments regarding our input on this Proposal, please contact me by phone (559) 621-4536, or email at Kevin.Meikle@fresno.gov.

Respectfully Submitted,

Kevin Meikle, Architect
Airports Planning Manager/Assistant Director of Aviation (Interim)

c: Russell C. Widmar, AAE, Director of Aviation

Mark Scott
City Manager

September 7, 2011

Mr. Robert Dogan, NGB/A7AM
Shepperd Hall
3510 Fetchet Avenue
Joint Base Andrews, MD 20762-5157

RE: CLARIFICATION OF OUR LETTER DATED AUGUST 18, 2011

Dear Mr. Dogan:

Subsequent to our subject letter, representatives of the City of Fresno, the Mayor and I met last week with Col. Said, Base Commander, 144th Fighter Wing regarding a wide range of F-15 conversion related issues. Afterwards, we agreed that the meeting had been very productive and provided certain insights that had not been apparent beforehand. Speaking for the Mayor, who will respond separately to you, I assure you that the City is very supportive of the F-15 conversion program, and despite the wide range of topics identified in our letter, we are confident that none of these issues are insurmountable nor in any way should stand in the way of a successful conversion.

By way of background, it is useful to highlight the dramatic financial issues that this City has faced during the past three years. Annual budget hearings now occur two or three times each year; our employees have been and will continue to be furloughed and many will receive a pay cut for the next two years. Every City department, including the Airport, has cut staff, programs and expenses to the core. On the surface, without the insight that our meeting with Col. Said provided, we were concerned that the conversion would result in significant cost increases for the Airport – without the means to fund them.

The discussions with Col. Said were very helpful in providing me with information not available at the time of my August 18th letter. Good examples of this are some of the concerns related to the baseline and projected noise contours. We are advised that the 144th Fighter Wing has already substantially reduced the number of F-16 operations at the Airport. Because of the way airport noise is averaged, this reduction in operations converts directly into reduced noise levels over the community lying northwest of the Airport. The F-15, although noisier than the F-16, could potentially move the noise contour; however, we believe that the contour will remain stable with respect to the baseline projections which are used to fund the noise abatement program.

This issue in itself removes a very significant concern on our part, as we expected the contours would be pushed out to levels well beyond those modeled previously.

City of Fresno
City Hall • 2600 Fresno Street • Fresno, California 93721-3601
(559) 621-7770 • FAX (559) 621-7776 • www.fresno.gov

RE: Clarification of Aug. 18 Letter
September 7, 2011
Page 2

Given that the Federal Aviation Administration has approved the current noise contours, and those contours are not expected to change in the future, despite the new aircraft type, the current noise mitigation program funding will remain in place and no new FAA approvals will be required in the immediate future. Any subsequent noise contour changes will be handled through an FAA approved Part 150 update process, which includes a funding component.

Col. Said had indicated that modeling F-15 arrivals using current flight procedures will reduce the impact of noise to the southeast, which will greatly benefit the community and reduce our concerns in that area as well.

While we understand the military's hesitancy to conduct demonstration flights, we do believe that more should be done to educate our citizens about aircraft noise. As you are aware, the Fresno community is extremely patriotic and supportive of the military. Unfortunately, people tend to engage only after a problem occurs. Perhaps that accounts for the scant participation from individuals at the public EIS scoping meeting held earlier this month. That is one reason the Mayor suggested additional public outreach be undertaken. Col. Said agreed to assist in the conduct of one or more meetings to accomplish this objective.

We are also pleased that Col. Said and our Director of Aviation, Russell Widmar, are developing a solid and collaborative working relationship and appear to be effectively working issues through as many avenues as possible to solve issues raised in my previous letter. Again, we appreciate Col. Said's professional approach and it is for this reason we are comfortable saying we see no unsolvable issues going forward.

Additionally, since Lemoore Naval Air Station is proceeding with an EIS for their own conversion to F-35 fighters, we will approach them regarding any concerns we have with their operations at Fresno Yosemite, thereby avoiding attribution of certain noise events to the 144th.

It is my hope that this letter provides sufficient clarification of the reasons we raised issues in our previous letter. Again, we are very supportive of the F-15 conversion program; however, it is prudent that my office provide this community with the proper and expected level of EIS due diligence to avoid future controversy. I believe our letter of August 18th provided that and this letter clarifies how we see things moving forward in a very positive direction through the EIS process.

Respectfully submitted,

Mark Scott

Mark Scott
City Manager

SOBOBA BAND OF LUISEÑO INDIANS
EST. JUNE 19, 1883

February 7, 2012

Attn: Robert Dogan, NGB/A7AM
Sheppard Hall
3501 Fetchet Ave
Joint Base Andrews MD 20762-5157

Re: Fresno F-15 Conversion EIS

The Soboba Band of Luiseño Indians appreciates your observance of Tribal Cultural Resources and their preservation in your project. The information provided to us on said project(s) has been assessed through our Cultural Resource Department, where it was concluded that although it is outside the existing reservation, the project area does fall within the bounds of our Tribal Traditional Use Areas. At this time the Soboba Band does not have any specific concerns regarding this project, and wishes to defer to other tribes that are located closer to the project area.

[SPECIAL NOTE (for projects other than cell towers): *If* this project is associated with a city or county specific plan or general plan action it is subject to the provisions of SB18-Tradtional Tribal Cultural Places (law became effective January 1, 2005) and will require the city or county to participate in **formal, government-to-government** consultation with the Tribe. If the city or county are your client, you may wish to make them aware of this requirement. By law, they are required to contact the Tribe.

Sincerely,

Joseph Ontiveros
Soboba Cultural Resource Department
P.O. Box 487
San Jacinto, Ca 92581
Phone (951) 654-5544 ext. 4137
Cell (951) 663-5279
jontiveros@soboba-nsn.gov

TABLE MOUNTAIN RANCHERIA
TRIBAL GOVERNMENT OFFICE

February 7, 2012

Sami D. Said, Colonel, CA ANG
Commander, 144the Fighter Wing
5323 E. McKinley Ave.
Fresno, Ca. 93727

RE: Conversion for the 144th Fighter Wing project.

Dear Sami D. Said:

This is in response to your letter dated January 18, 2012, regarding the conversion for the 144th Fighter Wing, project.

We appreciate receiving notice. We have no comments to offer on this project.

Sincerely,

Bob Pennell
Cultural Resources Director

Leanne Walker-Grant
Tribal Chairperson

Beverly J. Hunter
Tribal Vice-Chairperson

Craig Martinez
Tribal Secretary/Treasurer

Ray Barnes
Tribal Council Member

Matthew W. Jones
Tribal Council Member

23736
Sky Harbour Road
Post Office
Box 410
Friant
California
93626
(559) 822-2587
Fax
(559) 822-2693

STATE OF CALIFORNIA Edmund G. Brown, Jr., Governor

NATIVE AMERICAN HERITAGE COMMISSION
915 CAPITOL MALL, ROOM 364
SACRAMENTO, CA 95814
(916) 653-6251
Fax (916) 657-5390
Web Site www.nahc.ca.gov
e-mail: ds_nahc@pacbell.net

February 13, 2012

Colonel SAMI D. SAID, Commander, 144th Fighter Wing
California Air National Guard
Fresno Air National Guard Base, 144th Fighter Wing
5323 E. McKinley Avenue
Fresno, CA 93727-2199

Re: Sacred Lands File Search and Native American Contacts list for the **"The Implementation of an Aircraft Conversion for the 144th Fighter Wing Project;"** located at the Fresno Air National Guard Base at the Fresno-Yosemite International Airport; Fresno County, California

Dear Colonel Said:

The Native American Heritage Commission (NAHC) is the California State 'Trustee Agency' pursuant to Public Resources Code §21070 for the protection of California's Native American Cultural Resources. The NAHC is also a 'reviewing agency' for environmental documents prepared under the National Environmental Policy Act (NEPA; 42 U.S.C. 4321 *et seq*), 36 CFR Part 800.3, .5 and are subject to the Tribal and interested Native American consultation as required by the National Historic Preservation Act, as amended (Section 106) (16 U.S.C. 470; Section 106 [f] 110 [f] [k], 304). The provisions of the Native American Graves Protection and Repatriation Act (NAGPRA) (25 U.S.C. 3001-3013) and its implementation (43 CFR Part 10.2), and California Government Code §27491 may apply to this project if Native American human remains are inadvertently discovered.

The NAHC is of the opinion that the federal standards, pursuant to the above-referenced Acts and the Council on Environmental Quality (CSQ; 42 U.S.C. 4371 *et seq*) are similar to and in many cases more stringent with regard to the 'significance' of historic, including Native American items, and archaeological, including Native American items at least equal to the California Environmental Quality Act (CEQA.). In most cases, federal environmental policy require that any project that causes a substantial adverse change in the significance of an historical resource, that includes archaeological resources, is a 'significant effect' requiring the preparation of an Environmental Impact Statement (EIS).

The NAHC conducted a Sacred Lands File (SLF) search of its Inventory and Native American Cultural Resources **were not identified** in the project area you specified; early and quality consultation with the Native American on the attached list may provide detailed information of sites with which they are aware. Also, the absence of archaeological resources does not preclude their existence. Even though no Native American cultural resources were identified in the NAHC search, this area is known to the California NAHC to contain substantial archaeological/Native American cultural resources.

The NAHC Sacred Lands File Inventory of the Native American Heritage Commission is established by the California Legislature pursuant to California Public Resources Code §§5097.94(a) and 5097.96. The NAHC Sacred Lands Inventory is populated by submission to

the data by Native American tribes and Native American elders; In this way it differs from the California and National Register of Historic Places under the jurisdiction of the U.S. Secretary of the Interior.

The NAHC, pursuant to Appendix B of the Guidelines to the California Environmental Quality Act (CEQA) is designated as the agency with expertise in the areas of issues of cultural significance to California Native American communities. Also, in the 1985 California Appellate Court decision (170 Cal App 3rd 604), the court held that the NAHC has jurisdiction and special expertise, as a state agency, over affected Native American resources, impacted by proposed projects including archaeological, places of religious significance to Native Americans and burial sites

Culturally affiliated tribes are to be consulted to determine possible project impacts pursuant to the National Historic Preservation Act, as amended. Early consultation with Native American tribes in your area is the best way to avoid unanticipated discoveries once a project is underway. The NAHC recommends as part of 'due diligence', that you also contact the nearest Information Center of the California Historical Resources Information System (CHRIS) of the State Historic Preservation Office (SHPO) for other possible recorded sites in or near the APE (contact the Office of Historic Preservation at 916-445-7000).

Attached is a list of Native American contacts is attached to assist you; they may have knowledge of cultural resources in the project area. It is advisable to contact the persons listed and seek to establish a 'trust' relationship with them; if they cannot supply you with specific information about the impact on cultural resources, they may be able to refer you to another tribe or person knowledgeable of the cultural resources in or near the affected project area.

Lead agencies should consider avoidance, in the case of cultural resources that are discovered. A tribe or Native American individual may be the only source of information about a cultural resource; this is consistent with the NHPA (16 U.S.C. 470 *et seq* Sections. 106, 110, and 304) Section 106 Guidelines amended in 2009. Also, federal Executive Orders Nos. 11593 (preservation of cultural environment), 13175 (coordination & consultation) and 13007 (Sacred Sites) are helpful

NEPA regulations provide for provisions for accidentally discovered archeological resources during construction and mandate the processes to be followed in the event of an accidental discovery of any human remains in a project location other than a 'dedicated cemetery. Even though a discovery may be in federal property, California Government Code §27460 should be followed in the event of an accidental discovery of human remains during any groundbreaking activity; in such cases California Government Code §27491 and California Health & Safety Code §7050.5 will apply and construction cease in the affected area.

If you have any questions about this response to your request, please do not hesitate to contact me at (916) 653-6251.

Sincerely,

Dave Singleton

Attach: Native American Contacts list

Native American Contacts
Fresno County
February 10, 2012

Big Sandy Rancheria of Mono Indians
Liz Hutchins Kipp, Chairperson
P.O. Box 337 / 37302 — Western Mono
Auberry , CA 93602
ck@bigsandyrancheria.com
(559) 855-4003
(559) 855-4129 Fax

Sierra Nevada Native American Coalition
Lawrence Bill, Interim Chairperson
P.O. 125 — Mono
Dunlap , CA 93621 — Foothill Yokuts
(559) 338-2354 — Choinumni

Cold Springs Rancheria of Mono Indians
Robert Marquez, Chairperson
P.O. Box 209 — Mono
Tollhouse , CA 93667
(559) 855-5043
559-855-4445 - FAX

Choinumni Tribe; Choinumni/Mono
Lorrie Planas
2736 Palo Alto — Choinumni
Clovis , CA 93611 — Mono

North Fork Mono Tribe
Ron Goode, Chairperson
13396 Tollhouse Road — Mono
Clovis , CA 93619
rwgoode911@hotmail.com
(559) 299-3729 Home
(559) 355-1774 - cell

Table Mountain Rancheria
Bob Pennell, Cultural Resources Director
P.O. Box 410 — Yokuts
Friant , CA 93626-0177
(559) 325-0351
(559) 217-9718 - cell
(559) 325-0394 FAX

Dumna Wo-Wah Tribal Goverment
Keith F. Turner, Tribal Contact
P.O. Box 306 — Dumna/Foothill
Auberry , CA 93602 — Mono
t'si-akimcorr@at.net
(559) 855-3128 Home
(559) 696-0191 (Cell)

Kings River Choinumni Farm Tribe
John Davis, Chairman
1064 Oxford Avenue — Foothill Yokuts
Clovis , CA 93612-2211 — Choinumni
(559) 307-6430

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of the statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is applicable for contacting local Native Americans with regard to cultural resources for the proposed NEPA EIS for the Implementation of an Aircraft Converson for the 144th Fighter Wing of the California Air National Guard; located at the Fresno Air National Guard BAse, California.

Native American Contacts
Fresno County
February 10, 2012

Dunlap Band of Mono Historical Preservation Soc
Mandy Marine, Board Chairperson
P.O Box 18 Mono
Dunlap , CA 93621
mandy_marine@hotmail.com
559-274-1705
559-252-0198 - fax

Santa Rosa Tachi Rancheria
Lalo Franco, Cultural Coordinator
P.O. Box 8 Tachi
Lemoore , CA 93245 Tache
(559) 924-1278 - Ext. 5 Yokut
(559) 924-3583 - FAX

Chowchilla Tribe of Yokuts
Jerry Brown
10553 N. Rice Road North Valley Yokuts
Fresno , CA 93720
559-434-3160

The Choinumni Tribe of Yokuts
Rosemary Smith, Chairperson
1505 Barstow Choinumni
Clovis , CA 96311 Foothill YoKut
monoclovis@yahoo.com

Traditional Choinumni Tribe
David Alvarez, Chairperson
2415 E. Houston Avenue Choinumni
Fresno , CA 93720
davealvarez@sbcglobal.net

(559) 323-6231
(559) 292-5057 FAX

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of the statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is applicable for contacting local Native Americans with regard to cultural resources for the proposed NEPA EIS for the Implementation of an Aircraft Converson for the 144th Fighter Wing of the California Air National Guard; located at the Fresno Air National Guard BAse, California.

STATE OF CALIFORNIA – THE RESOURCES AGENCY Edmund G. Brown, Jr., *Governor*

OFFICE OF HISTORIC PRESERVATION
DEPARTMENT OF PARKS AND RECREATION
1725 23rd Street, Suite 100
SACRAMENTO, CA 95816-7100
(916) 445-7000 Fax: (916) 445-7053
calshpo@parks.ca.gov
www.ohp.parks.ca.gov

21 March 2012

In reply refer to: USA120120A

Robert L. Dogan
Plans and Requirements Branch
National Guard Bureau
3501 Fetchet Avenue
Joint Base Andrews MD 206762-5157

Re: Section 106 Consultation for Implementation of Aircraft Conversion for the 144th Fighter Wing, California Air National Guard at Fresno-Yosemite International Airport, Fresno, CA

Dear Mr. Dogan:

Thank you for your letter of 17 January 2012 requesting my review and comment pursuant to the National Historic Preservation Act of 1966 as amended and the implementing regulations in 36 CFR 800 in regard to the above referenced undertaking. Specifically, you are seeking my concurrence with the National Guard Bureau (NGB) determination of "No Historic Properties Effected."

As I understand it, the 144th Fighter Wing (144 FW), California Air National Guard at the Fresno-Yosemite International Airport (IAP) currently flies 18 F-16 Fighting Falcon Aircraft and plans on converting the unit to a F-15 Eagle aircraft. As part of the proposal, there would be a personnel increase at the 144 FW and would implement construction projects associated with the aircraft conversion. The proposal also includes Detachment 1 at March Air Reserve Base in Moreno Valley.

No historic properties were identified at both sites, and the only buildings and structures present are not of sufficient age to be considered for inclusion in the National Register of Historic Places (NRHP). Therefore, the NGB has determined the undertaking will not affect historic properties. I concur with this determination.

Thank you for seeking my comments and considering historic properties as part of your project planning. If you have any questions, please contact Amanda Blosser at 916.445.7048 or at ablosser@parks.ca.gov.

Sincerely,

Susan K Stratton for

Milford Wayne Donaldson, FAIA
State Historic Preservation Officer

MWD:ab

Appendix A2

Scoping

Scoping Open House
National Guard Bureau
Environmental Impact Statement (EIS) for the
Proposed Conversion to the F-15 Aircraft
144th Fighter Wing, Fresno-Yosemite International Airport, CA

COMMENT SHEET

Thank you for providing your comments on the proposed conversion from the F-16 to the F-15 aircraft for the 144th Fighter Wing at Fresno-Yosemite International Airport, and Detachment 1 at March ARB, CA. Please provide us with your comments no later than August 19, 2011. Comments may be submitted at the scoping meeting, emailed to the email address below, or mailed to the postal address below.

1. Scoping Meetings and future meetings on this issue should include a presentation (powerpoint) & group discussion

2. Map should be included - showing noise contours overlain on 2025 General Plan Land Use Map (City of Fresno)

3. Public presentation should include open disclosure of noise with a demonstration using a p.a. system - (ie, let participants hear engine noise at various decibel levels)

4. Discuss noise/mitigation & Air Quality

Over for more space →

Please Print

Name: Sophia Pagoulates, Supervising Planner City of Fresno

Address: 2600 Fresno Street, Fresno, CA 93721

Do you wish to be sent a CD copy of the Environmental Impact Statement? Yes ✓ No__
Do you wish to be sent a hard-copy of the Environmental Impact Statement? Yes ✓ No__

Note: Your address will not be made public if you are just requesting a copy of the EIS.

Please give this form to one of the Air National Guard representatives tonight or mail to:

Mr. Robert Dogan
NGB/A7AM
Shepperd Hall
3501 Fetchet Avenue
Joint Base Andrews Maryland 20762-5157
ang.env.comments@ang.af.mil

email: sophia.pagoulates@fresno.gov
(559)621-8062

Scoping Open House
National Guard Bureau
Environmental Impact Statement (EIS) for the
Proposed Conversion to the F-15 Aircraft
144th Fighter Wing, Fresno-Yosemite International Airport, CA

COMMENT SHEET

Thank you for providing your comments on the proposed conversion from the F-16 to the F-15 aircraft for the 144th Fighter Wing at Fresno-Yosemite International Airport, and Detachment 1 at March ARB, CA. Please provide us with your comments no later than August 19, 2011. Comments may be submitted at the scoping meeting, emailed to the email address below, or mailed to the postal address below.

The Airport Land Use Commission (Fresno COG) may ask for a presentation on the project at some point.

Over for more space →

Please Print

Name: CLARK THOMPSON

Address: FRESNO COUNCIL OF GOVERNMENTS (ALUC)
2035 TULARE, #201, FRESNO 93721

Do you wish to be sent a CD copy of the Environmental Impact Statement? Yes__ No__
Do you wish to be sent a hard-copy of the Environmental Impact Statement? Yes__ No__

Note: Your address will not be made public if you are just requesting a copy of the EIS.

Please give this form to one of the Air National Guard representatives tonight or mail to:
Mr. Robert Dogan
NGB/A7AM
Shepperd Hall
3501 Fetchet Avenue
Joint Base Andrews Maryland 20762-5157
ang.env.comments@ang.af.mil

Disabled American Veterans
Chapter [redacted]
Veterans Helping Veterans
Charles Romero
Mr. Charles Romero
[redacted]

1.

FRESNO F-15: CONVERSION EIS

4 Aug: 2011. THURSDAY.

HELLO CALIF AIR NATIONAL GUARD. Charles here. I live under the flight path South-West of March A.R. BASE, CALIF. FOR OVER 40 YEARS plus. I have enjoyed the passing AIRCRAFT OVER head, because it tells me our GOVERNMENT is still in BUSINESS. I RETIRED from the 452nd AMW. in 2000, CORPSMAN-medic. PLEASE go ahead and CONVERT your AIRCRAFT AT MARCH A.R. BASE AS SOON AS possible. I support your 144 FW Detachment 1 conversion here completely. We have to support our

Charles D. Romero
[redacted]

2.

Cont:

ANG AND RESERVES now more than EVER with possible active-duty cut-backs in store. Thank you very much. Best wishes
T/Sgt. Charles Duane Romero
USAF Reserve - Retired.

[redacted]

Charles Duane Romero

8/5/11

Mr. Robert Dogan, NGB/A7AM
Shepperd Hall
3501 Fetchet Avenue
Joint Base Andrews, MD 20762-5157

Dear Mr. Dogan,

In regard to your request for comments about the 144 the FIGHTER WING converting from the F 16 to the F 15 at the California Air National Guard at Fresno Yosemite International Airport in Fresno, Ca.

We read the obscure notice in the Fresno Bee 7-31-11. It was placed on the last page at the very bottom with ads on the back and only a two days notice of the meeting We weren't happy because we could not attend on such short notice.

Bringing in the F15's would be a terrible move for the people of Fresno. The noise that's now generated by the F16's is unbearable. We cannot enjoy our garden or take walks without hearing- protection when they fly over, which is several times a day and everyday!! This would be also a deterrent to sell property in the flight pattern.

As you probably know The airport is located at the Southeast end of the city, which means that with a prevailing wind from the Northwest that they take off over the major part of the city and most of the residential section. It's time to stop and find another location to fly and test these terrible noise makers. Fresno has been dumped on long enough!!

What ever has happened to DOMESTIC TRANQUILITY???

Concerned citizens of Fresno Ca.
Ken and Joyce Evans

August 12, 2011

Bill Richards
[redacted]

Roger Dogan, NGB/A7AM
Sheppard Hall
3501 Fetchet Avenue
Joint Base Andrews, MD 20762-5157

Subject: Fresno F-15 Conversion EIS

Thank you for the opportunity to comment on the referenced EIS and for the information provided at the Aug. 2, 2011, community meeting regarding the same.

I have the following concerns that I am requesting be addressed in future environmental studies and documentation.

*NOISE PROFILES: The preliminary information provided includes before and after noise profiles around the Fresno airport. These profiles include noise contours around the airport that are depicted as average noise levels during a 24 hour period. The result of this averaging can be deceiving as it defines relatively low noise levels from airport activity. These are qualified in terms such as "noise levels comparable to a vacuum cleaner", etc. As a result, this may be an unacceptable method of depicting these levels for the purpose of this EIS. A more appropriate process would be to include profiles of maximum noise levels. These are the levels that people hear and have to live with. In addition, this study should extend further from the airport and include all densely populated areas that are or will be affected.

*MILITARY USE OF AIRPORT: Currently a significant amount of aircraft noise occurs over Fresno as a result of airport use by non-ANG military aircraft conducting routine training exercises. These aircraft often create more noise than the ANG aircraft and can operate without the noise abatement processes utilized by the ANG aircraft. This usage adds to the maximum airport noise levels and at times may be more than what is created by the current ANG aircraft. This noise should be quantified to determine what it adds to the current maximum noise levels. In addition, the processes allowing for the airport usage by these aircraft should be defined to allow for a clear understanding of issues surrounding this use.

*CURRENT NOISE ABATEMENT PROCESSES: I was informed that the Fresno ANG has "informal agreements" with the Fresno Airport for procedures that are designed for noise reduction. This includes measure such as after burner usage, etc. These procedures should be addressed in the EIS along with their current effectiveness and enforceability as well as the anticipated effectiveness in mitigating increased noise levels generated by the changes proposed. In

addition, for the purpose of defining the cumulative effects of the combined ANG/Non ANG aircraft usage, the application of these procedures to both should be addressed.

*COST /BENEFIT ANALYSIS: The total taxpayer cost of this proposal should be addressed. This should not only include the direct costs for the military but all of the non-military indirect costs. Examples are enhanced noise mitigation for Fresno Neighborhoods, Noise studies, airport modifications and noise mitigation, etc. It is understood these may not all be military issues but they are issues the Fresno area and all taxpayers will have to live with and therefore, should be addressed in the EIS.

Again, thank you for this opportunity. If you have questions I can be contacted at
[redacted]

VERY TRULY YOURS,

B.G. RICHARDS

Sent by email on Aug 13, 2011
To: ang.env.comments@ang.af.mil

Fresno Unified School District

Preparing Career Ready Graduates

Measure Q

Facilities Management & Planning

BOARD OF EDUCATION
Michelle A. Asadoorian, President
Janet Ryan, Clerk
Valerie F. Davis
Lindsay Cal Johnson
Carol Mills, J.D.
Larry A. Moore
Tony Vang., Ed.D.

SUPERINTENDENT
Michael E. Hanson

August 18, 2011

Robert Dogan, NGB/A7AM
Shepperd Hall
3501 Fetchet Avenue
Joint Base Andrews, MD 20762-5157

Subject: Fresno F-15 Conversion EIS

Dear Mr. Dogan:

The purpose of this letter is to respond to your request for scoping comments on the proposed conversion of aircraft at the 144th Fighter Wing at Fresno-Yosemite International Airport from the F-16 Fighting Falcon to the F-15 Eagle. These comments are intended to provide our input as to what should be addressed in the upcoming Draft Environmental Impact Statement (DEIS).

Based on the information made available for the scoping meetings, the Fresno Unified School District has a number of schools that could be affected by this action. The schools within the 65 Community Noise Equivalent Level (CNEL) contour, an area substantially affected by existing noise from aircraft operations, include Thomas and Viking Elementary Schools, Scandinavian Middle School and Addicot School, which serves severely disabled children.

Of the two alternatives being considered, one with 18 F-15 aircraft and one with 24 F-15 aircraft, the 18 aircraft alternative does not appear to appreciably increase the area covered by the 65 CNEL contour northwest of the airport, while the 24 aircraft alternative shows areas of increased coverage.

Although a 60 CNEL contour is not shown on the maps provided, sensitive land uses such as schools are also adversely affected within the 60 CNEL contour. According to the Fresno County Airport Land Use Compatibility Plan noise contour map, the schools within or bisected by the 60 CNEL contour include Centennial, Holland, Robinson, Vinland, and Wolters Elementary Schools, Tioga Middle School and Duncan Polytechnic High School.

Noise can be very disruptive to the educational process. While the maps provided show CNEL, which is a weighted average, we are also concerned about disruption caused by single event noise levels during the actual time that the jets would be flying over. This needs to be addressed in relation to our schools.

Several of our schools received sound insulation in the past as a result of the Part 150 Program at Fresno-Yosemite International Airport, including Scandinavian and Tioga Middle Schools, and

2309 Tulare Street • Fresno, Ca 93721-2287 • www.fresno.k12.ca.us

Robert Dogan
August 18, 2011
Page 2

Thomas and Viking Elementary Schools. The DEIS should address whether additional sound insulation will be needed at these schools and whether such measures will be needed at other schools in the District to maintain acceptable interior noise levels. The EIS should also address how any such measures will be implemented and funded.

Thank you for the opportunity to submit these preliminary comments. We look forward to reviewing the Draft EIS once it is prepared. Please let me know if you have any questions regarding this letter or our school facilities.

Sincerely,

Lisa LeBlanc, Executive Director
Facilities Management and Planning

2

CLOVIS
UNIFIED
SCHOOL DISTRICT

Governing Board
Sandra A. Bengel
Christopher Casado
Brian D. Heryford
Ginny Hovsepian
Elizabeth J. Sandoval
F. Scott Troescher
Jim Van Volkinburg, D.D.S.

Administration
Janet L. Young, Ed.D.
Superintendent
Michelle Steagall, Ed.D.
Associate Superintendent
Steve Ward
Associate Superintendent

September 6, 2011

Robert Dogan, NGB/A7AM
Shepperd Hall
3501 Fetchet Avenue
Joint Base Andrews, MD 20762-5157

Subject: Fresno F-15 Conversion EIS

Dear Mr. Dogan:

This letter responds to the request for scoping comments for the Environmental Impact Statement addressing the proposed conversion of aircraft at the 144th Fighter Wing at Fresno-Yosemite International Airport (FYI) from the F-16 to the F-15.

It is our understanding that conversion to the F-15 will increase noise levels in the vicinity of the airport. Based on the noise contour mapping made available to us, the CNEL noise contours will increase most significantly southeast of the airport, an area that is primarily within the Clovis Unified School District. The District operates Temperance-Kutner Elementary School at the southeast corner of Olive and Temperance Avenues. With the operation of the F-15 aircraft, the 65 CNEL contour, a noise exposure level that is significant for schools, will expand to the point where it will pass through the Temperance-Kutner Elementary School grounds.

While CNEL represents an average noise level over 24 hours, single event noise levels are a significant concern with respect to disruption of educational activities. Single event noise levels will increase since the F-15 is a larger, heavier aircraft that operates with two engines as compared to one for the F-16. Based on single event contour maps that have been provided to us, the 95 dB contour for the F-15 passes very close to Temperance-Kutner School. In contrast, the 95 dB contour for the F-16 is located more than one-half mile away from the school.

The potential for increased noise levels at Temperance-Kutner School is of substantial concern to the District. We need to know how this will affect the educational environment at the school, whether the impact can be feasibly mitigated and if so, who will pay for the mitigation.

1450 Herndon Avenue · Clovis, CA 93611-0599
559-327-9000 · www.cusd.com

Thank you for the opportunity to provide scoping comments for the EIS. We look forward to reviewing the Draft EIS once it is completed.

Please contact me if you have any questions regarding this letter.

Sincerely,

Don Ulrich
Assistant Superintendent
Facility Services

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Appendix A3

Public Hearing Transcripts, Responses to Comments, and Written Comments on the Draft EIS

BEFORE

JUDGE ROAN, SENIOR APPELLATE JUDGE FOR

THE UNITED STATES AIR FORCE

In the Public hearing for:	)
	)
Draft Environmental Impact	)
Statement for the 144th Fighter	) FRESNO EIS
Wing's Proposed F-15 Conversion.	)
	)

TRANSCRIPT OF PROCEEDINGS

TUESDAY, JUNE 5, 2012

MORENO VALLEY, CALIFORNIA

Reported by:

CARLOS R. HICHO,
CSR No. 13111

1 BEFORE

2 JUDGE ROAN, SENIOR APPELLATE JUDGE FOR

3 THE UNITED STATES AIR FORCE

4

5

6

7 In the Public hearing for:)
)
8 Draft Environmental Impact)
Statement for the 144th Fighter) FRESNO EIS
9 Wing's Proposed F-15 Conversion:)
_____)

10

11

12

13

14 Transcript of Proceedings, taken at

15 14075 Frederick Street, Moreno Valley,

16 California 92553, commencing at the hour of

17 7:00 P.M., Tuesday, June 5, 2012, before

18 CARLOS R. HICHO, CSR No. 13111.

19

20

21

22

23

24

25

APPEARANCES:

AIR NATIONAL GUARD READINESS CENTER
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Environmental Planner
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452ND MSG/CIVIL ENGINEERS
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SCIENTIFIC RESOURCES ASSOCIATED
BY: VALORIE L. THOMPSON, Ph.D.
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vltsra@earthlink.net

(Continued.)

PANEL SPEAKERS

NAME	PAGE
TECH SERGEANT VAUGHN	5
COLONEL JANSKY	6
JUDGE ROAN	8
COLONEL MACEDO	12
JUDGE ROAN	19

PUBLIC SPEAKERS

NAME	PAGE
CHARLES DWAYNE RAMIRO	20

TUESDAY, JUNE 5, 2012, MORENO VALLEY, CALIFORNIA
7:00 P.M.
* * *

TECH SERGEANT VAUGHN: Good evening, ladies and gentlemen, and welcome to the hearing for the Draft Environmental Impact Statement for the 144th Fighter Wing's Proposed F-15 Conversion.

I am Tech Sergeant Charles Vaughn, with the 144th Public Affairs, located in Fresno, California. And I also work with Detachment 1, located at March Air Reserve Base in Moreno Valley, California.

Please enjoy the refreshments provided. Restrooms are outside in the lobby, and smoking in the facility is prohibited.

Before starting the formal portion of tonight's hearing, I ask that cell phones and pagers be turned off or placed in the silent mode.

During the proceedings, please do not interrupt the speakers and please be respectful to those providing oral comments. Everyone will be provided an opportunity to speak.

Again, welcome. Lieutenant Colonel Jansky, the Commander for the 144th Wing, Detachment 1, will now begin the formal portions of tonight's hearing.

COLONEL JANSKY: Good evening. My name is Mark

Jansky. I'm the Detachment 1 Commander for the California Air National Guard's 144th Fighter Wing at the March Air Reserve Base.

On behalf of the California Air National Guard, I want to welcome all of you to this significant public hearing regarding the Draft Environmental Impact Statement for the Proposed Aircraft Conversion at the 144th Fighter Wing.

It is our goal this evening to provide you with accurate information about the proposed aircraft conversion and The National Environmental Policy Act, commonly referred to as the NEPA process, to ensure your maximum participation and understanding of both activities.

It is required that I inform you that under the Privacy Act of 1974, your name, address, and comments, if provided during this NEPA process, will be used to compile mailing lists for sending project reports, brochures, and other information concerning the EIS to those individuals and groups who might be interested; forwarded to Federal, state and local agencies and elected officials; the addresses of private individuals submitting comments will not, I repeat, will not be published in documents released to the public.

Failure to provide the information requested would prevent delivery of documents and notifications of further developments. However, documents are available on the project Web site, in local public areas, such as libraries, with locations published in local newspapers.

I would like to introduce you to the individuals who are here this evening to assist in answering questions about the aircraft conversion and to facilitate your participation in commenting on the findings of the Draft Environmental Impact Statement.

First, we have Colonel James Roan, Senior Appellate Judge, from Headquarters Air Force Base, Joint Base Andrews, Maryland. He will be presiding over this evening's hearing.

Lieutenant Colonel John Macedo, 144th Fighter Wing's Environmental Manager, will be explaining some of the key considerations regarding the National Environmental Policy Act and the NEPA process. He will provide you with an overview of proposed actions and alternatives.

We also have a number of other individuals who have been involved in the development of the Draft Environmental Impact Statement. They are from the California Air National Guard, the National Guard

Bureau's Air National Guard Readiness Center, and our environmental consultants.

They will be available after the current, formal session to answer questions and to help facilitate this process. You will find that any member in uniform or with an EIS name tag can either answer your questions or direct you to the right individual to answer your questions.

Again, I want to thank you for your attendance and your interest in this evening. Please let me know if I can be of further assistance, either during or after tonight's formal proceedings conclude.

With that, I will turn over the hearing to Colonel Roan.

JUDGE ROAN: Thank you, Colonel Jansky.

Am I on?

Okay. Good evening. I am Colonel Roan, and I am the Senior Appellate Judge for the United States Air Force from Joint Based Andrews in Maryland.

I'd like to make clear from the outset that I'm here in my capacity as a Federal judge solely to act as a moderator in this hearing. The United States Trial Judiciary is an independent organization. I do not work for, or with, anyone in this room. I am not a member of the command or assigned to the installation.

I report directly to the Judge Advocate General of the United States Air Force. I have had no involvement with the preparation of this Proposed Action or the Environmental Impact Statement.

I have not rendered legal advice or assistance with respect to this Action. I'm here tonight to serve as an independent public hearing officer regarding the Draft Environmental Impact Statement. I am responsible for providing everyone an opportunity to comment tonight on the Proposed Action, alternatives, and associated environmental analysis.

This public hearing provides you the formal opportunity for comment. I do not make any recommendation or decision on whether the proposed project should be continued, modified, or abandoned or how the Environmental Impact Statement should be prepared.

Therefore, during the public comment portion of this hearing, I urge to direct your comments and questions to the individuals to my right.

The purpose of this hearing is to provide you with an opportunity to comment on the findings of the Draft Environmental Impact Statement. More importantly, this hearing is a formal opportunity for you to get involved in the NEPA process.

Now, we're scheduled to conclude at 9:00 p.m., but if necessary, we will continue until all comments have been received. This formal session may end before 9:00, if there are no more comments, but the overall hearing will continue as long as necessary.

To assure that this hearing runs smoothly, I am going to explain the sequence of events and some basic ground rules:

Lieutenant Colonel John Macedo, 144th Fighter Wing's Environmental Manager, will provide a brief presentation shortly. Now, registration cards were available at the registration table as you came in. If you have not filled out a card or indicated your desire to speak and wish to do so, please raise your hand and we will make sure you can get a card in the back there.

In addition, there are materials at the door, describing the official Air National Guard proposal, the description of the Proposed Action and alternatives, and information on locations where you can review the Draft EIS after tonight.

Now, to ensure that all interested citizens have an opportunity to speak, I will limit the comments to three minutes per person. You will only be allowed to comment when your name is called. If any elected officials are present, we will call them first and then

everybody else in the audience.

A stenographer is recording this proceeding for the record. Now, as far as amenities, restrooms are located outside this lobby, and refreshments have been provided in the back.

As a reminder, the purpose of tonight's hearing is not to debate or vote on the Proposed Action. At the conclusion of this hearing, you may discuss the findings of the Draft Environmental Impact Statement in greater detail with the staff members from the 144th Fighter Wing, National Guard Bureau, and the consultant's technical representatives.

If you do not wish to provide oral comments, written comments will be accepted and will be given equal consideration. Even if you do make an oral statement, it would be very helpful if you would also provide a written statement to reaffirm the comments you made and any additional comments you would like to make as well.

Written comments should be sent to the National Guard Bureau at the address printed on the registration card that you filled out, and it is also provided on the Comments sheet.

You may write to the National Guard Bureau. Substantive comments will be addressed and included in

the Final Environmental Impact Statement. The formal comment period for the Draft EIS ends on 25th of June, 2012. It is very important for you to realize that the California Air National Guard and the National Guard Bureau will be open and responsive to your comments and concerns throughout the NEPA process.

Before we proceed with the presentation, if you have not received a copy of the Draft EIS, copies are available for you to review while in attendance at this hearing at the back of the room.

There is also a list of locations where the Environmental Impact Statement is provided for public review after this meeting in the informational handouts. If you did not receive information materials that were available at the entrance, they will be provided at our back table.

At this point, I will turn this over to Lieutenant Colonel John Macedo, Environmental Manager for the 144th Fighter Wing.

COLONEL MACEDO: Thank you, your Honor.

Good evening, ladies and gentlemen, and welcome to the public hearing for the Draft EIS. As the Judge indicated, I am John Macedo and I serve as the environmental manager for the 144th Fighter Wing.

As a member of the unit and of the local

community, I am very interested in what happens here. This is an important occasion in which to discuss this topic and I appreciate your interest and your participation.

The Greater Fresno community is important to the 144th Fighter Wing. Community input is valuable to the environmental analysis. Fresno-Yosemite International Airport is the current home of the 144th Fighter Wing.

The 144th Fighter Wing, Detachment 1, supports the 144th Fighter Wing mission. It is located at March Air Reserve Base near Moreno Valley. Many of our current, as well as retired, members live both in Fresno and the Moreno Valley areas. We are part of these communities.

Many of you have been consistently supportive of the military and of the 144th Fighter Wing, both at Fresno and March Air Reserve Base. These communities helped foster the development of the California Air National Guard as well as the 144th Fighter Wing over the years.

This support is and has been deeply appreciated. Like you, our members live and work in these communities and care deeply about its future. This is home to us all.

This EIS analyzes the environmental effects of the Air Force Program Objective Memorandum, directing this aircraft and mission conversion. This consists of two primary Components:

One, conversion from F-16 to F-15 aircraft, and two, providing facilities on the existing installation to support the F-15 mission.

The proposed integration of 18 primary assigned F-15 aircraft with 3 back-up F-15, or spares, for a total of 21 F-15 aircraft and subsequent transfer of 18 F-16 aircraft from the 144th Fighter Wing would take place over a six-month period.

All F-16 aircraft would be relocated to other F-16 units with similar aircraft that have reached the end of their service life. Dual operations would occur during four months of the transition period. Departure of the F-16 would be phased over this period and the arrival of F-15 aircraft would be phased during the overlapping six-month period.

All proposed construction activities would occur at Fresno only. There is no proposed construction at March Air Reserve Base. Most construction actions would be upgrades and alterations to existing facilities.

Newly proposed construction includes an F-15

corrosion control hangar and shops, expansion of the existing arm and de-arm pads, an addition to the munitions storage facility, as well as an addition to the non-destructive inspection shop. These construction actions are necessary to support the F-15 mission and would be completed within a two-year period.

Along with the analysis of the aircraft and mission conversion and associated construction, this EIS fully analyzes three alternatives:

One, the first alternative, which is the preferred alternative, proposes that the 144th Fighter Wing would convert from 18 assigned F-16 aircraft to 21 assigned F-15 aircraft, 18 primarily aircraft with 3 back-up or spare F-15s, and with no increase of flight operations.

Two, the second conversion proposes that the 144th Fighter Wing would convert from 18 primary assigned F-16 aircraft to 24 primary assigned F-15 aircraft with 3 back-up, or spares, for a total of 27 F-15s and with a 30 percent increase in flight operations.

Three, the third alternative is the "No Action" alternative. The council on environmental Quality specifically requires that the analysis of the

"No Action" alternative in the NEPA documents such as this EIS.

Under this alternative, the 144th Fighter Wing would maintain their existing facilities, and would not build new facilities proposed, and would not undergo an aircraft and mission conversion.

With regard to local employment levels, implementation of the Proposed Action would provide an additional 23 full-time jobs to the Fresno's 144th Fighter Wing and a loss of one part-time job.

Likewise, the 144th Fighter Wing annual payroll would increase full-time salaries by an additional estimated 1.6 million per year. There would be no changes in personnel for the 144th Fighter Wing, Detachment 1, at March Air Reserve Base.

In terms of a simple summary of aircraft and mission implications, the 144th Fighter Wing would continue providing Global Air Superiority and Aerospace Control Alert for the Western United States and its population centers. The F-16 aircraft, currently flown by the 144th Fighter Wing, would be relocated to other F-16 units and replaced with F-15 aircraft.

The 144th Fighter Wing at Fresno typically flies five days per week plus one weekend per month. Under the proposed aircraft conversion, the 144th

Fighter Wing would conduct average of approximately 10 sorties per day.

A "sortie" is a take-off, training mission and landing. The current F-16 mission involves approximately the same number of sorties per day as would occur under the Proposed Action. The 144th Fighter Wing, Detachment 1, at March Air Reserve Base typically flies one to two sorties per day. This would remain the same under the Proposed Action.

At this point, I will briefly summarize the NEPA process: The National Environmental Policy Act, commonly referred to as NEPA, aids Federal agency decision-makers in determining the future course of Federal actions.

It is the objective of NEPA to ensure that decision-makers have environmental information and public input to facilitate informed decisions. NEPA assigns the Council on Environmental Quality the task of ensuring that Federal agencies meet their obligations under the Act.

The purpose of this EIS is analyze the environmental impacts and implement aircraft conversions actions with those impacts taken into consideration. The purpose of this hearing this evening is to provide the public with an opportunity to

comment on the findings in the Draft Environmental Impact Statement.

The Draft Environmental Impact Statement or Draft EIS, which is available for your viewing at a number of public locations, presents the findings and analysis of the Proposed Action and alternatives on environmental criteria set forth by NEPA.

Tonight's public hearing is the second of two public comment forums which provide the public an opportunity to comment on the scope and content of the Environmental Impact Statement. The first forum, called a "scoping meeting," was held last August.

Comment has also been solicited from local, states and Federal agencies. That process began with the release of the Notice of Intent on 15th July, 2011, and continues today with public and agency review of the Draft Environmental Impact Statement.

This hearing gives the community an opportunity to comment on the analyses that has been presented in the Draft EIS. The formal public comment period ends 25 of June, 2012. Following this period, oral and written comments received from both the public and government agencies will be reviewed by the Air Force and the National Guard Bureau.

We will continue to accept comments throughout

the NEPA process. However, it is more difficult to give your comments the consideration they deserve as the process winds down closer to the release of the Final Environmental Impact Statement or Final EIS.

After all comments on the Draft EIS have been addressed, the Final EIS will be prepared, incorporating applicable relevant comments. The Final EIS will be released to the public for a 30-day period before a record of decision is signed by the Secretary of the Air Force or his designee.

This concludes the explanation of both the conversion proposal as well as the environmental attributes. I now return the program back to our Hearing Officer. Thank you.

JUDGE ROAN: Thank you, Colonel Macedo.

Okay. We will now begin the formal oral presentation for comments. I'll call up the speakers that have indicated that they'd like to speak this evening. If you would, please, when you come to the podium, please state your name and the name of any organization that you may represent.

Please don't provide any other personal information, such as your home address or phone number, and your oral comments will be used to develop a transcript and permanent record of the meeting.

Again, as a courtesy to others, please limit your time to the three minutes. We'll give equal weight to all comments, whether they are oral, written, or both. You don't have to speak for the full-time, however, if you choose to speak for the entire three minutes, I'll give you a heads-up when you've completed two and we'll let you know when your three minutes have elapsed.

If you think that you'll have more comments that you would like to present in the time allotted, make the most important comments first and then follow up by submitting the remainder in writing, if you so wish.

Again, please understand there is no page limit to written comments, equal weight will be given to both oral and written remarks. They will all become a part of the official record and will be included in the Final Environmental Impact Statement.

With that said, we'll now begin the comment period. Our first speaker this evening is Mr. Charles Ramiro.

MR. RAMIRO: Good evening, ladies and gentlemen.

First name is Charles; middle, Dwayne; last name is Ramiro. I want to thank you for letting me speak today. I retired here at the March Air Reserve

Base 452nd. I support the aircraft coming down from Fresno one hundred percent. Okay. And we have to support our Guard and Reserve Troops. Thank you very much. Good night.

Robert, carry on.

MR. DOGAN: Thank you.

JUDGE ROAN: Thank you, Mr. Ramiro. Thank you very much for your comments.

MR. RAMIRO: You're welcome, sir.

JUDGE ROAN: That was the only card that I had received.

MR. DOGAN: It's the only speaker we have so far.

JUDGE ROAN: I know we have a couple of other folks in the audience.

Anybody would like to come up and provide comments this evening?

(Brief pause.)

JUDGE ROAN: Well, what I'd like to do then is, take a break and to see if anybody else may be coming in that was late in arriving or some of the folks in the audience change their mind. So we'll be on break for, let's say, 15 minutes and we'll see where we're at after that. Thank you.

(A recess was taken from 7:18 p.m. to 7:54 p.m.)

JUDGE ROAN: We've reconvened the hearing.

There did not appear to be any other speakers who'd wish to make presentations this evening. With that said, we will go ahead and formally adjourn and conclude.

MR. DOGAN: All right. We're done.

(Proceedings concluded at 7:56 p.m.)

REPORTER'S CERTIFICATE

The undersigned Certified Shorthand Reporter, licensed in the State of California, does hereby certify:

That the foregoing transcript of proceedings was taken before me at the time and place therein set forth; that the proceedings were recorded stenographically by me and were thereafter transcribed, said transcript being a true copy of my shorthand notes thereof.

That the dismantling of the original transcript will void the Reporter's certificate.

I further declare that I have no interest in the outcome of this action.

In witness whereof, I have subscribed my name this 22 day of June, 2012.

CARLOS R. HICHO
CSR NO. 13111

HEARING RE THE F-15 AIRCRAFT CONVERSION

144TH FIGHTER WING

CALIFORNIA AIR NATIONAL GUARD

FRESNO-YOSEMITE INTERNATIONAL AIRPORT

Thursday, June 7, 2012

Fresno, California

Reported by: Sandra L. Edmonson, CSR No. 7704, RPR, CRR

2

Fresno, California

June 7, 2012; 7:00 p.m.

Piccadilly Inn

TECH SERGEANT VAUGHN: Good evening, ladies and gentlemen, and welcome to the hearing for the draft environmental impact statement for the 144th Fighter Wing's proposed F-15 conversion. I am Tech Sergeant Charles Vaughn. I serve as a public affairs specialist for the 144th Fighter Wing located here in Fresno, California, and Detachment 1 located at March Air Reserve Base in Moreno Valley, California.

Please enjoy the refreshments provided. Restrooms are outside this room in the lobby. Smoking in the facility is prohibited.

Before starting the formal portion of tonight's hearing, I ask that cell phones and pagers be turned off or placed in the silent mode.

During the proceedings please do not interrupt the speaker, and please be respectful to those providing oral comments. Everyone will be provided an opportunity to speak.

Again, welcome.

Colonel Said, the 144th Fighter Wing Commander, will now begin the formal portions of tonight's hearing.

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COMMANDER SAID: Good evening. My name is Sam Said, and I'm the Wing Commander of the California Air National Guard's 144th Fighter Wing at the Fresno-Yosemite International Airport.

On behalf of the California Air National Guard, I want to welcome all of you to the significant public hearing regarding the draft environmental impact statement for the proposed aircraft conversion at the 144th Fighter Wing.

It is our goal this evening to provide you with accurate information about the proposed aircraft conversion and the National Environmental Policy Act, commonly referred to as the NEPA process, to ensure your maximum participation and understanding of both activities.

It is required that I inform you that under the Privacy Act of 1974, your name, address, and comments, if provided during this NEPA process, will be: First, used to compile mailing lists for sending project reports, brochures, and other information concerning the EIS to those individuals and groups who might be interested; forwarded to federal, state and local agencies and elected officials. The addresses of private individuals submitting comments will not, repeat, will not be published in documents released to

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1 the public.

2 Failure to provide the information requested

3 would prevent delivery of documents and notification of

4 further developments; however, documents are available

5 on the project website, in local public areas, such as

6 libraries, with locations published in local newspapers.

7 I would like to introduce you to individuals

8 who are here this evening to assist in answering

9 questions about the aircraft conversion and to

10 facilitate your participation in commenting on the

11 findings of the draft environmental impact statement.

12 First, we have Colonel James Roan, Senior

13 Appellate Judge, from Headquarters Air Force, Joint Base

14 Andrews, Maryland. He will be presiding over this

15 evening's hearing. Lieutenant Colonel John Macedo, the

16 144th Fighter Wing's Environmental Manager, will be

17 explaining some key considerations regarding the

18 National Environmental Policy Act and the NEPA process.

19 He will provide you with an overview of proposed action

20 and alternatives.

21 We also have a number of other individuals who

22 have been involved in the development of the draft

23 environmental impact statement. They are from the

24 California Air National Guard, the National Guard

25 Bureau's Air National Guard Readiness Center, and our

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environmental consultants. They will be available after the current formal session to answer questions and help facilitate this process. You will find that any member in uniform or with an EIS name tag can either answer your questions or direct you to the right individual to answer your questions.

Again, I want to thank you for your attendance and your interest this evening. Please let me know if I can be of further assistance, either during or after tonight's formal proceedings conclude.

With that, I would like to turn over the hearing to Colonel Roan.

COLONEL ROAN: Thank you, Colonel Said. I'll go ahead and stand so that you all don't have to move to see me.

I am Colonel Roan, and I am a Senior Appellate Judge from the United States Air Force from Joint Air Base Andrews in Maryland, and I'd like to make it clear from the outset that I'm here in my capacity as a federal judge solely to act as a moderator in this hearing. The United States Trial Judiciary is an independent organization. I do not work for or with anyone in the room. I'm not a member of the command or assigned to this installation. I report directly to the Judge Advocate General of the United States Air Force.

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I've had no involvement with the preparation of this proposed action or the environmental impact statement. I have not rendered legal advice or assistance with respect to this action. Rather, I am here this evening to serve as an independent public hearing officer regarding the draft environmental impact statement. I am responsible for providing everyone an opportunity to comment tonight on the proposed action, alternatives, and associated environmental analysis. This public hearing provides you with the formal opportunity for comment. I do not make any recommendations or decisions on whether the proposed project should be continued, modified, or abandoned, or how the environmental impact statement should be prepared.

The purpose of the hearing this evening is to provide you with an opportunity to comment on the draft environmental impact statement. More importantly, the hearing is a formal opportunity for you to get involved in the NEPA process. This hearing is scheduled to conclude at 9 p.m., but, if necessary, we will conclude past that to make sure everyone's comments are received.

To assure the hearing runs smoothly, I'm going to explain the sequence of events and basic ground rules.

First, Colonel John Macedo, the 144th Fighter

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1 Wing's Environmental Manager, will provide a
2 brief environ- -- excuse me -- a brief presentation.
3 Then we'll open it up to the public comment period.
4 Now, registration cards were available at the
5 table as you came in, and if you have not filled one out
6 or you decide you'd like to make a comment now, please
7 let us know, and we will certainly give you an
8 opportunity to do that.
9 In addition, there are materials at the door
10 describing the official Air National Guard proposal, the
11 description of the proposed action and alternatives, and
12 information on locations where you can review the draft
13 EIS report.
14 To ensure that all interested citizens have an
15 opportunity to speak, we will limit comments to three
16 minutes per person.
17 Now, the stenographer is recording this
18 proceeding for the record, and, if necessary, we will
19 take a break after everyone's had an opportunity to
20 speak so that she can have an opportunity to rest as
21 well.
22 We do have some restrooms located outside in
23 the lobby, and refreshments, as mentioned, have been
24 provided.
25 Now, as a reminder, the purpose of tonight's

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1 hearing is not to debate or vote on the proposed action.
2 At the conclusion of this hearing you may discuss the
3 findings of the draft environmental impact statement in
4 greater detail with the staff members from the 144th
5 Fighter Wing National Guard Bureau and the consultant's
6 technical representatives.
7 If you don't wish to provide oral comments,
8 written comments will be accepted and will be given
9 equal consideration. Even if you do make an oral
10 statement, it would be very helpful if you would make a
11 written statement as well to reaffirm the comments you
12 made and any additional comments you would like to make.
13 Written comments should be sent to the National
14 Guard Bureau at the address printed on the registration
15 card, and the address is also provided on your comment
16 sheets.
17 You may write to the National Guard Bureau.
18 Substantive comments will be addressed and included in
19 the final report, and the formal comment period for the
20 draft EIS ends on 25 June of this year. It is important
21 for you to realize that the California Air National
22 Guard and the National Guard Bureau will be open and
23 responsive to your comments and concerns throughout the
24 process.
25 Now, before we proceed on with the

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1 presentations, if you've not received a copy of the
2 draft EIS, copies are available for you to review while
3 in attendance at this hearing at the back of the room.
4 There's also a list of locations where the environmental
5 impact statement is provided for public review after
6 this meeting in the informational handouts. If you did
7 not receive other information, materials that were
8 available at the entrance, please let us know; we'll
9 make sure that you get those.
10 So at this point I'm going to turn it over to
11 the Lieutenant Colonel John Macedo, the Environmental
12 Manager for the 144th Fighter Wing.
13 LIEUTENANT COLONEL MACEDO: Thank you, your
14 Honor.
15 Good evening, ladies and gentlemen, and welcome
16 to the public hearing for the draft EIS. As the judge
17 indicated, I am John Macedo, and I serve as the
18 Environmental Manager for the 144th Fighter Wing. As a
19 member of the unit and of the local community, I am very
20 interested in what happens here. This is an important
21 occasion in which to discuss this topic, and I
22 appreciate your interest and your participation.
23 The greater Fresno community is important to
24 the 144th Fighter Wing. Community input is valuable to
25 the environmental analysis. Fresno-Yosemite

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1 International Airport is the current home of the 144th
2 Fighter Wing. The 144th Fighter Wing Detachment 1
3 supports the 144th Fighter Wing mission. It is located
4 at March Air Reserve Base near Moreno Valley. Many of
5 our current, as well as retired, members live both in
6 Fresno and the Moreno Valley areas. We are part of
7 these communities.
8 Many of you have been consistently supportive
9 of the military and of the 144th Fighter Wing, both at
10 Fresno and March Air Reserve Base. These communities
11 helped foster the development of the California Air
12 National Guard, as well as the 144th Fighter Wing over
13 the years. This support is and has been deeply
14 appreciated. Like you, our members live and work in
15 these communities and care deeply about their future.
16 This is home to all of us.
17 This EIS analyzes the environmental effects of
18 the Air Force Program Objective Memorandum directing
19 this aircraft and mission conversion. This consists of
20 two primary components:
21 1. Conversion from F-16 to F-15 aircraft, and
22 2. Providing facilities on the existing
23 installation to support the F-15 mission.
24 The proposed integration of 18 primarily
25 assigned F-15 aircraft with three back-up F-15 (or

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1 spares) for a total of 21 F-15 aircraft and subsequent
2 transfer of 18 F-16 aircraft from the 144th Fighter Wing
3 would take place over a six-month period.
4 All F-16 aircraft would be relocated to other
5 F-16 units with similar aircraft that have reached the
6 end of their service life. Dual operations would occur
7 during four months of the transition period. Departure
8 of the F-16 would be phrased over this period, and the
9 arrival of F-15 aircraft would be phased during an
10 overlapping six-month period.
11 All proposed construction activities would
12 occur at Fresno only. There's no proposed construction
13 at March Air Reserve Base. Most construction actions
14 would be upgrades and alterations to existing
15 facilities. Newly proposed construction includes an
16 F-15 corrosion control hangar and shops, expansion of
17 the existing arm and de-arm pads, and addition to the
18 munitions storage facility, as well as an addition to
19 the non-destructive inspection shop. These construction
20 actions are necessary to support the F-15 mission and
21 would be completed within a two-year period.
22 Along with the analysis of the aircraft and
23 mission conversion and associated construction, this EIS
24 fully analyzes three alternatives:
25 1. The first alternative, which is the

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1 preferred alternative, proposes that the 144th Fighter
2 Wing would convert from 18 assigned F-16 aircraft to 21
3 assigned F-15 aircraft (18 primary aircraft with three
4 back-up or spare F-15s) and with no increase of flight
5 operations.
6 2. The second alternative proposes the 144th
7 Fighter Wing would convert from 18 primary assigned F-16
8 aircraft to 24 primary assigned F-15 aircraft with three
9 back-up (or spares) for a total of 27 F-15s and with a
10 30 percent increase in flight operations.
11 3. The third alternative is the "no action"
12 alternative. The Council for Environmental Quality
13 specifically requires the analysis of the "no action
14 alternative" in all NEPA documents, such as this EIS.
15 Under this alternative, the 144th Fighter Wing would
16 maintain their existing facilities, would not build new
17 facilities proposed, and would not undergo an aircraft
18 and mission conversion.
19 With regard to local employment levels,
20 implementation of the proposed action would provide an
21 additional 23 full-time jobs to the Fresno's 144th
22 Fighter Wing, and a loss of one part-time job.
23 Likewise, the 144th Fighter Wing annual payroll would
24 increase the full-time salaries by an additional
25 estimated $1.6 per year. There would be no changes in

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1 personnel for the 144th Fighter Wing Detachment 1 at
2 March Air Reserve Base.
3 In terms of a simple summary of aircraft and
4 mission implications, the 144th Fighter Wing would
5 continue providing Global Air Superiority and Aerospace
6 Control Alert for the Western United States and its
7 population centers; the F-16 aircraft currently flown by
8 the 144th Fighter Wing would be relocated to other F-16
9 units and replaced with F-15 aircraft.
10 The 144th Fighter Wing at Fresno typically
11 flies five days per week plus one weekend per month.
12 Under the proposed aircraft conversion, the 144th
13 Fighter Wing would conduct average of approximately ten
14 sorties per day. A sortie is a take-off, training
15 mission, and landing. The current F-16 mission involves
16 approximately the same number of sorties per day as
17 would occur under the proposed action. The 144th
18 Fighter Wing Detachment 1 at March Air Reserve Base
19 typically flies one to two sorties per day. This would
20 remain the same under the proposed action.
21 At this point I will briefly summaries the NEPA
22 process. The National Environmental Policy Act,
23 commonly referred to as NEPA, aids federal agency
24 decision-makers in determining the future course of
25 federal actions. It is the objective of NEPA to ensure

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that decision-makers have environmental information and public input to facilitate informed decisions. NEPA assigns the Council on Environmental Quality the task of ensuring that federal agencies meet their obligations under the act. The purpose of this EIS is to analyze environmental impacts and implement aircraft conversion actions with those impacts taken into consideration.

The purpose of this hearing this evening is to provide the public with opportunities to comment on the findings in the draft environmental impact statement.

The draft environmental impact statement, or draft EIS, which is available for your viewing at a number of public locations, presents the findings and analysis of the proposed action and alternatives on environmental criteria set forth by NEPA. Tonight's public hearing is the second of two public comment forums which provide the public an opportunity to comment on the scope and content of the environmental impact statement. The first forum, called the scoping meeting, was held last August.

Comment has also been solicited from local, state, and federal agencies. That process began with the release of the notice of intent on 15 July 2011 and continues today with the public and agency review of the draft environmental impact statement.

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1 This hearing gives the community an opportunity
2 to comment on the analysis that has been presented in
3 the draft EIS.
4 The formal public comment period ends on 25
5 June 2012. Following this period, oral and written
6 comments received from both the public and governmental
7 agencies will be reviewed by the Air Force and the
8 National Guard Bureau. We will continue to accept
9 comments throughout the NEPA process; however, it is
10 more difficult to give your comments the consideration
11 they deserve as the process winds down closer to the
12 release of the final environmental impact statement, or
13 final EIS.
14 After all comments on the draft EIS have been
15 addressed, the final EIS will be a prepared
16 incorporating applicable relevant comments. The final
17 EIS will be released to the public for a 30-day period
18 before a record of decision is signed by the Secretary
19 of the Air Force or his designee.
20 This concludes the explanation of both the
21 conversion process proposal as well as environmental
22 attributes. I now return the program back to our
23 hearing officer. Thank you.
24 COLONEL ROAN: Thank you, Colonel Macedo.
25 All right. We'll now begin the public comment

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1 section this evening. If you would like to make a
2 comment, if you would please come up to the podium.
3 Please clearly state your name and the full name of any
4 organization that you may represent. You don't need to
5 provide any other personal information, such as your
6 home address or phone number, and your oral comments
7 will be used to develop a transcript in permanent record
8 of this proceeding. Now, we'll limit, as I mentioned,
9 limit comments to three minutes, but you don't have to
10 speak for the entire time, but if you do choose to do
11 so, we'll let you know when two minutes have elapsed,
12 and then I'll let you know when the full three minutes
13 have finished, and if you could conclude your comments
14 at that time, we can allow the next speaker to take the
15 podium.
16 If you have -- if you think you'll have more
17 comments than you can present in the time allotted, make
18 the most important comments first, and then follow up by
19 submitting the remainder of your comments in writing if
20 you would like. There are no page limits to the written
21 comments. Equal weight will be given to both oral and
22 written remarks. They will all become a part of the
23 official record and will be included in the final
24 draft [sic] environmental impact statement.
25 Okay. With that said, we'll begin. I don't

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have anybody who's mentioned that they'd like to make a comment, so I'd like to open it up to the audience. Would anybody like to make an oral comment or provide written statements at this time?

MR. RHODES: I'll make a comment.

COLONEL ROAN: Sir, if you'd like, you can do it from there or you can come up here to the podium, whichever's easier.

MR. RHODES: I'll do it from here if that's all right.

My name is Robby Rhodes, and I live in the -- I don't -- do not represent any agency or organization. I live in the flight path of the F-16s as they are now. I know that under the proposal my noise level will increase. I want to go on record as saying it can double for all I care. The -- I'm happy to see them flying, and I want to continue to see them fly.

The other thing is that, to me, I am appalled that a fighter wing has the environmental laws. I think the military necessity is the governing thing here, and if the Air Force and the Air Guard think they need more F-15s, then they should come. And I know that there's a -- you're required by law to do this, but I think that it's a -- we're sinking into an abyss of bureaucracy here when the key thing is to defend the country.

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And that concludes my comment.

COLONEL ROAN: Thank you, sir.

Would anybody else like to make a comment this evening?

All right. What we'll do is we will take a break, and during that time if anybody would like to let me know that they'd like to come in and make comments or provide written remarks, please do so. But we'll go ahead and go on a 15-minute break, and we'll see where we're at with that. Thank you.

(Recess taken.)

COLONEL ROAN: We'll reconvene at this time.

There does not appear to be anybody else that wishes to make a public comment; however, we'll stay open until 8 o'clock and see if anybody else comes in, and then we'll make a decision at that time whether to adjourn.

We're back on break.

(Recess taken.)

COLONEL ROAN: Okay. It's now 8 o'clock. There are no members of the public that wish to make a comment. We're going to formally adjourn this evening's proceedings.

(8:00 p.m.)

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STATE OF CALIFORNIA)
) ss.
COUNTY OF KERN)

I, Sandra L. Edmonson, a Certified Shorthand Reporter for the State of California, hereby certify that I was present and reported in stenotypy all the proceedings in the foregoing-entitled matter; and I further certify that the foregoing is a full, true, and correct statement of such proceedings and a full, true, and correct transcript of my stenotype notes thereof.

Dated at Bakersfield, California, on Tuesday, June 12, 2012.

_____
Sandra L. Edmonson, CSR No. 7704

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COMMENTS ON THE DRAFT EIS – F-15 AIRCRAFT CONVERSION

Comment Number	*Name/Agency*	*Date*	*Comment*	*Response*
1-1	Native American Heritage Commission	May 22, 2012	The NAHC conducted a Sacred Lands File (SLF) search of its inventory determined that Native American Cultural Resources **were not identified** in the project area you specified;	Thank you for your comment.
1-2	Native American Heritage Commission	May 22, 2012	It is advisable to contact the persons listed and seek to establish a 'trust' relationship with them; if they cannot supply you with specific information about the impact on cultural resources, they may be able to refer you to another tribe or person knowledgeable of the cultural resources in or near the affected project area.	Tribes have been contacted by both mail and telephone.
1-3	Native American Heritage Commission	May 22, 2012	NEPA regulations provide for provisions for accidentally discovered archeological resources during construction and mandate the processes to be followed in the event of an accidental discovery of any human remains in a project location other than a 'dedicated cemetery. Even though a discovery may be in federal property, California Government Code §27460 should be followed in the event of an accidental discovery of human remains during any groundbreaking activity; in such cases California Government Code §27491 and California Health & Safety Code §7050.5 will apply and construction cease in the affected area.	See Section 4.11.2.1.
2-1	Gilpin, Thomas	June 6, 2012	The analysis simply shows more people will be exposed to noise greater than 65 decibels. There was no mention of harmful effects this noise exposure will have. There is no mention of the range of noise people will be exposed to and how much of the exposure will be at levels that can trigger car alarms which I have experienced.	See Section 4.1 of the Draft EIS, pages 4-1 through 4-12. Additionally, see Appendix B.1, *Noise Analysis*, and B.2, *Noise Modeling Input Data, Fresno-Yosemite IAP*.
2-2	Gilpin, Thomas	June 6, 2012	There is no mention of the effects on carbon dioxide levels. Nor is there mention of the usage of fossil fuels per hour of use of these fighter jets. The effects on air pollution is also not addressed.	See Section 4.2 of the Draft EIS, pages 4-13 through 4-21. Additionally, see Appendix C, *Air Quality*, and Appendix D, *Conformity Determination*.

Comment Number	Name/Agency	Date	Comment	Response
4-1	City of Riverside	June 15, 2012	We thank you for the opportunity to comment on this project. Recently, the March Joint Powers Authority (MJPA), of which the City is a member, completed a draft Joint Land Use Study (JLUS) for the MARB/March inland Port (MIP). This proposed revision to the Noise Contour map needs to be incorporated into the JLUS and the environmental review currently in process by Riverside County Airport Land Use Commission (ALUC). It is important that the JLUS Plan and its subsequent EIR represent the most up-to-date and accurate data available based on this anticipated restructuring scenario for the F-15's.	Thank you for your comment.
5-1	San Joaquin Valley Air Pollution Control District	June 19, 2012	The USAF has determined that a positive conformity determination may be made based on the SJVAPCD's written determination per 40 CFR 93.158(a)(5)(i)(A). The District concurs with the USAF's finding.	The conformity analysis has been finalized based on the District's written determination. No changes have been made to the analysis. The project therefore has been found to conform with the SIP for the San Joaquin Valley Air Basin.
5-2	San Joaquin Valley Air Pollution Control District	June 19, 2012	The District concurs that the emissions associated with the preferred alternative will be below the Clean Air Act major source thresholds for attainment pollutants and the *de minimis* thresholds for nonattainment pollutants except for NOx.	Thank you for your comment.
5-3	San Joaquin Valley Air Pollution Control District	June 19, 2012	The District has indicated that the net increase in NOx emissions for the Proposed Action exceeds the District's CEQA significance threshold of 10 tons per year for nonattainment pollutants, and would have a significant impact on air quality.	Thank you for your comment.
5-4	San Joaquin Valley Air Pollution Control District	June 19, 2012	The District indicates that CEQA establishes a duty for public agencies to avoid or minimize environmental damage where feasible, and requires mitigation measures where available to lessen any significant effects that the project would have on the environment, considering economic, environmental, legal, social, and technological factors.	Thank you for your comment.

Comment Number	Name/Agency	Date	Comment	Response
5-5	San Joaquin Valley Air Pollution Control District	June 19, 2012	The USAF has determined that a positive conformity determination may be made based on the SJVAPCD's written determination per 40 CFR 93.158(a)(5)(i)(A). The District concurs with the USAF's finding.	The conformity analysis has been finalized based on the District's written determination. No changes have been made to the analysis. The project therefore has been found to conform with the SIP for the San Joaquin Valley Air Basin.
7-1	U.S. Environmental Protection Agency	June 25, 2012	Mitigation (sound proofing) by the City's Airports Department could help reduce noise impacts within dwellings; however, there is uncertainty that mitigation would occur since no funding source has been identified for the matching funds necessary to obtain Federal Aviation Administration noise mitigation funding. The City has indicated it does not currently have a funding source to cover the additional impacts that would result from the proposed action. We strongly recommend that the NGB work with the City's Airports Department to explore ways that the Air Force can assist in ensuring the continued funding of the City's noise mitigation program.	The 144 FW/CC met with the Mayor and City Manager of Fresno and confirmed that the Airport will update the noise exposure maps and submit them to FAA. This will trigger an updated Part 150 Study and subsequent mitigation funds will be provided by the City and the FAA. Mr. Dogan and contractor later met with the Airport Interim Director and were advised that the Airport Director has vacated his position. The Interim Director also confirmed the approach described above regarding funding of noise mitigation. The USAF cannot program or spend appropriated funds on facilities that the USAF does not own, without specific statutory authority, nor can the expenditure of funds be applied under another appropriation (known as augmentation). The FAA provides for off-airport noise mitigation through its Airport Noise Compatibility Planning program in accordance with 14 CFR Part 150 ("Part 150 program"), promulgated under the authority of the Aviation Safety and Noise Abatement Act of 1979 (49 USC 47501-47510). The Aviation Safety and Noise Abatement Act of 1979 was written specifically for the Secretary of Transportation; Congress has not provided similar authority to Secretary of Defense. Without specific statutory authority, the expenditure of funds for off-airport noise mitigation by the USAF would be considered an augmentation of FAA appropriations. Noise abatement procedures currently in place for the F-16 aircraft will be continued under F-15 operations. The F-15 airport will primarily continue using an overhead approach for the majority of arrivals from the south rather than a straight in approach to Runway 29. Modifications to the existing F-16 overhead approaches approved by the

Comment Number	Name/Agency	Date	Comment	Response
				FAA will mean the F-15 aircraft will be at higher altitudes over the land south of the airport. This means less land south of the airport will be exposed to higher levels of noise than would have been using the current F-16 overhead arrivals. The noise contours reflect the use of these overhead approaches with modified arrival altitudes.
7-2	U.S. Environmental Protection Agency	June 25, 2012	We also recommend that the noise impact analysis be improved in the FEIS to better disclose impacts to the public, and that the NGB provide targeted outreach to the affected minority population if this has not already occurred.	The ANG worked closely with the Fresno Airport Authority to determine what type of outreach would be needed for this EIS. Based on the Airport Authority's input, various avenues were used to announce the public scoping meetings and public hearings. Announcements for scoping and public hearings were made through public service announcements, newspaper advertisements, media releases, and flyers prepared by the local airport authority. Based on local experience, the need for special linguistics or enhanced outreach was not deemed necessary. NGB met with the Fresno Airport Authority again on September 6, 2012, and reconfirmed that minority populations in the area are predominantly bilingual. It is the Airport's standard practice to conduct public outreach in English only. Translation into other languges would not be necessary, nor has the Airport had a request for translation.

Comment Number	Name/Agency	Date	Comment	Response
8-1	Richards, B.G.	June 22, 2012	The EIS goes to extremes to identify negative noise impacts of this project within and surrounding the immediate airport area. However, it does not address the effectiveness of previous mitigation applied to current operations and does not include actual mitigation for the proposed changes. The only suggestion of mitigation is an FAA airport study that may or may not identity FUTURE mitigation for the proposed changes. Looking back in history a bit, the previous "FAA airport study" did identify some mitigation but also took many years to come close to completing. Then the consideration of effectiveness of the completed mitigation has never been discussed. It is imperative that another approach be taken to identify effective mitigation and review the cost of this mitigation. In addition, it is important that at least some consideration and review be given on how current and proposed operations impact home values within these areas. For the purpose of enforceability and the ability to develop fair mitigation for homeowners and the public at large, it is necessary that mitigation be developed, discussed and approved by the local government PRIOR to project implementation.	The Air Force cannot program or spend appropriated funds on facilities that the Air Force does not own, without specific statutory authority, nor can the expenditure of funds be applied under another appropriation (known as augmentation). The FAA provides for off-airport noise mitigation through its Airport Noise Compatibility Planning program in accordance with 14 CFR Part 150 ("Part 150 program"), promulgated under the authority of the Aviation Safety and Noise Abatement Act of 1979 (49 U.S.C. 47501-47510). The Part 150 Program is the primary Federal regulation guiding and controlling planning for aviation noise compatibility on and around commercial airports. Part 150 established procedures, standards, and methodologies to be used by airport operators for the preparation of airport Noise Exposure Maps and Airport Noise Compatibility Programs. The purpose of the Part 150 process is to provide a balanced approach for mitigating the noise impacts of airports upon airport neighbors while protecting or increasing both airport access and capacity as well as maintaining the efficiency of the national aviation system.
8-2			The EIS seems to only provide information regarding noise issues within certain areas fairly close to the airport. No discussions occur for the rest of the City of Fresno. This is significant since the noise levels all over the north end of the City from military aircraft operations has increased significantly in the past 10 years. This has been done without study or environmental review. As an example, it is now not uncommon to have to cease a normal conversation during military jet take off over homes that are many miles from the airport. Being a long time resident of this area, this is a major change from the beginning of my residency at this location. The ability to carry on a	The Federal Interagency Committee on Urban Noise (FICUN) issued a report entitled Guidelines for Considering Noise in Land Use Planning and Control in June 1980. This report established the Federal government's DNL 65 dB standard and related guidelines. The FICUN generally agreed that standard residential construction was compatible for noise exposure from all sources up to DNL 65 dB. Therefore, only those areas in Fresno that are located within the 65 dB noise contour warrant examination of potential impacts from the proposed aircraft conversion.

Comment Number	Name/Agency	Date	Comment	Response
			normal conversation without yelling should fall within the parameters designated for study. The EIS does mention that noise reduction measures are utilized during aircraft takeoff but does not define what they are or discuss their effectiveness. Again, for the purpose of enforceability mitigation should be developed and analyzed as to effectiveness BEFORE project approval. In addition, the study area should be redefined to include more extensive review of noise impacts beyond those currently addressed.	
8-3			The EIS does include some discussion regarding the cumulative impacts of all military aircraft utilizing the Fresno airport. The only specific identification is the use of the airport by "transient aircraft" from the Lemoore Naval Air Station. However, there is no discussion as to how much noise this use contributes to the overall noise from military aircraft operating from the airport. It is not uncommon to experience jet aircraft many miles f rom the airport conducting low level exercises in which the noise goes well beyond take off noise. The assumption is that these jets are from the NAS since I have been assured that they are not ANG aircraft. Regardless of where they are *from*, they are using the Fresno airport to support these types of exercise and this use significantly contributes to the military jet noise experienced in this area. This combined use by the military is only minimally discussed in this EIS which should void the document as being significantly incomplete. The minimal discussion of this issue includes a statement that the Lemoore aircraft may, someday, not use the Fresno airport for these operations pending the assignment of different aircraft. Again, the assumption appears to be that the project should be approved PRIOR to development of adequate mitigation. For the purpose of enforceability and effectiveness the total impacts of the use of the airport by military aircraft should be analyzed	There is no proposed change to the use of Fresno-Yosemite International Airport by transient aircraft under the proposed action. Transient aircraft are a part of the baseline at Fresno, and their use of the airport is included in the noise analysis.

Comment Number	Name/Agency	Date	Comment	Response
			BEFORE project approval. This is also an interesting issue to review as I cannot remember any environmental documentation for the use of the airport by Lemoore NAS aircraft . If conducting such a review the few first questions that might come to mind are what noise mitigation measures do they adhere to *and*, if they happen to be the previously mentioned jet aircraft conducting low level exercises over heavily populated areas-- is it appropriate? One has to wonder why aircraft stationed at a very rural location have to conduct exercises over the City of Fresno.	
9-1	Evans, Ken and Joyce	June 19, 2012	Fresno is not a military base, the citizens are not military personnel, therefore, we should not be subject to the whims of the military. Fresno and the central valley has the highest pollution rate in the NATION. We do not need the military adding to it. Fresno has a population of over 500,000 and we have many unhealthy days that the military jets continue to ignore. The constant roar of the jets has got to stop! It is not fair that the people of Fresno have to take all this abuse. It's like living in a war zone where the war never ends.	Thank you for your comment.

Comment #1

STATE OF CALIFORNIA Edmund G. Brown, Jr., Governor

NATIVE AMERICAN HERITAGE COMMISSION
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May 22, 2012

Mr. Robert Dogan:
United States Department of Defense
National Guard Bureau
Sheppard Hall, 3501 Fetchet Avenue
Joint Base Andrews MD 20762-5157

Re: SCH#2012054001; NEPA Notice of Completion; draft Environmental Impact Statement (DEIS) for the **"F-15 Aircraft Conversion Environmental Impact Statement Project;"** located at the Fresno-Yosemite International Airport in Fresno County, California.

Dear Mr. Dogan:

The Native American Heritage Commission (NAHC) is the California State 'Trustee Agency' pursuant to Public Resources Code §21070 for the protection of California's Native American Cultural Resources. The NAHC is also a 'reviewing agency' for environmental documents prepared under the National Environmental Policy Act (NEPA; 42 U.S.C. 4321 *et seq*), 36 CFR Part 800.3, .5 and are subject to the Tribal and interested Native American consultation as required by the National Historic Preservation Act, as amended (Section 106) (16 U.S.C. 470; Section 106 [f] 110 [f] [k], 304). The provisions of the Native American Graves Protection and Repatriation Act (NAGPRA) (25 U.S.C. 3001-3013) and its implementation (43 CFR Part 10.2), and California Government Code §27491 may apply to this project if Native American human remains are inadvertently discovered.

The NAHC is of the opinion that the federal standards, pursuant to the above-referenced Acts and the Council on Environmental Quality (CSQ; 42 U.S.C. 4371 *et seq*) are similar to and in many cases more stringent with regard to the 'significance' of historic, including Native American items, and archaeological, including Native American items at least equal to the California Environmental Quality Act (CEQA.). In most cases, federal environmental policy require that any project that causes a substantial adverse change in the significance of an historical resource, that includes archaeological resources, is a 'significant effect' requiring the preparation of an Environmental Impact Statement (EIS).

The NAHC conducted a Sacred Lands File (SLF) search of its Inventory determined that Native American Cultural Resources **were not identified** in the project area you specified; early and quality consultation with the Native American on the attached list may provide detailed information of sites with which they are aware. However, this area is known to the NAHC to be very culturally sensitive. Also, the absence of archaeological resources does not preclude their existence, particularly at the subsurface level. 1-1

The NAHC Sacred Lands File Inventory of the Native American Heritage Commission is established by the California Legislature pursuant to California Public Resources Code §§5097.94(a) and 5097.96. The NAHC Sacred Lands Inventory is populated by submission to the data by Native American tribes and Native American elders. In this way it differs from the California and National Register of Historic Places under the jurisdiction of the U.S. Secretary of

the Interior.

The NAHC, pursuant to Appendix B of the Guidelines to the California Environmental Quality Act (CEQA) is designated as the agency with expertise in the areas of issues of cultural significance to California Native American communities. Also, in the 1985 California Appellate Court decision (170 Cal App 3rd 604), the court held that the NAHC has jurisdiction and special expertise, as a state agency, over affected Native American resources, impacted by proposed projects including archaeological, places of religious significance to Native Americans and burial sites

Culturally affiliated tribes are to be consulted to determine possible project impacts pursuant to the National Historic Preservation Act, as amended. Early consultation with Native American tribes in your area is the best way to avoid unanticipated discoveries once a project is underway. The NAHC recommends as part of 'due diligence', that you also contact the nearest Information Center of the California Historical Resources Information System (CHRIS) of the State Historic Preservation Office (SHPO) for other possible recorded sites in or near the APE (contact the Office of Historic Preservation at 916-445-7000).

Attached is a list of Native American contacts is attached to assist you; they may have knowledge of cultural resources in the project area. It is advisable to contact the persons listed and seek to establish a 'trust' relationship with them; if they cannot supply you with specific information about the impact on cultural resources, they may be able to refer you to another tribe or person knowledgeable of the cultural resources in or near the affected project area. 1-2

Lead agencies should consider avoidance, in the case of cultural resources that are discovered. A tribe or Native American individual may be the only source of information about a cultural resource; this is consistent with the NHPA (16 U.S.C. 470 *et seq* Sections. 106, 110, and 304) Section 106 Guidelines amended in 2009. Also, federal Executive Orders Nos. 11593 (preservation of cultural environment), 13175 (coordination & consultation) and 13007 (Sacred Sites) are helpful

NEPA regulations provide for provisions for accidentally discovered archeological resources during construction and mandate the processes to be followed in the event of an accidental discovery of any human remains in a project location other than a 'dedicated cemetery. Even though a discovery may be in federal property, California Government Code §27460 should be followed in the event of an accidental discovery of human remains during any groundbreaking activity; in such cases California Government Code §27491 and California Health & Safety Code §7050.5 will apply and construction cease in the affected area. 1-3

If you have any questions about this response to your request, please do not hesitate to contact me at (916) 653-6251.

Sincerely,

Dave Singleton

Cc: State Clearinghouse

Attach: Native American Contacts list

Native American Contacts
Fresno County
May 22, 2012

Big Sandy Rancheria of Mono Indians
Liz Hutchins Kipp, Chairperson
P.O. Box 337 / 37302 — Western Mono
Auberry , CA 93602
ck@bigsandyrancheria.com
(559) 855-4003
(559) 855-4129 Fax

Dunlap Band of Mono Indians
Benjamin Charley, Sr., Chairperson
Box 45 — Mono
Dunlap , CA 93621
(559) 338-2545

Cold Springs Rancheria of Mono Indians
Robert Marquez, Chairperson
P.O. Box 209 — Mono
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Dumna Wo-Wah Tribal Goverment
Robert Ledger SR., Tribal Chairperson
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ledgerrobert@ymail.com
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Rueben Barrios, Chairperson
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(559) 924-3583 Fax

Sierra Nevada Native American Coalition
Lawrence Bill, Interim Chairperson
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Dunlap , CA 93621 — Foothill Yokuts
(559) 338-2354 — Choinumni

Table Mountain Rancheria
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Choinumni Tribe; Choinumni/Mono
Lorrie Planas
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Clovis , CA 93611 — Mono

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of the statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is applicable for contacting local Native Americans with regard to cultural resources for the proposed SCH#2012054001; NEPA notice; draft Environmental Impact Statement (DEIS) for the F-15 Aircraft Conversion Enviornmental Impact Statement; located at the Fresno-Yosemite International Airport; located in Fresno County, callifornia.

Native American Contacts
Fresno County
May 22, 2012

Table Mountain Rancheria
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Clovis , CA 93612-2211 Choinumni
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Dunlap Band of Mono Historical Preservation Soc
Mandy Marine, Board Chairperson
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Dunlap , CA 93621
mandy_marine@hotmail.
com
559-274-1705

Chowchilla Tribe of Yokuts
Jerry Brown
10553 N. Rice Road North Valley Yokuts
Fresno , CA 93720
559-434-3160

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of the statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is applicable for contacting local Native Americans with regard to cultural resources for the proposed SCH#2012054001; NEPA notice; draft Environmental Impact Statement (DEIS) for the F-15 Aircraft Conversion Enviornmental Impact Statement; located at the Fresno-Yosemite International Airport; located in Fresno County, callifornia.

Comment #2

From: thomas gilpin
To: ANGRC/NGB/A7A NEPA COMMENTS
Subject: Fresno F-15 conversion EIS
Date: Wednesday, June 06, 2012 12:16:19 PM

Public comments on
draft environmental impact report
for proposed conversion to F-15 fighter jets
California Air National Guard
144th Fighter Wing

June 4, 2012

After reviewing the environmental impact report at www.eis144w.com, I was uneasy with the limited analysis of the impact on the environment by the conversion to F-15 fighter jets by the California Air National Guard 144th Fighter Wing.

The analysis simply shows more people will be exposed to noise greater than 65 decibels. There was no mention of harmful effects this noise exposure will have. There is no mention of the range of noise people will be exposed to and how much of the exposure will be at levels that can trigger car alarms which I have experienced. 2-1
There is no mention of the effects on carbon dioxide levels. Nor is there mention of the usage of fossil fuels per hour of use of these fighter jets. The effects on air pollution is also not addressed. 2-2

Please reject this draft EIR as insufficient. The citizens of Fresno deserve a safe and healthy environment.

Thank you for providing the citizens an opportunity to comment.

Comment #3

[redacted] [redacted]
Disabled American Veterans
Chapter [redacted]
Veterans Helping Veterans
Charles Romero
Chas. Duane Romero
[redacted]

5 MAY 2012
TUESDAY

ATT: ROBERT DOGAN:
NGB / 47 A.M.
SHEPPERD HALL.
#3501 FETCHET AVE 20762-5157
JOINT BASE ANDREWS MD.

I support the 144TH CALIF AIR NAT'L GUARD's move to MARCH A.R. BASE 100%.

I RETIRED from 452nd ARW. We need to support our AIR RESERVE and AIR GUARD.

Thank you very much.

BEST WISHES

CHARLES DUANE ROMERO
RETIRED USAFR: MED/CORP.

Comment #4

Community Development
Department
Planning Division

CITY OF
RIVERSIDE

June 15, 2012

Robert L. Dogan, GS-13, REM
Plans and Requirements Branch
National Guard Bureau
3501 Fetchet Avenue, Joint Base Andrews MD 20762-5157

SUBJECT: P11-0093 -- F-15 Conversion EIS 144th Fighter Wing, California Air National Guard at March Air Reserve Base (MARB)

Dear Mr. Dogan:

The City of Riverside recently received a Draft EIS from the National Guard Bureau for the F-15 Aircraft Conversion for the 144th Fighter Wing Detachment 1 at March Air Reserve Base (MARB). This EIS addresses the environmental impacts associated with the proposal to replace the existing F-16 Fighting Falcon aircraft at MARB with F-15 Eagle aircraft as part of a national restructuring of United States Air Force fighter fleets. The EIS indicates that the number of aircraft and general operation of the aircraft will go unchanged, but does indicate that the F-15 aircraft are louder at takeoffs than the existing F-16, and as such would increase the area contained within the 65dB noise contour by 424 acres around MARB and unincorporated County land. Noise contours for the City of Riverside will remain the same.

We thank you for the opportunity to comment on this project. Recently, the March Joint Powers Authority (MJPA), of which the City is a member, completed a draft Joint Land Use Study (JLUS) for the MARB/March inland Port (MIP). This proposed revision to the Noise Contour map needs to be incorporated into the JLUS and the environmental review currently in process by Riverside County Airport Land Use Commission (ALUC). It is important that the JLUS Plan and its subsequent EIR represent the most up-to-date and accurate data available based on this anticipated restructuring scenario for the F-15's. 4-1

City staff appreciates your collaboration on this project and looks forward to continued cooperation EIR. Should you have any questions regarding this letter, please feel free to contact David Murray, Senior Planner at (951) 826-5773 or by email at dmurray@riversideca.gov.

Sincerely,

Steve Hayes, AICP
City Planner

cc: Ronald Loveridge, Mayor
Riverside City Council Members
Scott Barber, City Manager
Deanna Lorson, Assistant City Manager
Belinda Graham, Assistant City Manager
Kristi Smith, Supervising Deputy City Attorney
Lori Stone, Executive Director, March JPA, 23555 Meyer Dr., Riverside, CA 92518
Ed Cooper, Executive Director, Riverside County ALUC, Riverside County Administrative Center, 4080 Lemon Street, 14th Floor, Riverside, CA 92501

G:\GENPLAN\Agency Comments\MARB\PSP11-0093_National_Guard\Letter - Noise Contour Update.docx

3900 Main Street • Riverside, CA 92522 • 951.826.5371 • fax 951.826.5981 • www.riversideca.gov

Comment #5

San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT

HEALTHY AIR LIVING™

June 19, 2012

Robert Dogan
NGB/A7AM
3501 Fetchet Avenue
Joint Base Andrews, MD 20762-5157

Project: Draft Environmental Impact Statement for the F-15 Aircraft Conversion, 144th Fighter Wing, California Air National Guard, Fresno-Yosemite International Airport (IAP)

Subject: NEPA/CEQA Comments

District Reference No: 20120029

Dear Mr. Dogan:

The San Joaquin Valley Unified Air Pollution Control District (District) has reviewed the Draft Environmental Impact Statement (Draft EIS) for the F-15 Aircraft Conversion, 144th Fighter Wing California Air National Guard, located at the Fresno-Yosemite International Airport. The Draft EIS describes the Proposed Action (Preferred Alternative) as the conversion from 18 F-16 aircraft to 18 F-15 aircraft. 15 F-15 aircraft would be based at Fresno-Yosemite IAP. At least three of the F-15 aircraft would always be located at March ARB. Baseline operations at Fresno-Yosemite IAP total 122,319 annual operations. The number of operations would remain unchanged under the Proposed Action. The Proposed Action includes construction at Fresno-Yosemite IAP of a new aircraft corrosion control hangar and shops, expansion of existing arm and dearm pads, addition to existing munitions storage facility and addition to existing non-destructive inspection shop.

Seyed Sadredin
Executive Director/Air Pollution Control Officer

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4800 Enterprise Way
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Tel: (209) 557-6400 FAX: (209) 557-6475

Central Region (Main Office)
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Fresno, CA 93726-0244
Tel: (559) 230-6000 FAX: (559) 230-6061

Southern Region
34946 Flyover Court
Bakersfield, CA 93308-9725
Tel: 661-392-5500 FAX: 661-392-5585

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The USAF has reviewed and evaluated the conformity applicability analysis and documentation, and it has determined that a draft positive general conformity may be made based on the SJVAPCD's written determination per 40 CFR § 93.158(a)(5)(i)(A). The District concurs with the USAF's Finding of Conformity. 5-1

District Comments

From a NEPA perspective, The District concurs with the United States Air Force's (USAF) conclusion that annual emissions under the Preferred Alternative (including both construction and airfield operations) would be below the Clean Air Act (CAA) major source thresholds for attainment pollutants, and would be below the General Conformity Rule *de minimis* thresholds for all pollutants except NOx. The applicable de minimis threshold for NOx is 10 tons per year. 5-2

As presented in Draft EIS, the net increase in NOx (11.15 tons in 2014 and 10.93 tons in 2015 and beyond) for the Proposed Action (Preferred Action) exceeds the District's threshold of significance of 10 tons per year for NOx. Thus, from a CEQA perspective, without further mitigation, the project would be considered to have a significant impact on air quality. 5-3

CEQA establishes a duty for public agencies to avoid or minimize environmental damage where feasible. A public agency should not approve a project as proposed if there are feasible alternatives or mitigation measures available that would substantially lessen any significant effects that the project would have on the environment. In deciding whether changes in a project are feasible, an agency may consider specific economic, environmental, legal, social, and technological factors (CCR §15021). 5-4

As amended in 1998, California Environmental Quality Act (CEQA) Guidelines recognize the use of fee payments as mitigation where there is good reason to assume that money collected will actually be spent on mitigation. 5-5

A voluntary emissions reduction agreement (VERA) is a mitigation measure by which a project proponent provides pound-for-pound mitigation of project specific emissions increases. The process provides opportunity for the project proponent to directly fund emission reduction projects. The District's role is to administer the emission reduction projects and to verify that emission increases have been successfully mitigated. The emission reduction projects may be proposed by the project proponent, or may be solicited by the District. To implement a VERA, the project proponent and the District enter into a contractual agreement in which the project proponent agrees to mitigate project emissions by providing funds for use by the District's Emission Reduction Incentive Program. The District agrees to fund projects that achieve the required emission reductions, verify that actual emission reductions have been achieved, and ensure enforceability of achieved reductions.

District staff is available to meet with you and/or the applicant to further discuss the regulatory requirements that are associated with this project. If you have any questions or require further information, please call Dan Barber, PhD. at (559) 230-5840 and provide the reference number at the top of this letter.

Sincerely,

David Warner
Director of Permit Services

for Daniel T Barber
Arnaud Marjollet
Permit Services Manager

DW: gs

Comment #6

JIM COSTA
20TH DISTRICT, CALIFORNIA
WEB PAGE: www.costa.house.gov

COMMITTEE ON NATURAL RESOURCES
SUBCOMMITTEE ON
ENERGY AND MINERAL RESOURCES
SUBCOMMITTEE ON
WATER AND POWER

CONGRESS OF THE UNITED STATES
HOUSE OF REPRESENTATIVES
WASHINGTON, DC 20515

COMMITTEE ON AGRICULTURE
SUBCOMMITTEE ON
CONSERVATION, ENERGY AND FORESTRY
SUBCOMMITTEE ON
RURAL DEVELOPMENT, RESEARCH,
BIOTECHNOLOGY AND FOREIGN AGRICULTURE
RANKING MEMBER

June 20, 2012

Robert Dogan, NGB/A7AM
Shepperd Hall
3501 Fetchet Avenue
Joint Base Andrews, MD 20762-5157

Dear Mr. Dogan:

This letter is to convey my support for the Preferred Alternative of the F-15 Aircraft Conversion Draft Environmental Impact Statement (EIS) for the 144th Fighter Wing at Fresno-Yosemite International Airport (IAP). The proposal is to convert the F-16 Fighting Falcon aircraft and operations to the F-15 Eagle aircraft and operations at Fresno-Yosemite IAP.

Protecting and defending the airspace and population centers of the western coast of the United States from potential threats from adversaries requires an air superiority capability currently provided by the Aerospace Control Alert (ACA) mission at the 144th Fighter Wing. While both the F-16 and F-15 aircraft are able to perform this mission, the F-15 aircraft is a superior platform. Conversion to this aircraft will significantly enhance the Wing's ACA mission as well as their air superiority mission in support of joint operations around the globe.

Due to its central location along the West Coast of the United States, Fresno-Yosemite IAP has already been determined to be an ideal location to support the ACA mission. As the Draft EIS stated, Fresno-Yosemite IAP "is the only installation that has the available required infrastructure to support the [(ACA)] mission." From their locations within California, the 144th Fighter Wing is capable of immediately responding to an air defense threat with six jets and launching an additional 12 jets in less than six hours. Other locations would require 24-72 hours to mobilize additional aircraft, personnel and equipment during an emergency in the Southwest region.

Furthermore, I wholeheartedly oppose the Draft EIS's No Action Alternative, which would effectively eliminate the 144th Fighter Wing at Fresno-Yosemite IAP. The elimination of the Wing would leave the United States less prepared to defend against future threats from the air, land or sea.

The 144th Fighter Wing has widespread support from members of the community and local elected leaders. In fact, the Wing enjoys a zero-rent lease from the city of Fresno through the year 2047 because the city understands the positive job creation and long-term economic

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WASHINGTON, DC 20515
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FRESNO, CA 93721
PHONE: (559) 495-1620
FAX: (559) 495-1027

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2700 M STREET, SUITE 225
BAKERSFIELD, CA 93301
PHONE: (661) 869-1620
FAX: (661) 869-1027

Robert Dogan, NGB/A7AM
June 20, 2012
Page Two

impact the operations will have on the community. As the representative of California's 20th District, it is with great confidence I support the aircraft conversion at the 144th Fighter Wing.

Sincerely,

JIM COSTA
Member of Congress

Comment #7

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

June 25, 2012

Robert Dogan, NGB/A7AM
Sheppard Hall
3501 Fetchet Avenue
Joint Base Andrews, MD 20762-5157

Subject: Draft Environmental Impact Statement (DEIS), F-15 Aircraft Conversion 144th Fighter Wing California Air National Guard, Fresno-Yosemite International Airport, Fresno, California (CEQ # 20120144)

Dear Mr. Dogan:

The U.S. Environmental Protection Agency (EPA) has reviewed the subject document pursuant to the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations (40 CFR Parts 1500-1508), and our NEPA review authority under Section 309 of the Clean Air Act. Our detailed comments are enclosed.

The Air Force National Guard Bureau (NGB) proposes to implement an aircraft conversion for the 144th Fighter Wing at Fresno-Yosemite International Airport that would convert the unit from F-16 Fighting Falcon aircraft and operations to F-15 Eagle aircraft and operations. The proposed action includes changes to staffing and manpower and some construction, building renovation and facility demolition at the airport.

Based on our review, we have rated the DEIS's proposed action (preferred alternative) as Environmental Concerns – Insufficient Information (EC-2) (see enclosed "Summary of Rating Definitions"). According to the analysis in the DEIS, the proposed action would more than double the number of residents experiencing noise impacts not compatible with residential land use (from 1,431 to 3,304 persons). Over 70% of these individuals are in the minority population and there is no information as to whether the NGB adapted project public outreach to overcome linguistic, cultural, or other potential barriers to effective participation by this population. Mitigation (sound-proofing) by the City's Airports Department could help reduce noise impacts within dwellings; however, there is uncertainty that mitigation would occur since no funding source has been identified for the matching funds necessary to obtain Federal Aviation Administration noise mitigation funding. The City has indicated it does not currently have a funding source to cover the additional impacts that would result from the proposed action. We strongly recommend that the NGB work with the City's Airports Department to explore ways that the Air Force can assist in ensuring the continued funding of the City's noise mitigation program. 7-1 We also recommend that the noise impact analysis be improved in the FEIS to better disclose impacts to the public, and that the NGB provide targeted outreach to the affected minority population if this has not already occurred. 7-2

EPA appreciates the opportunity to review this DEIS. When the Final EIS is released for public review, please send one copy to the address above (mail code: CED-2). If you have any questions, please contact me at (415) 972-3521, or contact Karen Vitulano, the lead reviewer for this project, at 415-947-4178 or vitulano.karen@epa.gov.

Sincerely,

Kathleen Martyn Goforth, Manager
Environmental Review Office (CED-2)

Enclosure: Summary of EPA Rating Definitions
EPA's Detailed Comments

cc: Barry Franklin, Federal Aviation Administration
Kevin Meikle, City of Fresno Airports Department

2

SUMMARY OF EPA RATING DEFINITIONS*

This rating system was developed as a means to summarize the U.S. Environmental Protection Agency's (EPA) level of concern with a proposed action. The ratings are a combination of alphabetical categories for evaluation of the environmental impacts of the proposal and numerical categories for evaluation of the adequacy of the Environmental Impact Statement (EIS).

ENVIRONMENTAL IMPACT OF THE ACTION

"LO" (Lack of Objections)

The EPA review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

"EC" (Environmental Concerns)

The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce the environmental impact. EPA would like to work with the lead agency to reduce these impacts.

"EO" (Environmental Objections)

The EPA review has identified significant environmental impacts that should be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

"EU" (Environmentally Unsatisfactory)

The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potentially unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the Council on Environmental Quality (CEQ).

ADEQUACY OF THE IMPACT STATEMENT

Category "1" (Adequate)

EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis or data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

Category "2" (Insufficient Information)

The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses, or discussion should be included in the final EIS.

Category "3" (Inadequate)

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the NEPA and/or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

*From EPA Manual 1640, Policy and Procedures for the Review of Federal Actions Impacting the Environment.

EPA DETAILED COMMENTS ON THE F-15 AIRCRAFT CONVERSION DRAFT ENVIRONMENTAL IMPACT STATEMENT, 144TH FIGHTER WING, CALIFORNIA AIR NATIONAL GUARD, FRESNO-YOSEMITE INTERNATIONAL AIRPORT, FRESNO, CALIFORNIA, JUNE 25, 2012

Noise Impacts

Noise Impact Assessment and Disclosure

The DEIS indicates that, under the Proposed Action, the number of residents who would be affected by noise levels above 65 decibels (dB) Community Noise Level Equivalent (CNEL) would more than double over the existing number of residents exposed to these noise levels. Roughly 3,304 persons would be affected by CNEL above 65 dB, with 1,873 of these people being newly affected (p. 4-4). CNEL is roughly equivalent to the Day-Night Level (DNL), and U.S. Air Force land use guidelines identify a DNL of 65 dB as the highest aircraft noise level that is normally compatible with residential uses (p. 4-1). According to the DEIS, even with special noise attenuation measures installed, residential developments are never considered to be compatible with a DNL greater than 75 dB (p. 4-1).

The Federal Interagency Committee on Urban Noise (FICUN) Guidelines for Considering Noise in Land Use Planning and Control (1980) identify a DNL above 65 as a significant exposure, (Table 1 of FICUN Guidelines); however, the DEIS identifies the significance threshold for its noise analysis as exposing new residential land uses above 75 dB DNL (p. 4-2). The DEIS does not provide a compelling rationale for using this higher threshold[1].

The DEIS also includes, as a significance criterion, whether persons are exposed to noise levels that could cause impacts other than annoyance (p. 4-2). This appears intended to support the use of 75 dB DNL as a threshold, since a DNL of 75 dB is the threshold above which effects other than annoyance may occur (Committee on Hearing, Bioacoustics, and Biomechanics 1977). Such an approach implies that annoyance alone is not significant. As Appendix B indicates, long-term annoyance is the primary indicator of community response because it attempts to account for all negative aspects of noise effects, e.g. increased annoyance due to being awakened by aircraft and interference with everyday conversation (p. B1-10). It is not clear why these indicators are not considered in the significance determination, especially given their possible association with health impacts and learning barriers. Additionally, expressing noise impacts as speech interference and awakenings is easier for the lay reader to understand than DNL or CNEL and is, therefore, important in disclosing impacts and interpreting the results in a way that is more meaningful to the public. The analysis in the Marine Corps' West Coast Basing of the F-35B EIS[2] presented data for both indoor speech interference and indoor sleep disturbance for representative residences with windows open and windows closed. The F-35B EIS also identified the number of housing units affected in the 65 dB+ areas, which is useful for disclosing impacts and expressing the mitigation burden for the soundproofing of dwellings.

The DEIS calculates the single event sound (SEL) values for the F-15 and F-16 (Table 4.1-4) but does not interpret these values in relation to the proposed action.

[1] We note that EPA identifies 55 dB DNL as the goal for outdoors in residential areas for protecting the public health and welfare with an adequate margin of safety – See *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety*, Environmental Protection Agency, Washington, D.C. (EPA 550/9-74-004) March 1974

[2] See http://www.usmcjsfwest.com/Resources/Documents/Final_Volume_I.pdf

Recommendations: EPA recommends the following improvements to the noise analysis in the Final EIS:

- Amend the significance thresholds in the noise analysis to ascribe significance to exposures above 65 dB DNL for residential or other sensitive land uses
- Disclose the indoor speech interference and indoor sleep disturbance expected under the proposed action and alternatives.
- Disclose the number of housing units affected for the different noise contours.
- Interpret the SEL values and changes in noise in relation to the proposed action.

Health Impacts from Noise

There is increasing evidence that noise impacts have health effects. We appreciate the generic discussion in Appendix B of the health effects of noise; however no health or well-being impacts are discussed in the body of the EIS in relation to the proposed action. We note that a fairly recent review article[3] that summarizes studies from the National Library of Medicine database on the adverse health effects of noise concludes that "*the potential health effects of noise pollution are numerous, pervasive, persistent, and medically and socially significant. Noise produces direct and cumulative adverse effects that impair health and that degrade residential, social, working, and learning environments with corresponding real (economic) and intangible (well-being) losses*". The health discussion in Appendix B concludes that there is no scientific basis for health effects from noise below 75 dB but EPA is concerned that all available data may not have been considered in this conclusion, particularly regarding the long-term health effects from sleep disturbances and on cardiovascular disturbances.

Recommendation: Disclose specific health impacts that could occur from the project in the body of the FEIS. Interpret the single event sound (SEL) analysis data (Table 4.1-4) in relation to sleep disturbances.

Noise Mitigation

We are concerned that the proposed action would expose an additional 1,873 residents to noise levels over 65 dB CNEL, which is not normally compatible with residential land use. It is important that the Air Force ensure mitigation would occur for these impacts before proceeding with the proposed action.

The DEIS implies that these impacts will be mitigated when it states that "*Implementation of a revised Airport Part 150[4] Study by the FAA would establish mitigation measures that would minimize the impacts of the increase in noise.*" (p. ES-4). Based on a conversation with the Federal Aviation Administration (FAA), we understand it is highly likely that the FAA would revisit the Part 150 Program as a result of the project. However, the FAA requires local entities to provide matching funding in order to receive grants through its noise mitigation program and, based on conversations with the City of Fresno Airports Department, no funding source has been identified within the City to cover the additional impacts predicted from the proposed action. Without an identified funding source,

[3] Goines, Lisa RN and Hagler, Louis MD. "Noise Pollution: A Modern Plague", *Southern Medical Journal*: March 2007 - Volume 100 - Issue 3 - pp 287-294.

[4] "Part 150 of the Federal Aviation Regulations, Airport Noise Compatibility Planning, sets forth standards for airport operators to use in documenting noise exposure in the airport environs and establishing programs to minimize noise-related land use incompatibilities" (p. 3-6).

2

mitigation of the noise impacts from the F-15 conversion cannot take place. In the absence of assurances that funding will be available for this program, statements in the DEIS that impacts from the proposed action would be minimized are not supported.

> *Recommendation:* We strongly recommend that the Air Force National Guard Bureau work with the City of Fresno Airports Department to explore ways that the Air Force can assist in ensuring the continued funding for the City's noise mitigation program. We understand that there is no existing Department of Defense program that permits appropriated funding for off-base sound attenuation; however, the Air Force could request authorization from Congress to fund off-base noise mitigation measures or explore alternative funding avenues such as those connected with the joint use agreement being negotiated with the City.

Environmental Justice

The DEIS states that the noise impacts would not disproportionately affect minority or low-income populations in the vicinity of Fresno-Yosemite IAP (p. 4-28). Tables 3.4-4 and 4.4-1 show that compared to the baseline, the minority population within the 65-70 dB noise contour would more than double under the proposed action (from 1,014 to 2,219), and the minority population in the 70-75 dB noise contour would significantly increase (from 5 to 205). This minority population constitutes over 73% of the total population in these noise-impacted areas. It is difficult to conclude that this is not a disproportional impact to minorities. The DEIS concludes that because the *percentage* of minority and low-income persons affected would increase slightly, it is not a disproportional impact; however, expanding an existing disproportional impact does not support a conclusion that project impacts are not disproportionate. The DEIS also concludes that there would be no cumulative disproportionate impacts to minority populations in concert with the current and reasonably foreseeable actions in the region of influence (p. 5-7); however, the assessment of cumulative impacts should include past actions as well[5] (40 CFR 1508.7), which are reflected in the existing conditions.

Additionally, the project's noise impacts appear to meet all three significance criteria identified on p. 4-27 of the DEIS: *"(1) there must be one or more* [minority or low-income] *populations within the region of influence (ROI), (2) there must be adverse (or significant) impacts from the Proposed Action, and (3) the environmental justice populations within the ROI must bear a disproportionate burden of those adverse impacts".*

The DEIS does not indicate which minority population(s) are primarily affected; however, based on the online census information for the City of Fresno[6], we assume the minorities are largely those of Hispanic or Latino origin. The DEIS does not indicate whether the Air Force made any efforts to ensure the minority population was accommodated in its public outreach efforts. Executive Order 12898 - *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* states that each Federal agency shall, "wherever practicable and appropriate, translate crucial public documents, notices and hearings, relating to human health or the environment for limited English speaking populations" and work to "ensure that public documents, notices, and hearings relating to human health or the environment are concise, understandable, and readily accessible to the public."

[5] Per 40 CFR 1508.7 - "Cumulative impact" is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions.
[6] 46.9% of persons in Fresno (city) are of Hispanic or Latino origin. See: http://quickfacts.census.gov/qfd/states/06/0627000.html

3

Recommendation: The Final EIS should clearly document that high and adverse noise impacts from the proposed action would be disproportionately borne by a minority population. As we state above, any resident within the 65+ dB noise contour represents a significant exposure that is incompatible with residential land use per the FICUN Guidelines, and this is a significant impact, especially since mitigation is not assured.

Because the majority of noise impacts of the proposed action would be borne by minorities, EPA recommends that targeted outreach to these communities occur, consistent with E.O. 12898. If targeted outreach has not already occurred, we recommend this occur prior to issuance of the Final EIS. If targeted outreach has occurred, document this in the Final EIS.

Impacts to Children

The DEIS states that there would be three new schools within the noise contours of 65 dB and above under the Proposed Action (p. 4-22). One is a K-12 school (Scandinavian Middle School) and would fall between 65 dB and 70 dB noise contours or above (p. 4-29), and there is one existing K-12 school that is currently exposed to aircraft noise 65 dB or above. The DEIS does not disclose whether this currently impacted school would experience increased noise impacts or whether this school currently includes noise mitigation features.

Appendix B contains a generic discussion of the noise effects on learning and cognitive abilities of children, but this information is not discussed in relation to the proposed project's predicted impacts. For example, Appendix B cites the ANSI acoustical performance criteria for schools and the requirement that the one-hour average background noise level shall not exceed 35 dBA in core learning spaces smaller than 20,000 cubic feet and 40 dBA in larger spaces. It does not discuss whether the schools affected would meet these criteria, and if not, whether it is possible to mitigate impacts to meet these criteria.

Recommendation: The information in Appendix B regarding impacts to children and learning should be incorporated into the body of the EIS and discussed in relation to the proposed project. The FEIS should indicate whether project impacts are capable of being mitigated to levels that would meet the ANSI acoustical performance criteria for schools, and if so, the likelihood that mitigation would occur.

4

Comment #8

B. G. Richards

Robert L. Dogan, NGB/A7AM
Sheppard Hall
3501 Fetchet Ave.
Andrews AFB, MD 20762-5157

Thank you for the opportunity to review the Draft F-15 Aircraft conversion EIS, dated May 2012. This EIS actually was rather confusing to follow because of a bit too much technical jargon for a lay person to fully understand. However, I have identified the following issues that I believe the local citizens as well as their elected representatives should concern themselves with.

ISSUE 1

The EIS goes to extremes to identify negative noise impacts of this project within and surrounding the immediate airport area. However, it does not address the effectiveness of previous mitigation applied to current operations and does not include actual mitigation for the proposed changes. The only suggestion of mitigation is an FAA airport study that may or may not identity FUTURE mitigation for the proposed changes.

Looking back in history a bit, the previous "FAA airport study" did identify some mitigation but also took many years to come close to completing. Then the consideration of effectiveness of the completed mitigation has never been discussed. It is imperative that another approach be taken to identify effective mitigation and review the cost of this mitigation. In addition, it is important that at least some consideration and review be given on how current and proposed operations impact home values within these areas. 8-1

For the purpose of enforceability and the ability to develop fair mitigation for homeowners and the public at large, it is necessary that mitigation be developed, discussed and approved by the local government PRIOR to project implementation.

ISSUE 2

The EIS seems to only provide information regarding noise issues within certain areas fairly close to the airport. No discussions occur for the rest of the City of Fresno. This is significant since the noise levels all over the north end of the City from military aircraft operations has increased significantly in the past 10 years. This has been done without study or environmental review. As an example, it is now not uncommon to have to cease a normal conversation during military jet take off over homes that are many miles from the airport. Being a long time resident of this area, this is a major change from the beginning of my residency at this location. The ability to carry on a normal conversation without yelling should fall within the parameters designated for study. 8-2

The EIS does mention that noise reduction measures are utilized during aircraft takeoff but does not define what they are or discuss their effectiveness. Again, for the purpose of enforceability mitigation should be developed and analyzed as to effectiveness BEFORE project approval. In addition, the study area should be redefined to include more extensive review of noise impacts beyond those currently addressed.

ISSUE 3

The EIS does include some discussion regarding the cumulative impacts of all military aircraft utilizing the Fresno airport. The only specific identification is the use of the airport by "transient aircraft" from the Lemoore Naval Air Station. However, there is no discussion as to how much noise this use contributes to the overall noise from military aircraft operating from the airport. It is not uncommon to experience jet aircraft many miles from the airport conducting low level exercises in which the noise goes well beyond take off noise. The assumption is that these jets are from the NAS since I have been assured that they are not ANG aircraft. Regardless of where they are from, they are using the Fresno airport to support these types of exercise and this use significantly contributes to the military jet noise experienced in this area. This combined use by the military is only minimally discussed in this EIS which should void the document as being significantly incomplete. 8-3

The minimal discussion of this issue includes a statement that the Lemoore aircraft may, someday, not use the Fresno airport for these operations pending the assignment of different aircraft. Again, the assumption appears to be that the project should be approved PRIOR to development of adequate mitigation. For the purpose of enforceability and effectiveness the total impacts of the use of the airport by military aircraft should be analyzed BEFORE project approval. This is also an interesting issue to review as I cannot remember any environmental documentation for the use of the airport by Lemoore NAS aircraft. If conducting such a review the few first questions that might come to mind are what noise mitigation measures do they adhere to and, if they happen to be the previously mentioned jet aircraft conducting low level exercises over heavily populated areas-- is it appropriate? One has to wonder why aircraft stationed at a very rural location have to conduct exercises over the City of Fresno.

Again, thank you for the opportunity to review this document. I encourage you to reconsider the adequacy of this study as currently written. Many questions remain that need to be answered and reviewed. For the most part, the citizens of the Fresno area offer a lot of support to the ANG. However, continual noise increases from ANG aircraft, addition of other military aircraft and then proposals to again increase noise levels from ANG aircraft might result in the military use of this airport becoming inappropriate for a heavily populated area.

B. G. Richards

c: City of Fresno

Comment #9

Dear Mr. Dogan; June 19. 2012

We received your news letter and appreciate the information. Since our last correspondence nothing has changed. The noise continues and if we read your news letter correctly it will only get worse.

Fresno is not a military base, the citizens are not military personnel, therefore, we should not be subject to the whims of the military.

Fresno and the central valley has the highest pollution rate in the NATION. We do not need the military adding to it. Fresno has a population of over 500,000 and we have many unhealthy days that the military jets continue to ignore. The constant roar of the jets has got to stop! It is not fair that the people of Fresno have to take all this abuse. It's like living in a war zone where the war never ends. 9-1

How much do the citizens of Fresno have to endure before someone steps up and takes responsibility for all this noise and pollution and does something to stop it?

I hope we're not just a voice in the wilderness. Our health and well being are at risk It's time for the Air Guard to move to another location and give us some much deserved peace and quiet.

Sincerely, Ken and Joyce Evans

Comment #10

STATE OF CALIFORNIA
GOVERNOR'S OFFICE *of* PLANNING AND RESEARCH
STATE CLEARINGHOUSE AND PLANNING UNIT

EDMUND G. BROWN JR.
GOVERNOR

KEN ALEX
DIRECTOR

June 26, 2012

Robert Dogan
U.S. Army National Guard
Sheppard Hall, 3501 Fetchet Ave.
Joint Base Andrews, MD 20762-5157

Subject: F-15 Aircraft Conversion EIS
SCH#: 2012054001

Dear Robert Dogan:

The State Clearinghouse submitted the above named Draft EIS to selected state agencies for review. On the enclosed Document Details Report please note that the Clearinghouse has listed the state agencies that reviewed your document. The review period closed on June 25, 2012, and the comments from the responding agency (ies) is (are) enclosed. If this comment package is not in order, please notify the State Clearinghouse immediately. Please refer to the project's ten-digit State Clearinghouse number in future correspondence so that we may respond promptly.

Please note that Section 21104(c) of the California Public Resources Code states that:

> "A responsible or other public agency shall only make substantive comments regarding those activities involved in a project which are within an area of expertise of the agency or which are required to be carried out or approved by the agency. Those comments shall be supported by specific documentation."

These comments are forwarded for use in preparing your final environmental document. Should you need more information or clarification of the enclosed comments, we recommend that you contact the commenting agency directly.

This letter acknowledges that you have complied with the State Clearinghouse review requirements for draft environmental documents, pursuant to the California Environmental Quality Act. Please contact the State Clearinghouse at (916) 445-0613 if you have any questions regarding the environmental review process.

Sincerely,

Scott Morgan
Director, State Clearinghouse

Enclosures
cc: Resources Agency

1400 10th Street P.O. Box 3044 Sacramento, California 95812-3044
(916) 445-0613 FAX (916) 323-3018 www.opr.ca.gov

Document Details Report
State Clearinghouse Data Base

SCH# **2012054001**
Project Title F-15 Aircraft Conversion EIS
Lead Agency U.S. Army National Guard

Type **EIS** Draft EIS

Description Note: Review per lead

This DEIS analyzes the potential environmental impacts associated with an aircraft conversion for the 144th Fighter Wing (144 FW) at Fresno-Yosemite International Airport (IAP) in Fresno, CA. The proposal is to convert the unit from the F-16 Fighting Falcon aircraft and operations to the F-15 Eagle aircraft and operations at Fresno-Yosemite IAP, which would also include Detachment 1, based at March ARB.

Lead Agency Contact

Name Robert Dogan
Agency U.S. Army National Guard
Phone 240 612 8859 ***Fax***
email
Address Sheppard Hall, 3501 Fetchet Ave.
City Joint Base Andrews ***State*** MD ***Zip*** 20762-5157

Project Location

County Fresno
City Fresno
Region
Lat / Long
Cross Streets Fresno International Airport, Clovis Avenue / McKinley Avenue
Parcel No.
Township ***Range*** ***Section*** ***Base***

Proximity to:

Highways
Airports
Railways
Waterways
Schools
Land Use

Project Issues Air Quality; Archaeologic-Historic; Biological Resources; Economics/Jobs; Noise; Schools/Universities; Soil Erosion/Compaction/Grading; Solid Waste; Toxic/Hazardous; Traffic/Circulation; Water Quality; Landuse; Cumulative Effects

Reviewing Agencies Resources Agency; Department of Fish and Game, Region 4; Office of Historic Preservation; Department of Parks and Recreation; Department of Water Resources; Caltrans, Division of Aeronautics; California Highway Patrol; Caltrans, District 6; Air Resources Board, Airport/Energy Projects; Regional Water Quality Control Bd., Region 5 (Fresno); Native American Heritage Commission

Date Received 05/16/2012 ***Start of Review*** 05/16/2012 ***End of Review*** 06/25/2012

Note: Blanks in data fields result from insufficient information provided by lead agency.

STATE OF CALIFORNIA Edmund G. Brown, Jr., Governor

NATIVE AMERICAN HERITAGE COMMISSION
915 CAPITOL MALL, ROOM 364
SACRAMENTO, CA 95814
(916) 653-6251
Fax (916) 657-5390
Web Site www.nahc.ca.gov
e-mail: ds_nahc@pacbell.net

6.25.12 Clear

RECEIVED
MAY 29 2012
STATE CLEARING HOUSE

May 22, 2012

Mr. Robert Dogan:
United States Department of Defense
National Guard Bureau
Sheppard Hall, 3501 Fetchet Avenue
Joint Base Andrews MD 20762-5157

Re: SCH#2012054001; NEPA Notice of Completion; draft Environmental Impact Statement (DEIS) for the **"F-15 Aircraft Conversion Environmental Impact Statement Project;"** located at the Fresno-Yosemite International Airport in Fresno County, California.

Dear Mr. Dogan:

The Native American Heritage Commission (NAHC) is the California State 'Trustee Agency' pursuant to Public Resources Code §21070 for the protection of California's Native American Cultural Resources. The NAHC is also a 'reviewing agency' for environmental documents prepared under the National Environmental Policy Act (NEPA; 42 U.S.C. 4321 *et seq*), 36 CFR Part 800.3, .5 and are subject to the Tribal and interested Native American consultation as required by the National Historic Preservation Act, as amended (Section 106) (16 U.S.C. 470; Section 106 [f] 110 [f] [k], 304). The provisions of the Native American Graves Protection and Repatriation Act (NAGPRA) (25 U.S.C. 3001-3013) and its implementation (43 CFR Part 10.2), and California Government Code §27491 may apply to this project if Native American human remains are inadvertently discovered.

The NAHC is of the opinion that the federal standards, pursuant to the above-referenced Acts and the Council on Environmental Quality (CSQ; 42 U.S.C. 4371 *et seq*) are similar to and in many cases more stringent with regard to the 'significance' of historic, including Native American items, and archaeological, including Native American items at least equal to the California Environmental Quality Act (CEQA.). In most cases, federal environmental policy require that any project that causes a substantial adverse change in the significance of an historical resource, that includes archaeological resources, is a 'significant effect' requiring the preparation of an Environmental Impact Statement (EIS).

The NAHC conducted a Sacred Lands File (SLF) search of its Inventory determined that Native American Cultural Resources **were not identified** in the project area you specified; early and quality consultation with the Native American on the attached list may provide detailed information of sites with which they are aware. However, this area is known to the NAHC to be very culturally sensitive. Also, the absence of archaeological resources does not preclude their existence, particularly at the subsurface level.

The NAHC Sacred Lands File Inventory of the Native American Heritage Commission is established by the California Legislature pursuant to California Public Resources Code §§5097.94(a) and 5097.96. The NAHC Sacred Lands Inventory is populated by submission to the data by Native American tribes and Native American elders. In this way it differs from the California and National Register of Historic Places under the jurisdiction of the U.S. Secretary of

the Interior.

The NAHC, pursuant to Appendix B of the Guidelines to the California Environmental Quality Act (CEQA) is designated as the agency with expertise in the areas of issues of cultural significance to California Native American communities. Also, in the 1985 California Appellate Court decision (170 Cal App 3rd 604), the court held that the NAHC has jurisdiction and special expertise, as a state agency, over affected Native American resources, impacted by proposed projects including archaeological, places of religious significance to Native Americans and burial sites

Culturally affiliated tribes are to be consulted to determine possible project impacts pursuant to the National Historic Preservation Act, as amended. Early consultation with Native American tribes in your area is the best way to avoid unanticipated discoveries once a project is underway. The NAHC recommends as part of 'due diligence', that you also contact the nearest Information Center of the California Historical Resources Information System (CHRIS) of the State Historic Preservation Office (SHPO) for other possible recorded sites in or near the APE (contact the Office of Historic Preservation at 916-445-7000).

Attached is a list of Native American contacts is attached to assist you; they may have knowledge of cultural resources in the project area. It is advisable to contact the persons listed and seek to establish a 'trust' relationship with them; if they cannot supply you with specific information about the impact on cultural resources, they may be able to refer you to another tribe or person knowledgeable of the cultural resources in or near the affected project area.

Lead agencies should consider avoidance, in the case of cultural resources that are discovered. A tribe or Native American individual may be the only source of information about a cultural resource; this is consistent with the NHPA (16 U.S.C. 470 *et seq* Sections. 106, 110, and 304) Section 106 Guidelines amended in 2009. Also, federal Executive Orders Nos. 11593 (preservation of cultural environment), 13175 (coordination & consultation) and 13007 (Sacred Sites) are helpful

NEPA regulations provide for provisions for accidentally discovered archeological resources during construction and mandate the processes to be followed in the event of an accidental discovery of any human remains in a project location other than a 'dedicated cemetery. Even though a discovery may be in federal property, California Government Code §27460 should be followed in the event of an accidental discovery of human remains during any groundbreaking activity; in such cases California Government Code §27491 and California Health & Safety Code §7050.5 will apply and construction cease in the affected area.

If you have any questions about this response to your request, please do not hesitate to contact me at (916) 653-6251.

Sincerely,

Dave Singleton

Cc: State Clearinghouse

Attach: Native American Contacts list

Comment #11

United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
Pacific Southwest Region
333 Bush Street, Suite 515
San Francisco, CA 94104

IN REPLY REFER TO:
(ER 12/350)

Filed Electronically

22 June 2012

Robert L. Dogan
Community Planner
NGB/A7AM
Shepperd Hall
3501 Fetchet Avenue
Joint Base Andrews MD 20762-5157

Subject: Review of the Draft Environmental Impact Statement (DEIS) for the F-15 Aircraft Conversion, 144th Fighter Wing, California National Guard, Fresno-Yosemite International Airport, Fresno County, CA

Dear Mr. Dogan:

The Department of the Interior has received and reviewed the subject document and has no comments to offer.

Thank you for the opportunity to review this project.

Sincerely,

Patricia Sanderson Port

Patricia Sanderson Port
Regional Environmental Officer

cc:
Director, OEPC

Appendix B1

Noise Analysis

1. Basics of Sound

Noise is unwanted sound. Sound is all around us; sound becomes noise when it interferes with normal activities, such as sleep or conversation.

Sound is a physical phenomenon consisting of minute vibrations that travel through a medium, such as air, and are sensed by the human ear. Whether that sound is interpreted as pleasant (e.g., music) or unpleasant (e.g., jackhammers) depends largely on the listener's current activity, past experience, and attitude toward the source of that sound.

The measurement and human perception of sound involves three basic physical characteristics: intensity, frequency, and duration. First, intensity is a measure of the acoustic energy of the sound vibrations and is expressed in terms of sound pressure. The greater the sound pressure, the more energy carried by the sound and the louder the perception of that sound. The second important physical characteristic of sound is frequency, which is the number of times per second the air vibrates or oscillates. Low-frequency sounds are characterized as rumbles or roars, while high-frequency sounds are typified by sirens or screeches. The third important characteristic of sound is duration or the length of time the sound can be detected.

The loudest sounds that can be detected comfortably by the human ear have intensities that are a trillion times higher than those of sounds that can barely be detected. Because of this vast range, using a linear scale to represent the intensity of sound becomes very unwieldy. As a result, a logarithmic unit known as the decibel (abbreviated dB) is used to represent the intensity of a sound. Such a representation is called a sound level. 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 begin to be felt inside the human ear as discomfort. Sound levels between 130 to 140 dB are felt as pain (Berglund and Lindvall 1995).

Because of the logarithmic nature of the decibel unit, sound levels cannot be arithmetically added or subtracted and are somewhat cumbersome to handle mathematically. However, some simple rules are useful in dealing with sound levels. First, if a sound's intensity is doubled, the sound level increases by 3 dB, regardless of the initial sound level. For example:

$$60 \text{ dB} + 60 \text{ dB} = 63 \text{ dB, and}$$

$$80 \text{ dB} + 80 \text{ dB} = 83 \text{ dB.}$$

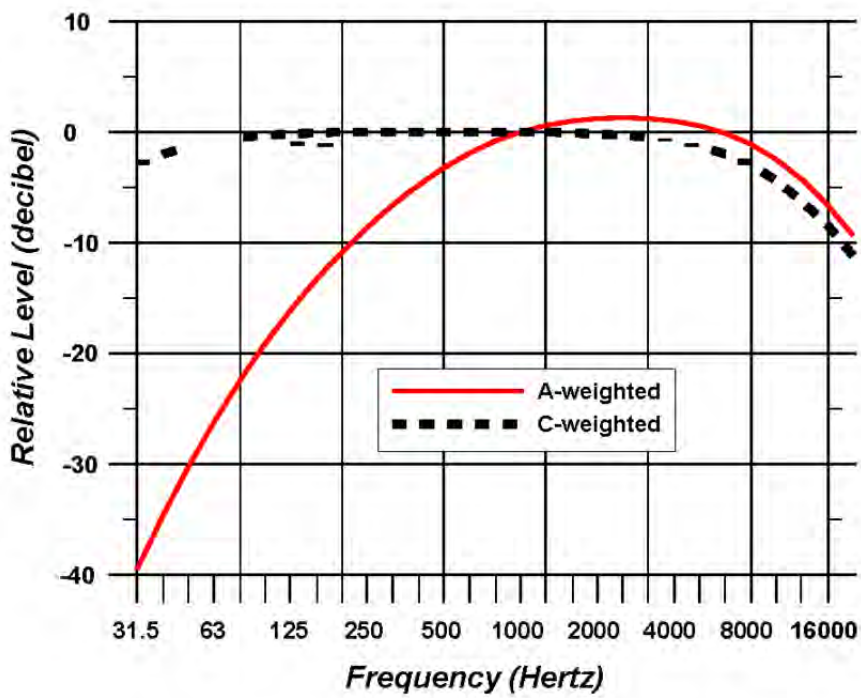
Second, the total sound level produced by two sounds of different levels is usually only slightly more than the higher of the two. For example:

$$60.0 \text{ dB} + 70.0 \text{ dB} = 70.4 \text{ dB}.$$

Because the addition of sound levels is different than that of ordinary numbers, such addition is often referred to as "decibel addition" or "energy addition." The latter term arises from the fact that what we are really doing when we add decibel values is first converting each decibel value to its corresponding acoustic energy, then adding the energies using the normal rules of addition, and finally converting the total energy back to its decibel equivalent.

The minimum change in the sound level of individual events that an average human ear can detect is about 3 dB. On average, a person perceives a change in sound level of about 10 dB as a doubling (or halving) of the sound's loudness, and this relation holds true for loud and quiet sounds. A decrease in sound level of 10 dB actually represents a 90 percent decrease in sound intensity but only a 50 percent decrease in perceived loudness because of the nonlinear response of the human ear (similar to most human senses).

Sound frequency is measured in terms of cycles per second (cps), or hertz (Hz), which is the standard unit for cps. The normal human ear can detect sounds that range in frequency from about 20 Hz to about 15,000 Hz. All sounds in this wide range of frequencies, however, are not heard equally by the human ear, which is most sensitive to frequencies in the 1,000 to 4,000 Hz range. Weighting curves have been developed to correspond to the sensitivity and perception of different types of sound. A-weighting and C-weighting are the two most common weightings. A-weighting accounts for frequency dependence by adjusting the very high and very low frequencies (below approximately 500 Hz and above approximately 10,000 Hz) to approximate the human ear's lower sensitivities to those frequencies. C-weighting is nearly flat throughout the range of audible frequencies, hardly de-emphasizing the low frequency sound while approximating the human ear's sensitivity to higher intensity sounds. The two curves shown in Figure B-1 are also the most adequate to quantify environmental noises.



Source: ANSI S1.4A -1985 "Specification of Sound Level Meters"

Figure B-1. Frequency Response Characteristics of A- and C-Weighting Networks

A-weighted Sound Level

Sound levels that are measured using A-weighting, called A-weighted sound levels, are often denoted by the unit dBA or dB(A) rather than dB. When the use of A-weighting is understood, the adjective "A-weighted" is often omitted and the measurements are expressed as dB. In this report (as in most environmental impact documents), dB units refer to A-weighted sound levels.

Noise potentially becomes an issue when its intensity exceeds the ambient or background sound pressures. Ambient background noise in metropolitan, urbanized areas typically varies from 60 to 70 dB and can be as high as 80 dB or greater; quiet suburban neighborhoods experience ambient noise levels of approximately 45-50 dB (U.S. Environmental Protection Agency [USEPA] 1978).

Figure B-2 is a chart of A-weighted sound levels from typical sounds. Some noise sources (air conditioner, vacuum cleaner) are continuous sounds which levels are constant for some time. Some (automobile, heavy truck) are the maximum sound during a vehicle pass-by. Some (urban daytime, urban nighttime) are averages over extended periods. A variety of noise metrics have been developed to describe noise over different time periods, as discussed below.

Aircraft noise consists of two major types of sound events: aircraft takeoffs and landings, and engine maintenance operations. The former can be described as intermittent sounds and the latter as continuous. Noise levels from flight operations exceeding background noise typically occur beneath main approach and departure corridors, in local air traffic patterns around the airfield, and in areas immediately adjacent to parking ramps and aircraft staging areas. As aircraft in flight gain altitude, their noise contribution drops to lower levels, often becoming indistinguishable from the background.

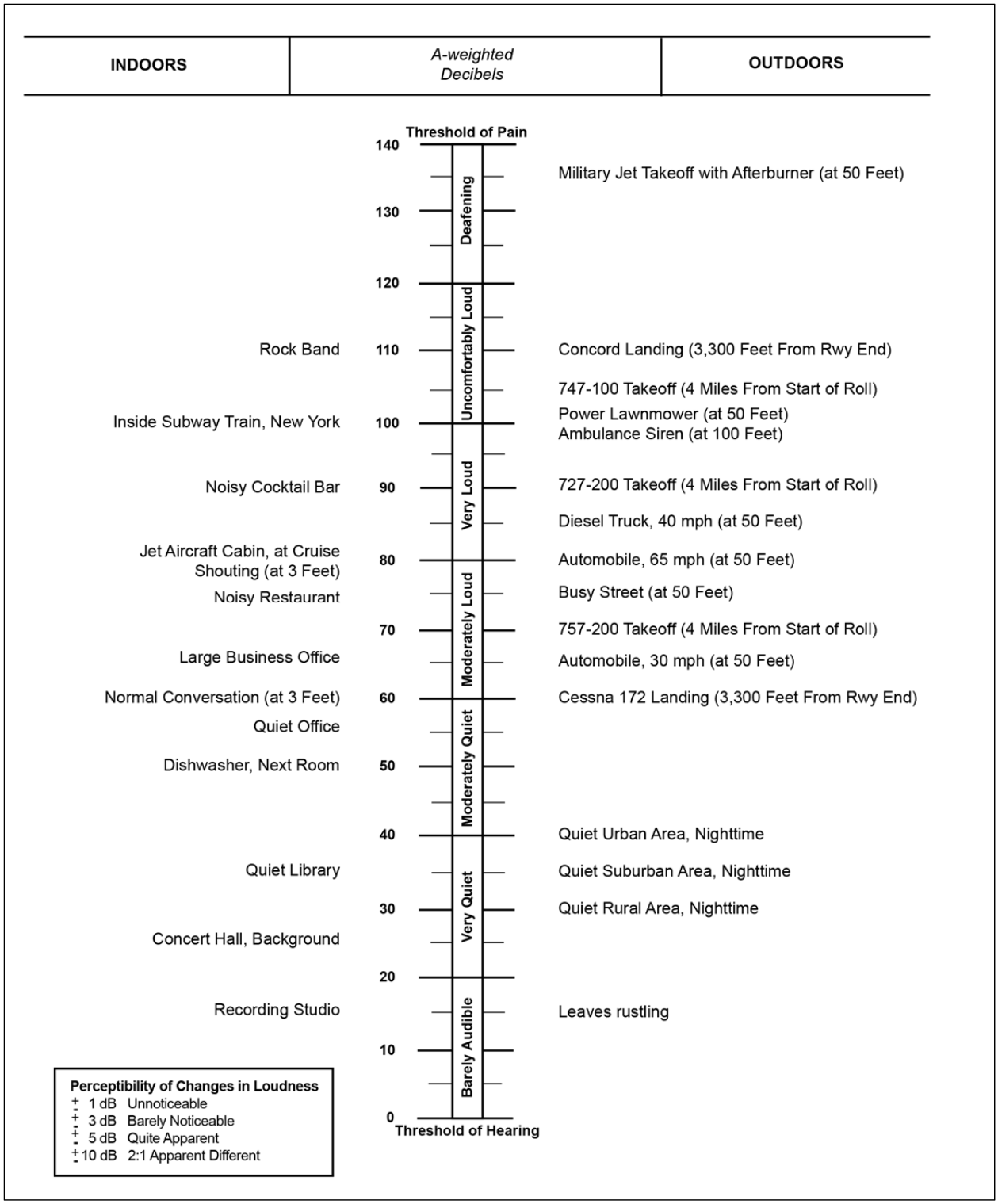
C-weighted Sound Level

Sound levels measured using a C-weighting are most appropriately called C-weighted sound levels (and denoted dBC). C-weighting is nearly flat throughout the audible frequency range, hardly de-emphasizing the low frequency. This weighting scale is generally used to describe impulsive sounds. Sounds that are characterized as impulsive generally contain low frequencies. Impulsive sounds may induce secondary effects, such as shaking of a structure, rattling of windows, inducing vibrations. These secondary effects can cause additional annoyance and complaints.

The following definitions in the American National Standard Institute (ANSI) Report S12.9, Part 4 provide general concepts helpful in understanding impulsive sounds (ANSI 1996).

<u>Impulsive Sound</u>: Sound characterized by brief excursions of sound pressure (acoustic impulses) that significantly exceeds the ambient environmental sound pressure. The duration of a single impulsive sound is usually less than one second (ANSI 1996).

<u>Highly Impulsive Sound</u>: Sound from one of the following enumerated categories of sound sources: small-arms gunfire, metal hammering, wood hammering, drop hammering, pile driving, drop forging, pneumatic hammering, pavement breaking, metal impacts during rail-yard shunting operation, and riveting.



Source: State of California Department of Transportation 2002.

Figure B-2. Typical Decibel Level of Common Sounds

High-energy Impulsive Sound: Sound from one of the following enumerated categories of sound sources: quarry and mining explosions, sonic booms, demolition and industrial processes that use high explosives, military ordnance (e.g., armor, artillery and mortar fire, and bombs), explosive ignition of rockets and missiles, explosive industrial circuit breakers, and any other explosive source where the equivalent mass of dynamite exceeds 25 grams.

1.1 Noise Metrics

In general, a metric is a statistic for measuring or quantifying. A noise metric quantifies the noise environment. There are three families of noise metrics described herein – one for single noise events such as an aircraft flyby, one for cumulative noise events such as a day's worth of aircraft activity, and one which quantifies the events or time relative to single noise events.

Within the single noise event family, metrics described below include Peak Sound Pressure Level (L_{pk}), Maximum Sound Level (L_{max}) and Sound Exposure Level (SEL). Within the cumulative noise events family, metrics described below include Equivalent Sound Level (L_{eq}), Day-Night Average Sound Level (DNL or L_{dn}), and several others. Within the events/time family, metrics described below include Number of Events Above a Threshold Level and Time Above a Specified Level.

Maximum Sound Level (L_{max})

The highest A-weighted integrated sound level measured during a single event in which the sound level changes value with time (e.g., an aircraft overflight) is called the maximum A-weighted sound level or L_{max}.

During an aircraft overflight, the noise level starts at the ambient or background noise level, rises to the maximum level as the aircraft flies closest to the observer, and returns to the background level as the aircraft recedes into the distance. The L_{max} indicates the maximum sound level occurring for a fraction of a second. For aircraft noise, the "fraction of a second" over which the maximum level is defined is generally one-eighth of a second, and is denoted as "fast" response (ANSI 1988). Slowly varying or steady sounds are generally measured over a period of one second, denoted "slow" response. The L_{max} is important in judging the interference caused by a noise event with conversation, TV or radio listening, sleep, or other common activities. Although it provides some measure of the intrusiveness of the event, it does not completely describe the total event, because it does not include the period of time that the sound is heard.

Peak Sound Pressure Level (L_{pk})

The L_{pk} is the highest instantaneous level obtained by a sound level measurement device. The L_{pk} is typically measured using a 20 microseconds or faster sampling rate, and is typically based on unweighted or linear response of the meter.

Sound Exposure Level (SEL)

SEL is a composite metric that represents both the intensity of a sound and its duration. Individual time-varying noise events (e.g., aircraft overflights) have two main characteristics: a sound level that changes throughout the event and a period of time during which the event is heard. SEL provides a measure of the net impact of the entire acoustic event, but it does not directly represent the sound level heard at any given time. During an aircraft flyover, SEL would include both the L_{max} and the lower noise levels produced during onset and recess periods of the overflight.

SEL is a logarithmic measure of the total acoustic energy transmitted to the listener during the event. Mathematically, it represents the sound level of a constant sound that would, in one second, generate the same acoustic energy as the actual time-varying noise event. For sound from aircraft overflights, which typically lasts more than one second, the SEL is usually greater than the L_{max} because an individual overflight takes seconds and the L_{max} occurs instantaneously. SEL represents the best metric to compare noise levels from overflights.

Equivalent Sound Level (L_{eq})

A cumulative noise metric useful in describing noise is the L_{eq}. L_{eq} is the continuous sound level that would be present if all of the variations in sound level occurring over a specified time period were smoothed out as to contain the same total sound energy.

Just as SEL has proven to be a good measure of the noise impact of a single event, L_{eq} has been established to be a good measure of the impact of a series of events during a given time period. Also, while L_{eq} is defined as an average, it is effectively a sum over that time period and is, thus, a measure of the cumulative impact of noise. For example, the sum of all noise-generating events during the period of 7 a.m. to 4 p.m. could provide the relative impact of noise generating events for a school day.

Day-Night Average Sound Level (DNL or L_{dn}) and Community Noise Equivalent Level (CNEL)

DNL, or L_{dn}, and CNEL are composite metrics that account for all noise events in a 24-hour period. In order to account for increased human sensitivity to noise at night, a 10 dB penalty is

applied to nighttime events (10 p.m. to 7 a.m. time period). A variant of the DNL, the CNEL includes a 5 dB penalty on noise during the 7 a.m. to 10 p.m. time period, and a 10 dB penalty on noise during the 10 p.m. to 7 a.m. time period. The notations DNL and L_{dn} are both used for Day-Night Average Sound Level and are equivalent.

Like L_{eq}, DNL and CNEL without their penalties are average quantities, mathematically representing the continuous A-weighted or C-weighted sound level that would be present if all of the variations in sound level that occur over a 24-hour period were smoothed out so as to contain the same total sound energy. These composite single-measure time-average metrics account for the SELs, L_{max}, the duration of the events (sorties or operations), and the number of events that occur over a 24-hour period but do not provide specific information on the number of noise events or the individual sound levels that occur during the 24-hour day. Like SEL, neither DNL nor CNEL represent the sound level heard at any particular time, but quantifies the total sound energy received. While it is normalized as an average, it represents all of the sound energy, and is therefore a cumulative measure.

The nighttime penalties in both DNL and CNEL account for the added intrusiveness of sounds that occur during normal sleeping hours, both because of the increased sensitivity to noise during those hours and because ambient sound levels during nighttime are typically about 10 dB lower than during daytime hours. The evening penalty in CNEL accounts for the added intrusiveness of sounds during that period.

The inclusion of daytime, evening, and nighttime periods in the computation of the DNL and CNEL reflects their basic 24-hour definition. They can, however, be applied over periods of multiple days. For application to civil airports, where operations are consistent from day to day, DNL and CNEL are usually applied as an annual average.

The logarithmic nature of the decibel unit causes the noise levels of the loudest events to control the 24-hour average. A DNL of 65 dB could result from a very few noisy events or a large number of quieter events.

As a simple example of this characteristic, consider a case in which only one aircraft overflight occurs during the daytime over a 24-hour period, creating a sound level of 100 dB for 30 seconds. During the remaining 23 hours, 59 minutes, and 30 seconds of the day, the ambient sound level is 50 dB. The DNL for this 24-hour period is 65.9 dB. Assume, as a second example that 10 such 30-second overflights occur during daytime hours during the next 24-hour period, with the same ambient sound level of 50 dB during the remaining 23 hours and 55 minutes of the day. The DNL for this 24-hour period is 75.5 dB. Clearly, the averaging of noise over a 24-hour period does not ignore the louder single events and tends to emphasize both the sound levels and number of those events.

Daily average sound levels are typically used for the evaluation of community noise effects (i.e., long-term annoyance), and particularly aircraft noise effects. In general, scientific studies and social surveys have found a high correlation between the percentages of groups of people highly annoyed and the level of average noise exposure measured in DNL (USEPA 1978, Schultz 1978).

Number-of-Events Above (NA) a Threshold Level (L)

The Number-of-Events Above (NA) metric provides the total number of noise events that exceed the selected noise level threshold during a specified period of time. Combined with the selected threshold level (L), the NA metric is symbolized as NAL. The threshold L can be defined in terms of either the SEL or L_{max} metric, and it is important that this selection is reflected in the nomenclature. When labeling a contour line or point of interest (POI) on a map, the NAL will be followed by the number of events in parentheses for that line or POI. For example, the noise environment at a location where 10 events exceed an SEL of 90 dB, over a given period of time, would be represented by the nomenclature NA90SEL(10). Similarly, for L_{max} it would be NA90L_{max}(10). The period of time can be an average 24-hour day, daytime, nighttime, school day, or any other time period appropriate to the nature and application of the analysis.

NA can be portrayed for single or multiple locations, or by means of noise contours on a map similar to the common DNL contours. A threshold level is selected that best meets the need for that situation. An L_{max} threshold is normally selected to analyze speech interference, whereas an SEL threshold is normally selected for analysis of sleep disturbance.

The NA metric is the only supplemental metric that has been developed that combines single-event noise levels with the number of aircraft operations. In essence, it answers the question of how many aircraft (or range of aircraft) fly over a given location or area at or above a selected threshold noise level.

Time Above (TA) a Specified Level (L)

The Time Above (TA) metric is a measure of the total time that the A-weighted aircraft noise level is at or above a defined sound level threshold. Combined with the selected threshold level (L), the TA metric is symbolized as TAL. TA is not a sound level, but rather a time expressed in minutes. TA values can be calculated over a full 24-hour annual average day, the 15-hour daytime and 9-hour nighttime periods, a school day, or any other time period of interest, provided there is operational data to define the time period of interest.

TA has application for describing the noise environment in schools, particularly when comparing the classroom or other noise sensitive environments for different operational scenarios. TA can be portrayed by means of noise contours on a map similar to the common DNL contours.

The TA metric is a useful descriptor of the noise impact of an individual event or for many events occurring over a certain time period. When computed for a full day, the TA can be compared alongside the DNL in order to determine the sound levels and total duration of events that contribute to the DNL. TA analysis is usually conducted along with NA analysis so the results show not only how many events occur above the selected threshold(s), but also the total duration of those events above those levels for the selected time period.

2. Noise Effects

This noise effects section includes discussions of annoyance, speech interference and sleep disturbance, and the effects of noise on hearing, health, performance, learning, animals, property values, terrain and archaeological sites.

2.1 Annoyance

The primary effect of aircraft noise on exposed communities is one of long-term annoyance, defined by the USEPA as any negative subjective reaction on the part of an individual or group. The scientific community has adopted the use of long-term annoyance as a primary indicator of community response because it attempts to account for all negative aspects of effects from noise, e.g., increased annoyance due to being awakened the previous night by aircraft and interference with everyday conversation.

Numerous laboratory studies and field surveys have been conducted to measure annoyance and to account for a number of variables, many of which are dependent on a person's individual circumstances and preferences. Laboratory studies of individual response to noise have helped isolate a number of the factors contributing to annoyance, such as the intensity level and spectral characteristics of the noise, duration, the presence of impulses, pitch, information content, and the degree of interference with activity. Social surveys of community response to noise have allowed the development of general dose-response relationships that can be used to estimate the proportion of people who will be highly annoyed by a given noise level. The results of these studies have formed the basis for criteria established to define areas of compatible land use.

A wide variety of responses have been used to determine intrusiveness of noise and disturbances of speech, sleep, audio/video entertainment, and outdoor living; but the most useful metric for assessing peoples' responses to noise is the percentage of the population expected to be "highly annoyed." The concept of "percent highly annoyed" has provided the most consistent response of a community to a particular noise environment. In his synthesis of several different social surveys that employed different response scales, Schultz (1978) defined "highly annoyed" respondents as those respondents whose self-described annoyance fell within the upper 28 percent of the response scale where the scale was numerical or un-named. For surveys where

the response scale was named, Schultz counted those who claimed to be highly annoyed, combining the responses of "very annoyed" and "extremely annoyed." Schultz's definition of "percent highly annoyed" (%HA) became the basis for the federal policy on environmental noise. Daily average sound levels are typically used for the evaluation of community noise effects, such as long-term annoyance.

In general, scientific studies and social surveys have found a correlation between the percentages of groups of people highly annoyed and the level of average noise exposure. Thus, the results are expressed as the average %HA at various exposure levels measured in DNL. The classic analysis is Schultz's original 1978 study, whose results are shown in Figure B-3. This figure is commonly referred to as the Schultz curve. It represents the synthesis of a large number of social surveys (161 data points in all), that relates the long-term community response to various types of noise sources, measured using the DNL metric.

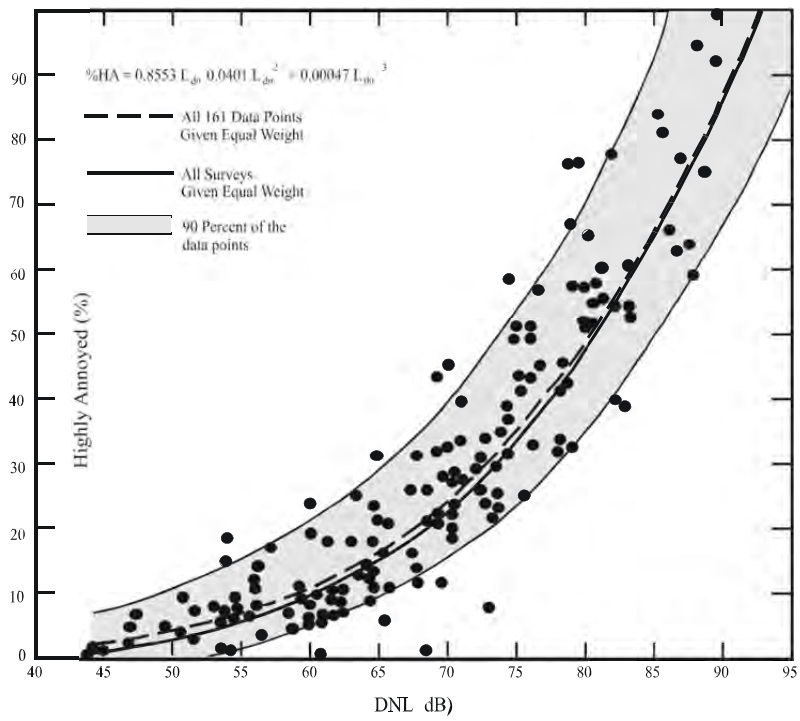
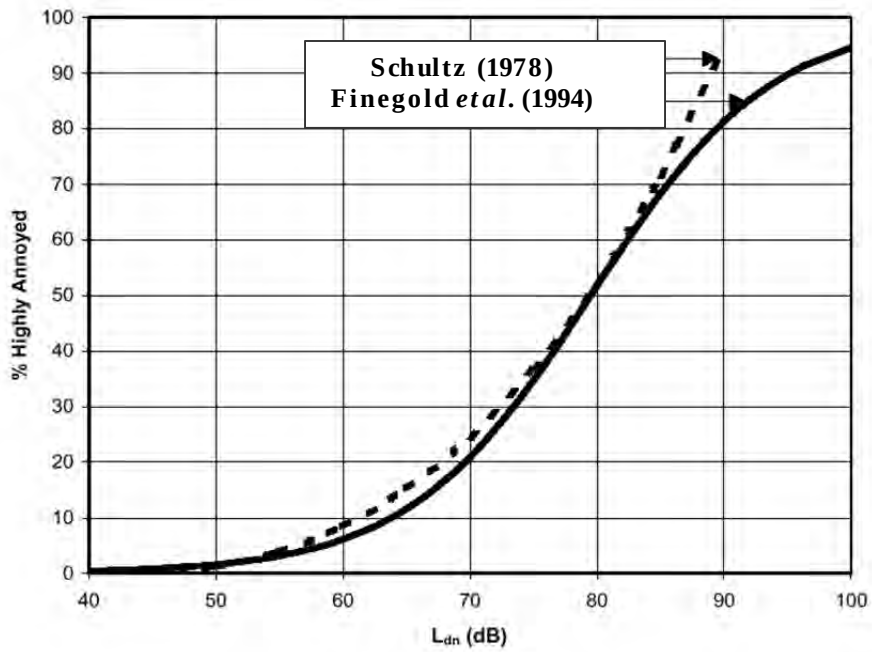


Figure B-3. Community Surveys of Noise Annoyance

An updated study of the original Schultz data based on the analysis of 400 data points collected through 1989 essentially reaffirmed this relationship. Figure B-4 shows an updated form of the curve fit in comparison with the original Schultz curve (Finegold *et al.* 1994). The updated fit, which does not differ substantially from the original, is the preferred form in the U.S. The relationship between %HA and DNL is:

$$\%HA = 100/[1+ \exp(11.13 - 0.141L_{dn})]$$



Sources: (Schultz, 1978) and Current (Finegold *et al.* 1994) Curve Fits

Figure B-4. Response of Communities to Noise; Comparison of Original

In general, correlation coefficients of 0.85 to 0.95 are found between the percentages of groups of people highly annoyed and the level of average noise exposure. However, the correlation coefficients for the annoyance of individuals are relatively low, on the order of 0.5 or less. This is not surprising, considering the varying personal factors that influence the manner in which individuals react to noise.

A number of non-acoustic factors have been identified that may influence the annoyance response of an individual. Newman and Beattie (1985) divided these factors into emotional and physical variables.

Emotional Variables:

- Feelings about the necessity or preventability of the noise;
- Judgment of the importance and value of the activity that is producing the noise;
- Activity at the time an individual hears the noise;
- Attitude about the environment;
- General sensitivity to noise;

- Belief about the effect of noise on health; and
- Feeling of fear associated with the noise.

Physical Variables:

- Type of neighborhood;
- Time of day;
- Season;
- Predictability of noise;
- Control over the noise source; and
- Length of time an individual is exposed to a noise.

The low correlation coefficients for individuals' reactions reflect the large amount of scatter among the data drawn from the various surveys and point to the substantial uncertainty associated with the equation representing the relationship between %HA and DNL. Based on the results of surveys it has been observed that noise exposure can explain less than 50 percent of the observed variance in annoyance, indicating that non-acoustical factors play a major role. As a result, it is not possible to accurately predict individual annoyance in any specific community based on the aircraft noise exposure. Nevertheless, changes in %HA can be useful in giving the decision maker more information about the relative effects that different alternatives may have on the community.

The original Schultz curve and the subsequent updates do not separate out the annoyance from aircraft noise and other transportation noise sources. This was an important element, in that it allowed Schultz to obtain some consensus among the various social surveys from the 1960s and 1970s that were synthesized in the analysis. In essence, the Schultz curve assumes that the effects of long-term annoyance on the general population are the same, regardless of whether the noise source is road, rail, or aircraft. In the years after the classical Schultz analysis, additional social surveys have been conducted to better understand the annoyance effects of various transportation sources.

Miedema and Vos (1998) present synthesis curves for the relationship between DNL and percentage "Annoyed" and percentage "Highly Annoyed" for three transportation noise sources. Separate, non-identical curves were found for aircraft, road traffic, and railway noise. Table B-1 illustrates that, for a DNL of 65 dB, the percent of the people forecasted to be Highly Annoyed is

28 percent for air traffic, 18 percent for road traffic, and 11 percent for railroad traffic. For an outdoor DNL of 55 dB, the percent highly annoyed would be close to 12 percent if the noise is generated by aircraft operations, but only 7 percent and 4 percent, respectively, if the noise is generated by road or rail traffic. Comparing the levels on the Miedema and Vos curve to those on the updated Schultz curve indicates that the percentage of people highly annoyed by aircraft noise may be higher than previously thought when the noise is solely generated by aircraft activity.

Table B-1. Percent Highly Annoyed for Different Transportation Noise Sources

DNL (dB)	PERCENT HIGHLY ANNOYED (%HA)			
	Miedema and Vos			*Schultz Combined*
	Air	*Road*	*Rail*	
55	12	7	4	3
60	19	12	7	6
65	28	18	11	12
70	37	29	16	22
75	48	40	22	36

Source: Miedema and Vos 1998

As noted by the World Health Organization (WHO), even though aircraft noise seems to produce a stronger annoyance response than road traffic, caution should be exercised when interpreting synthesized data from different studies (WHO 2000). The WHO noted that five major parameters should be randomly distributed for the analyses to be valid: personal, demographic, and lifestyle factors, as well as the duration of noise exposure and the population experience with noise.

The Federal Interagency Committee on Noise (FICON) found that the updated Schultz curve remains the best available source of empirical dosage effect information to predict community response to transportation noise without any segregation by transportation source (FICON 1992); a position held by the FICAN in 1997 (FICAN 1997). However, FICON also recommended further research to investigate the differences in perceptions of aircraft noise, ground transportation noise (highways and railroads), and general background noise.

2.2 Speech Interference

Speech interference associated with aircraft noise is a primary cause of annoyance for communities. The disruption of routine activities such as radio or television listening, telephone use, or family conversation gives rise to frustration and irritation. The quality of speech communication is particularly important in classrooms and offices. In industrial settings it can cause fatigue and vocal strain in those who attempt to communicate over the noise.

The disruption of speech in the classroom is a primary concern, due to the potential for adverse effects on children's learning ability. There are two aspects to speech comprehension:

1. *Word Intelligibility* - the percent of words transmitted and received. This might be important for students in the lower grades who are learning the English language, and particularly for students who have English as a Second Language.

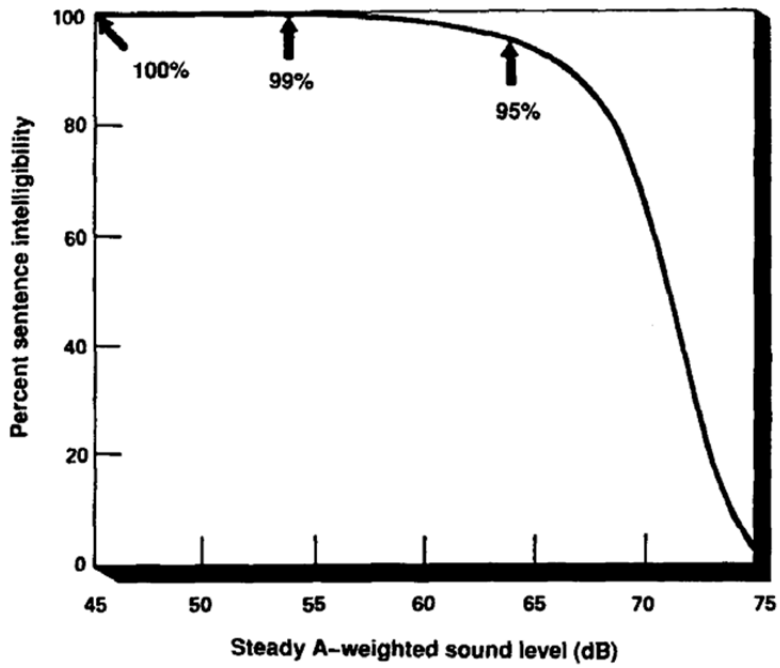
2. *Sentence Intelligibility* – the percent of sentences transmitted and understood. This might be important for high-school students and adults who are familiar with the language, and who do not necessarily have to understand each word in order to understand sentences.

For teachers to be clearly understood by their students, it is important that regular voice communication is clear and uninterrupted. Not only does the background sound level have to be low enough for the teacher to be clearly heard, but intermittent outdoor noise events also need to be minimized. It is therefore important to evaluate the steady background level, the level of voice communication, and the single-event level due to aircraft overflights that might interfere with speech.

Several research studies have been conducted and guideline documents been developed resulting in a fairly consistent set of noise level criteria for speech interference. This section provides an overview of the results of these studies.

U.S. Federal Criteria for Interior Noise

In 1974, the USEPA identified a goal of an indoor 24-hour average sound level $L_{eq(24)}$ of 45 dB to minimize speech interference based on the intelligibility of sentences in the presence of a steady background noise (USEPA 1974). Intelligibility pertains to the percentage of speech units correctly understood out of those transmitted, and specifies the type of speech material used, i.e., sentences or words. The curve displayed in Figure B-5 shows the effect of steady indoor background sound levels on sentence intelligibility. For an average adult with normal hearing and fluency in the language, steady background sound levels indoors of less than 45 dB L_{eq} are expected to allow 100 percent intelligibility of sentences.



Source: USEPA 1974

Figure B-5. Speech Intelligibility Curve

The curve shows 99 percent sentence intelligibility for background levels at a L_{eq} of 54 dB, and less than 10 percent intelligibility for background levels above a L_{eq} of 73 dB. Note that the curve is especially sensitive to changes in sound level between 65 dB and 75 dB - an increase of 1 dB in background sound level from 70 dB to 71 dB results in a 14 percent decrease in sentence intelligibility, whereas a 1 dB increase in background sound level from 60 dB to 61 dB results in less than 1 percent decrease in sentence intelligibility.

2.3 Classroom Criteria

For listeners with normal hearing and fluency in the language, complete sentence intelligibility can be achieved when the signal-to-noise ratio (i.e., the difference between the speech level and the level of the interfering noise) is in the range 15-18 dB (Lazarus 1990).

Both the ANSI and the American Speech-Language-Hearing Association (ASHLA) recommend at least a 15 dB signal-to-noise ratio in classrooms, to ensure that children with hearing impairments and language disabilities are able to enjoy high speech intelligibility (ANSI 2002, ASHLA 1995). As such, provided that the average adult male or female voice registers a minimum of 50 dB L_{max} in the rear of the classroom, the ANSI standard requires that the continuous background noise level indoors must not exceed a L_{eq} of 35 dB (assumed to apply for the duration of school hours).

The WHO reported for a speaker-to-listener distance of about 1 meter, empirical observations have shown that speech in relaxed conversations is 100 percent intelligible in background noise levels of about 35 dB, and speech can be fairly well understood in the presence of background levels of 45 dB. The WHO recommends a guideline value of 35 dB L_{eq} for continuous background levels in classrooms during school hours (WHO 2000).

Bradley suggests that in smaller rooms, where speech levels in the rear of the classroom are approximately 50 dB L_{max}, steady-state noise levels above 35 dB L_{eq} may interfere with the intelligibility of speech (Bradley 1993).

For the purposes of determining eligibility for noise insulation funding, the Federal Aviation Administration (FAA) guidelines state that the design objective for a classroom environment is 45 dB L_{eq} resulting from aircraft operations during normal school hours (FAA 1985).

However, most aircraft noise is not continuous and consists of individual events where the sound level exceeds the background level for a limited time period as the aircraft flies over. Since speech interference in the presence of aircraft noise is essentially determined by the magnitude and frequency of individual aircraft flyover events, a time-averaged metric alone, such as L_{eq}, is not necessarily appropriate when evaluating the overall effects. In addition to the background level criteria described above, single-event criteria, which account for those sporadic intermittent outdoor noisy events, are also essential to specifying speech interference criteria.

In 1984, a report to the Port Authority of New York and New Jersey recommended utilizing the Speech Interference Level (SIL) metric for classroom noise criteria (Sharp and Plotkin 1984). This metric is based on the maximum sound levels in the frequency range (approximately 500 Hz to 2,000 Hz) that directly affects speech communication. The study identified an SIL (the average of the sound levels in the 500, 1,000, and 2,000 Hz octave-bands) of 45 dB as the desirable goal, which was estimated to provide 90 percent word intelligibility for the short time periods during aircraft over-flights. Although early classroom level criteria were defined in terms of SIL, the use and measurement of L_{max} as the primary metric has since become more popular. Both metrics take into consideration the L_{max} associated with intermittent noise events and can be related to existing background levels when determining speech interference percentages. An SIL of 45 dB is approximately equivalent to an A-weighted L_{max} of 50 dB for aircraft noise (Wesler 1986).

In 1998, a report also concluded that if an aircraft noise event's indoor L_{max} reached the speech level of 50 dB, 90 percent of the words would be understood by students seated throughout the classroom (Lind *et al.* 1998). Since intermittent aircraft noise does not appreciably disrupt classroom communication at lower levels and other times, the authors also adopted an indoor

L_{max} of 50 dB as the maximum single-event level permissible in classrooms. Note that this limit was set based on students with normal hearing and no special needs; at-risk students may be adversely affected at lower sound levels.

Bradley recommends SEL as a better indicator of indoor estimated speech interference in the presence of aircraft overflights (Bradley 1985). For acceptable speech communication using normal vocal efforts, Bradley suggests that the indoor SEL be no greater than 64 dB. He assumes a 26 dB outdoor-to-indoor noise reduction that equates to 90 dB SEL outdoors. Aircraft events producing outdoor SEL values greater than 90 dB would result in disruption to indoor speech communication. Bradley's work indicates that, for speakers talking with a casual vocal effort, 95 percent intelligibility would be achieved when indoor SEL values did not exceed 60 dB, which translates approximately to an L_{max} of 50 dB.

In the presence of intermittent noise events, ANSI states that the criteria for allowable background noise level can be relaxed since speech is impaired only for the short time when the aircraft noise is close to its maximum value. Consequently, they recommend when the background noise level of the noisiest hour is dominated by aircraft noise, the indoor criteria (35 dB L_{eq} for continuous background noise) can be increased by 5 dB to an L_{eq} of 40 dB, as long as the noise level does not exceed 40 dB for more than 10 percent of the noisiest hour (ANSI 2002).

The WHO does not recommend a specific indoor L_{max} criterion for single-event noise, but does place a guideline value at L_{eq} of 35 dB for overall background noise in the classroom. However, WHO does report that "for communication distances beyond a few meters, speech interference starts at sound pressure levels below 50 dB for octave bands centered on the main speech frequencies at 500 Hz, 1 kilohertz (kHz), and 2 kHz" (WHO 2000). One can infer this can be approximated by an L_{max} value of 50 dB.

The United Kingdom Department for Education and Skills (UKDFES) established in its classroom acoustics guide a 30-minute time-averaged metric [$L_{eq(30min)}$] for background levels and $L_{A1,30}$ min for intermittent noises, at thresholds of 30-35 dB and 55 dB, respectively. $L_{A1,30}$ min represents the A-weighted sound level that is exceeded 1 percent of the time (in this case, during a 30 minute teaching session) and is generally equivalent to the L_{max} metric (UKDFES 2003).

Summary

As the previous section demonstrates, research indicates that it is not only important to consider the continuous background levels using time-averaged metrics, but also the intermittent events,

using single-event metrics such as L_{max}. Table B-2 provides a summary of the noise level criteria recommended in the scientific literature.

Table B-2. Indoor Noise Level Criteria Based on Speech Intelligibility

Source	*Metric/Level (dB)*	*Effects and Notes*
FAA (1985)	L_{eq}(during school hours) = 45 dB	Federal assistance criteria for school sound insulation; supplemental single-event criteria may be used
Lind *et al.* (1998), Sharp and Plotkin (1984), Wesler (1986)	L_{max} = 50 dB / SIL 45	Single event level permissible in the classroom
WHO (1999)	L_{eq} = 35 dB Lmax = 50 dB	Assumes average speech level of 50 dB and recommends signal to noise ratio of 15 dB
ANSI (2002)	L_{eq} = 40 dB, Based on Room Volume	Acceptable background level for continuous noise/ relaxed criteria for intermittent noise in the classroom
UKDFES (2003)	$L_{eq(30min)}$ = 30-35 dB L_{max} = 55 dB	Minimum acceptable in classroom and most other learning environs

When considering intermittent noise caused by aircraft overflights, a review of the relevant scientific literature and international guidelines indicates that an appropriate criteria is a limit on indoor background noise levels of 35 to 40 dB L_{eq} and a limit on single events of 50 dB L_{max}.

2.4 Sleep Disturbance

The disturbance of sleep is a major concern for communities exposed to nighttime aircraft noise. There have been numerous research studies that have attempted to quantify the complex effects of noise on sleep. This section provides an overview of the major noise-induced sleep disturbance studies that have been conducted, with particular emphasis placed on those studies that have influenced U.S. federal noise policy. The studies have been separated into two groups:

1. Initial studies performed in the 1960s and 1970s, where the research was focused on laboratory sleep observations.

2. Later studies performed in the 1990s up to the present, where the research was focused on field observations, and correlations to laboratory research were sought.

2.4.1 Initial Studies

The relationship between noise levels and sleep disturbance is complex and not fully understood. The disturbance depends not only on the depth of sleep, but also on the previous exposure to aircraft noise, familiarity with the surroundings, the physiological and psychological condition of the recipient, and a host of other situational factors. The most readily measurable effect of noise on sleep is the number of arousals or awakenings, and so the body of scientific literature has

focused on predicting the percentage of the population that will be awakened at various noise levels. Fundamentally, regardless of the tools used to measure the degree of sleep disturbance (awakenings, arousals, etc.), these studies have grouped the data points into bins to predict the percentage of the population likely to be disturbed at various sound level thresholds.

FICON produced a guidance document that provided an overview of the most pertinent sleep disturbance research that had been conducted throughout the 1970s (FICON 1992). Literature reviews and meta-analysis conducted between 1978 and 1989 made use of the existing datasets that indicated the effects of nighttime noise on various sleep-state changes and awakenings (Lukas 1978, Griefahn 1978, Pearsons *et al.* 1989). FICON noted that various indoor A-weighted sound levels ranging from 25 to 50 dB were observed to be thresholds below which significant sleep effects were not expected. Due to the large variability in the data, FICON did not endorse the reliability of the results.

However, FICON did recommend the use of an interim dose-response curve—awaiting future research—which predicted the percent of the exposed population expected to be awakened as a function of the exposure to single event noise levels expressed in terms of SEL. This curve was based on the research conducted for the U.S. Air Force (USAF) (Finegold 1994). The dataset included most of the research performed up to that point, and predicted that 10 percent of the population would be awakened when exposed to an interior SEL of approximately 58 dB. The data utilized to derive this relationship were primarily the results of controlled laboratory studies.

2.4.2 Recent Sleep Disturbance Research – Field and Laboratory Studies

It was noted in the early sleep disturbance research that the controlled laboratory studies did not account for many factors that are important to sleep behavior, such as habituation to the environment and previous exposure to noise and awakenings from sources other than aircraft noise. In the early 1990s, field studies were conducted to validate the earlier laboratory work. The most significant finding from these studies was that an estimated 80 to 90 percent of sleep disturbances were not related to individual outdoor noise events, but were instead the result of indoor noise sources and other non-noise-related factors. The results showed that there was less of an effect of noise on sleep in real-life conditions than had been previously reported from laboratory studies.

2.4.3 Federal Interagency Committee on Aviation Noise

The interim FICON dose-response curve that was recommended for use in 1992 was based on the most pertinent sleep disturbance research that was conducted through the 1970s, primarily in laboratory settings. After that time, considerable field research was conducted to evaluate the sleep effects in peoples' normal, home environment. Laboratory sleep studies tend to show

higher values of sleep disturbance than field studies because people who sleep in their own homes are habituated to their environment and, therefore, do not wake up as easily (FICAN 1997).

Based on the new information, FICAN updated its recommended dose-response curve in 1997, depicted as the lower curve in Figure B-6. This figure is based on the results of three field studies (Ollerhead *et al.* 1992, Fidell *et al.* 1994, 1995a, and 1995b), along with the datasets from six previous field studies.

The new relationship represents the higher end, or upper envelope, of the latest field data. It should be interpreted as predicting the "maximum percent of the exposed population expected to be behaviorally awakened" or the "maximum percent awakened" for a given residential population. According to this relationship, a maximum of 3 percent of people would be awakened at an indoor SEL of 58 dB, compared to 10 percent using the 1992 curve. An indoor SEL of 58 dB is equivalent to outdoor SEL's of 73 and 83 dB respectively assuming 15 and 25 dB noise level reduction from outdoor to indoor with windows open and closed, respectively.

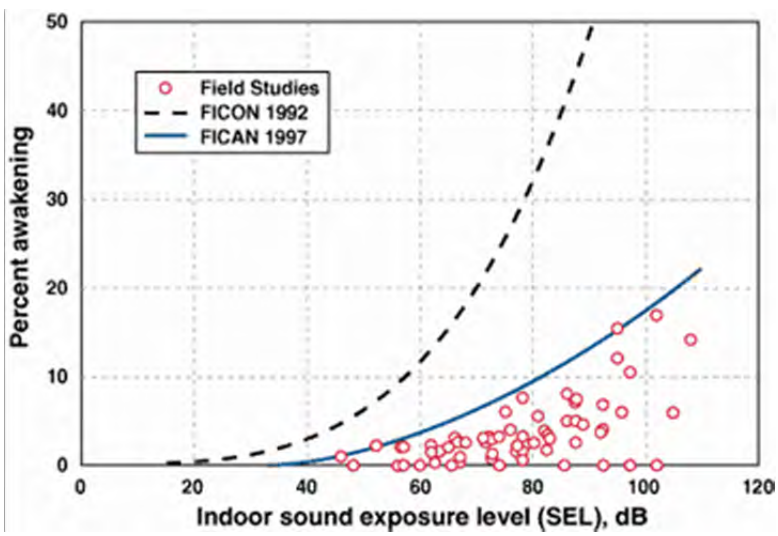


Figure B-6. FICAN's 1997 Recommended Sleep Disturbance Dose-Response Relationship

The FICAN 1997 curve is represented by the following equation:

$$\text{Percent Awakenings} = 0.0087 \times [\text{SEL} - 30]^{1.79}$$

Note the relatively low percentage of awakenings to fairly high noise levels. People think they are awakened by a noise event, but usually the reason for awakening is otherwise. For example, the 1992 United Kingdom Civil Aviation Authority study found the average person was awakened about 18 times per night for reasons other than exposure to an aircraft noise – some of

these awakenings are due to the biological rhythms of sleep and some to other reasons that were not correlated with specific aircraft events.

2.4.4 Number of Events and Awakenings

In recent years, there have been studies and one proposal that attempted to determine the effect of multiple aircraft events on the number of awakenings. The German Aerospace Center (DLR) conducted an extensive study focused on the effects of nighttime aircraft noise on sleep and other related human performance factors (Basner 2004). The DLR study was one of the largest studies to examine the link between aircraft noise and sleep disturbance and involved both laboratory and in-home field research phases. The DLR investigators developed a dose-effect curve that predicts the number of aircraft events at various values of L_{max} expected to produce one additional awakening over the course of a night. The dose-effect curve was based on the relationships found in the field studies.

In July 2008 ANSI and the Acoustical Society of America (ASA) published a method to estimate the percent of the exposed population that might be awakened by multiple aircraft noise events based on statistical assumptions about the probability of awakening (or not awakening) (ANSI 2008). This method relies on probability theory rather than direct field research/experimental data to account for multiple events.

Figure B-7 depicts the awakenings data that form the basis and equations of ANSI S12.9-2008. The curve labeled 'Eq. (B1)' is the relationship between noise and awakening endorsed by FICAN in 1997. The ANSI recommended curve labeled 'Eq. (1)' quantifies the probability of awakening for a population of sleepers who are exposed to an outdoor noise event as a function of the associated indoor SEL in the bedroom. This curve was derived from studies of behavioral awakenings associated with noise events in "steady state" situations where the population has been exposed to the noise long enough to be habituated. The data points in Figure B-7 come from these studies. Unlike the FICAN curve, the ANSI 2008 curve represents the average of the field research data points.

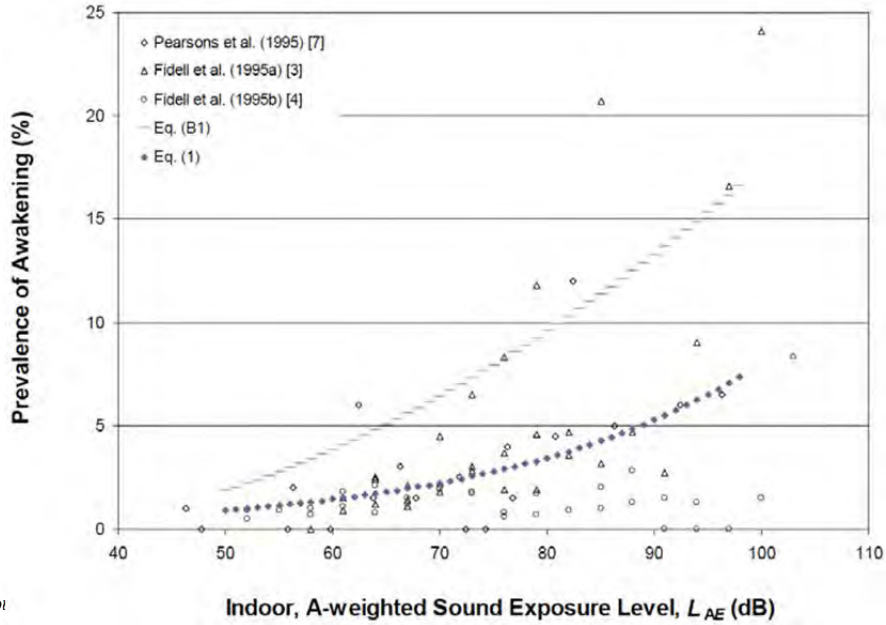


Figure B-7. Plot of Sleep Awakening Data versus Indoor SEL

In December 2008, FICAN recommended the use of this new estimation procedure for future analyses of behavioral awakenings from aircraft noise. In that statement, FICAN also recognized that additional sleep disturbance research is underway by various research organizations, and results of that work may result in additional changes to FICAN's position. Until that time, FICAN recommends the use of ANSI S12.9-2008.

2.5 Noise-Induced Hearing Impairment

Residents in surrounding communities express concerns regarding the effects of aircraft noise on hearing. This section provides a brief overview of hearing loss caused by noise exposure. The goal is to provide a sense of perspective as to how aircraft noise (as experienced on the ground) compares to other activities that are often linked with hearing loss.

2.5.1 Hearing Threshold Shifts

Hearing loss is generally interpreted as a decrease in the ear's sensitivity or acuity to perceive sound; i.e., a shift in the hearing threshold to a higher level. This change can either be a Temporary Threshold Shift (TTS), or a Permanent Threshold Shift (PTS) (Berger 1995).

TTS can result from exposure to loud noise over a given amount of time, yet the hearing loss is not necessarily permanent. An example of TTS might be a person attending a loud music concert. After the concert is over, the person may experience a threshold shift that may last several hours, depending upon the level and duration of exposure. While experiencing TTS, the person becomes less sensitive to low-level sounds, particularly at certain frequencies in the

speech range (typically near 4,000 Hz). Normal hearing ability eventually returns, as long as the person has enough time to recover within a relatively quiet environment.

PTS usually results from repeated exposure to high noise levels, where the ears are not given adequate time to recover from the strain and fatigue of exposure. A common example of PTS is the result of working in a loud environment such as a factory. It is important to note that a temporary shift (TTS) can eventually become permanent (PTS) over time with continuous exposure to high noise levels. Thus, even if the ear is given time to recover from TTS, repeated occurrence of TTS may eventually lead to permanent hearing loss. The point at which a TTS results in a PTS is difficult to identify and varies with a person's sensitivity.

2.5.2 Criteria for Permanent Hearing Loss

Considerable data on hearing loss have been collected and analyzed by the scientific/medical community. It has been well established that continuous exposure to high noise levels will damage human hearing (USEPA 1978). The Occupational Safety and Health Administration (OSHA) regulation of 1971 standardizes the limits on workplace noise exposure for protection from hearing loss as an average level of 90 dB over an 8-hour work period or 85 dB over a 16-hour period (the average level is based on a 5 dB decrease per doubling of exposure time) (U.S. Department of Labor 1970). Even the most protective criterion (no measurable hearing loss for the most sensitive portion of the population at the ear's most sensitive frequency, 4,000 Hz, after a 40-year exposure) is an average sound level of 70 dB over a 24-hour period.

The USEPA established 75 dB for an 8-hour exposure and 70 dB for a 24-hour exposure as the average noise level standard requisite to protect 96 percent of the population from greater than a 5 dB PTS (USEPA 1978). The National Academy of Sciences Committee on Hearing, Bioacoustics, and Biomechanics (CHABA) identified 75 dB as the minimum level at which hearing loss may occur (CHABA 1977). Finally, the WHO has concluded that environmental and leisure-time noise below an $L_{eq(24)}$ value of 70 dB "will not cause hearing loss in the large majority of the population, even after a lifetime of exposure" (WHO 2000).

2.5.3 Hearing Loss and Aircraft Noise

The 1982 USEPA Guidelines report specifically addresses the criteria and procedures for assessing the noise-induced hearing loss in terms of the Noise-Induced Permanent Threshold Shift (NIPTS), a quantity that defines the permanent change in hearing level, or threshold, caused by exposure to noise (USEPA 1982). Numerically, the NIPTS is the change in threshold averaged over the frequencies 0.5, 1, 2, and 4 kHz that can be expected from daily exposure to noise over a normal working lifetime of 40 years, with the exposure beginning at an age of 20 years. A grand average of the NIPTS over time (40 years) and hearing sensitivity (10 to 90 percentiles of the exposed population) is termed the Average NIPTS, or Ave NIPTS

for short. The Ave NIPTS that can be expected for noise exposure as measured by the DNL metric is given in Table B-3.

Table B-3. Ave NIPTS and 10th Percentile NIPTS as a Function of DNL

DNL	*Ave NIPTS dB**	*10th Percentile NIPTS dB**
75-76	1.0	4.0
76-77	1.0	4.5
77-78	1.6	5.0
78-79	2.0	5.5
79-80	2.5	6.0
80-81	3.0	7.0
81-82	3.5	8.0
82-83	4.0	9.0
83-84	4.5	10.0
84-85	5.5	11.0

*Note:**Rounded to the nearest 0.5 dB

For example, for a noise exposure of 80 dB DNL, the expected lifetime average value of NIPTS is 2.5 dB, or 6.0 dB for the 10th percentile. Characterizing the noise exposure in terms of DNL will usually overestimate the assessment of hearing loss risk as DNL includes a 10 dB weighting factor for aircraft operations occurring between 10 p.m. and 7 a.m. If, however, flight operations between the hours of 10 p.m. and 7 a.m. account for 5 percent or less of the total 24-hour operations, the overestimation is on the order of 1.5 dB. From a civilian airport perspective, the scientific community has concluded that there is little likelihood that the resulting noise exposure from aircraft noise could result in either a temporary or permanent hearing loss. Studies on community hearing loss from exposure to aircraft flyovers near airports showed that there is no danger, under normal circumstances, of hearing loss due to aircraft noise (Newman and Beattie 1985). The USEPA criterion ($L_{eq(24)}$ = 70 dBA) can be exceeded in some areas located near airports, but that is only the case outdoors. Inside a building, where people are more likely to spend most of their time, the average noise level will be much less than 70 dBA (Eldred and von Gierke 1993). Eldred and von Gierke also report that "several studies in the U.S., Japan, and the United Kingdom have confirmed the predictions that the possibility for permanent hearing loss in communities, even under the most intense commercial take-off and landing patterns, is remote."

With regard to military airbases, as individual aircraft noise levels are increasing with the introduction of new aircraft, a 2009 Department of Defense (DoD) policy directive requires that hearing loss risk be estimated for the at risk population, defined as the population exposed to DNL greater than or equal to 80 dB and higher (DoD 2009). Specifically, DoD components are directed to "use the 80 Day-Night A-Weighted (DNL) noise contour to identify populations at the most risk of potential hearing loss." This does not preclude populations outside the 80 DNL contour, i.e., at lower exposure levels, from being at some degree of risk of hearing loss.

However, the analysis should be restricted to populations within this contour area, including residents of on-base housing. The exposure of workers inside the base boundary area should be considered occupational and evaluated using the appropriate DoD component regulations for occupational noise exposure.

2.5.4 Summary

Aviation and typical community noise levels near airports are not comparable to the occupational or recreational noise exposures associated with hearing loss. Studies of aircraft noise levels associated with civilian airport activity have not definitively correlated permanent hearing impairment with aircraft activity. It is unlikely that airport neighbors will remain outside their homes 24 hours per day, so there is little likelihood of hearing loss below an average sound level of 75 dB DNL. Near military airbases, average noise levels above 75 dB may occur, and while new DoD policy dictates that NIPTS be evaluated, no research results to date have definitively related permanent hearing impairment to aviation noise.

2.6 Non-auditory Health Effects

Studies have been conducted to determine whether correlations exist between noise exposure and cardiovascular problems, birth weight, and mortality rates. The non-auditory effect of noise on humans is not as easily substantiated as the effect on hearing. The results of studies conducted in the U.S., primarily concentrating on cardiovascular response to noise, have been contradictory (Cantrell 1974). Cantrell concluded that the results of human and animal experiments show that average or intrusive noise can act as a stress-provoking stimulus. Prolonged stress is known to be a contributor to a number of health disorders. Kryter and Poza (1980) state, “It is more likely that noise-related general ill-health effects are due to the psychological annoyance from the noise interfering with normal everyday behavior, than it is from the noise eliciting, because of its intensity, reflexive response in the autonomic or other physiological systems of the body.” Psychological stresses may cause a physiological stress reaction that could result in impaired health.

The National Institute for Occupational Safety and Health and USEPA commissioned CHABA in 1981 to study whether established noise standards are adequate to protect against health disorders other than hearing defects. CHABA’s conclusion was that:

> Evidence from available research reports is suggestive, but it does not provide definitive answers to the question of health effects, other than to the auditory system, of long-term exposure to noise. It seems prudent, therefore, in the absence of adequate knowledge as to whether or not noise can produce effects upon health other than damage to auditory system, either directly or mediated through stress, that insofar as feasible, an attempt should be made to obtain more critical evidence.

Since the CHABA report, there have been more recent studies that suggest that noise exposure may cause hypertension and other stress-related effects in adults. Near an airport in Stockholm, Sweden, the prevalence of hypertension was reportedly greater among nearby residents who were exposed to energy averaged noise levels exceeding 55 dB and maximum noise levels exceeding 72 dB, particularly older subjects and those not reporting impaired hearing ability (Rosenlund *et al.* 2001). A study of elderly volunteers who were exposed to simulated military low-altitude flight noise reported that blood pressure was raised by L_{max} of 112 dB and high speed level increase (Michalak *et al.* 1990). Yet another study of subjects exposed to varying levels of military aircraft or road noise found no significant relationship between noise level and blood pressure (Pulles *et al.* 1990).

The U.S. Department of the Navy prepared a programmatic Environmental Assessment (EA) for the continued use of non-explosive ordnance on the Vieques Inner Range. Following the preparation of the EA, it was learned that research conducted by the University of Puerto Rico, Ponce School of Medicine, suggested that Vieques fishermen and their families were experiencing symptoms associated with vibroacoustic disease (VAD) (U.S. Department of the Navy 2002). The study alleged that exposure to noise and sound waves of large pressure amplitudes within lower frequency bands, associated with Navy training activities—specifically, air-to-ground bombing or naval fire support—was related to a larger prevalence of heart anomalies within the Vieques fishermen and their families. The Ponce School of Medicine study compared the Vieques group with a group from Ponce Playa. A 1999 study conducted on Portuguese aircraft-manufacturing workers from a single factory reported effects of jet aircraft noise exposure that involved a wide range of symptoms and disorders, including the cardiac issues on which the Ponce School of Medicine study focused. The 1999 study identified these effects as VAD.

Johns Hopkins University (JHU) conducted an independent review of the Ponce School of Medicine study, as well as the Portuguese aircraft workers study and other relevant scientific literature. Their findings concluded that VAD should not be accepted as a syndrome, given that exhaustive research across a number of populations has not yet been conducted. JHU also pointed out that the evidence supporting the existence of VAD comes largely from one group of investigators and that similar results would have to be replicated by other investigators. In short, JHU concluded that it had not been established that noise was the causal agent for the symptoms reported and no inference can be made as to the role of noise from naval gunfire in producing echocardiographic abnormalities (U.S. Department of the Navy 2002).

Most studies of non-auditory health effects of long-term noise exposure have found that noise exposure levels established for hearing protection will also protect against any potential non-auditory health effects, at least in workplace conditions. One of the best scientific summaries of

these findings is contained in the lead paper at the National Institutes of Health Conference on Noise and Hearing Loss, held on 22 to 24 January 1990 in Washington, D.C.:

"The non-auditory effects of chronic noise exposure, when noise is suspected to act as one of the risk factors in the development of hypertension, cardiovascular disease, and other nervous disorders, have never been proven to occur as chronic manifestations at levels below these criteria (an average of 75 dBA for complete protection against hearing loss for an 8-hour day). At the recent (1988) International Congress on Noise as a Public Health Problem, most studies attempting to clarify such health effects did not find them at levels below the criteria protective of noise-induced hearing loss, and even above these criteria, results regarding such health effects were ambiguous. Consequently, one comes to the conclusion that establishing and enforcing exposure levels protecting against noise-induced hearing loss would not only solve the noise-induced hearing loss problem, but also any potential non-auditory health effects in the work place" (von Gierke 1990).

Although these findings were specifically directed at noise effects in the workplace, they are equally applicable to aircraft noise effects in the community environment. Research studies regarding the nonauditory health effects of aircraft noise are ambiguous, at best, and often contradictory. Yet, even those studies that purport to find such health effects use time-average noise levels of 75 dB and higher for their research.

For example, two University of California Los Angeles (UCLA) researchers apparently found a relationship between aircraft noise levels under the approach path to Los Angeles International Airport (LAX) and increased mortality rates among the exposed residents by using an average noise exposure level greater than 75 dB for the "noise-exposed" population (Meacham and Shaw 1979). Nevertheless, three other UCLA professors analyzed those same data and found no relationship between noise exposure and mortality rates (Frerichs *et al.* 1980).

As a second example, two other UCLA researchers used this same population near LAX to show a higher rate of birth defects for 1970 to 1972 when compared with a control group residing away from the airport (Jones and Tauscher 1978). Based on this report, a separate group at the Center for Disease Control performed a more thorough study of populations near Atlanta's Hartsfield International Airport (ATL) for 1970 to 1972 and found no relationship in their study of 17 identified categories of birth defects to aircraft noise levels above 65 dB (Edmonds *et al.* 1979).

In summary, there is no scientific basis for a claim that potential health effects exist for aircraft time-average sound levels below 75 dB.

The potential for noise to affect physiological health, such as the cardiovascular system, has been speculated; however, no unequivocal evidence exists to support such claims (Harris 1997). Conclusions drawn from a review of health effect studies involving military low-altitude flight noise with its unusually high maximum levels and rapid rise in sound level have shown no increase in cardiovascular disease (Schwartze and Thompson 1993). Additional claims that are unsupported include flyover noise producing increased mortality rates and increases in cardiovascular death, aggravation of post-traumatic stress syndrome, increased stress, increase in admissions to mental hospitals, and adverse effects on pregnant women and the unborn fetus (Harris 1997).

2.6.1 Performance Effects

The effect of noise on the performance of activities or tasks has been the subject of many studies. Some of these studies have established links between continuous high noise levels and performance loss. Noise-induced performance losses are most frequently reported in studies employing noise levels in excess of 85 dB. Little change has been found in low-noise cases. It has been cited that moderate noise levels appear to act as a stressor for more sensitive individuals performing a difficult psychomotor task.

While the results of research on the general effect of periodic aircraft noise on performance have yet to yield definitive criteria, several general trends have been noted including:

- A periodic intermittent noise is more likely to disrupt performance than a steady-state continuous noise of the same level. Flyover noise, due to its intermittent nature, might be more likely to disrupt performance than a steady-state noise of equal level.
- Noise is more inclined to affect the quality than the quantity of work.
- Noise is more likely to impair the performance of tasks that place extreme demands on the worker.

2.7 Noise Effects on Children

In response to noise-specific and other environmental studies, Executive Order (EO) 13045, *Protection of Children from Environmental Health Risks and Safety Risks* (1997), requires federal agencies to ensure that policies, programs, and activities address environmental health and safety risks to identify any disproportionate risks to children.

A review of the scientific literature indicates that there has not been a tremendous amount of research in the area of aircraft noise effects on children. The research reviewed does suggest that environments with sustained high background noise can have variable effects, including noise

effects on learning and cognitive abilities, and reports of various noise-related physiological changes.

2.7.1 Effects on Learning and Cognitive Abilities

In 2002, ANSI refers to studies that suggest that loud and frequent background noise can affect the learning patterns of young children (ANSI 2002). ANSI provides discussion on the relationships between noise and learning, and stipulates design requirements and acoustical performance criteria for outdoor-to-indoor noise isolation. School design is directed to be cognizant of, and responsive to surrounding land uses and the shielding of outdoor noise from the indoor environment. The ANSI acoustical performance criteria for schools include the requirement that the one-hour-average background noise level shall not exceed 35 dBA in core learning spaces smaller than 20,000 cubic feet and 40 dBA in core learning spaces with enclosed volumes exceeding 20,000 cubic feet. This would require schools be constructed such that, in quiet neighborhoods indoor noise levels are lowered by 15 to 20 dBA relative to outdoor levels. In schools near airports, indoor noise levels would have to be lowered by 35 to 45 dBA relative to outdoor levels (ANSI 2002).

The studies referenced by ANSI to support the new standard are not specific to jet aircraft noise and the potential effects on children. However, there are references to studies that have shown that children in noisier classrooms scored lower on a variety of tests. Excessive background noise or reverberation within schools causes interferences of communication and can therefore create an acoustical barrier to learning (ANSI 2002). Studies have been performed that contribute to the body of evidence emphasizing the importance of communication by way of the spoken language to the development of cognitive skills. The ability to read, write, comprehend, and maintain attentiveness, is in part, based upon whether teacher communication is consistently intelligible (ANSI 2002).

Numerous studies have shown varying degrees of effects of noise on the reading comprehension, attentiveness, puzzle-solving, and memory/recall ability of children. It is generally accepted that young children are more susceptible than adults to the effects of background noise. Because of the developmental status of young children (linguistic, cognitive, and proficiency), barriers to hearing can cause interferences or disruptions in developmental evolution.

Research on the impacts of aircraft noise, and noise in general, on the cognitive abilities of school-aged children has received more attention in recent years. Several studies suggest that aircraft noise can affect the academic performance of schoolchildren. Although many factors could contribute to learning deficits in school-aged children (e.g., socioeconomic level, home environment, diet, sleep patterns), evidence exists that suggests that chronic exposure to high aircraft noise levels can impair learning.

Specifically, elementary school children attending schools near New York City's two airports demonstrated lower reading scores than children living farther away from the flight paths (Green *et al.* 1982). Researchers have found that tasks involving central processing and language comprehension (such as reading, attention, problem solving, and memory) appear to be the most affected by noise (Evans and Lepore 1993, Hygge 1994, and Evans *et al.* 1998). It has been demonstrated that chronic exposure of first- and second-grade children to aircraft noise can result in reading deficits and impaired speech perception (i.e., the ability to hear common, low-frequency [vowel] sounds but not high frequencies [consonants] in speech) (Evans and Maxwell 1997).

The Evans and Maxwell (1997) study found that chronic exposure to aircraft noise resulted in reading deficits and impaired speech perception for first- and second-grade children. Other studies found that children residing near the LAX had more difficulty solving cognitive problems and did not perform as well as children from quieter schools in puzzle-solving and attentiveness (Bronzaft 1997, Cohen *et al.* 1980). Children attending elementary schools in high aircraft noise areas near London's Heathrow Airport demonstrated poorer reading comprehension and selective cognitive impairments (Haines *et al.* 2001a and 2001b). Similarly, a 1994 study found that students exposed to aircraft noise of approximately 76 dBA scored 20 percent lower on recall ability tests than students exposed to ambient noise of 42-44 dBA (Hygge 1994). Similar studies involving the testing of attention, memory, and reading comprehension of school children located near airports showed that their tests exhibited reduced performance results compared to those of similar groups of children who were located in quieter environments (Evans *et al.* 1998, Haines *et al.* 1998). The Haines and Stansfeld study indicated that there may be some long-term effects associated with exposure, as one-year follow-up testing still demonstrated lowered scores for children in higher noise schools (Haines *et al.* 2001a and 2001b). In contrast, a 2002 study found that although children living near the old Munich airport scored lower in standardized reading and long-term memory tests than a control group, their performance on the same tests was equal to that of the control group once the airport was closed (Hygge *et al.* 2002).

Finally, although it is recognized that there are many factors that could contribute to learning deficits in school-aged children, there is increasing awareness that chronic exposure to high aircraft noise levels may impair learning. This awareness has led the WHO and a North Atlantic Treaty Organization working group to conclude that daycare centers and schools should not be located near major sources of noise, such as highways, airports, and industrial sites (WHO 2000, North Atlantic Treaty Organization 2000).

2.7.2 Health Effects

Physiological effects in children exposed to aircraft noise and the potential for health effects have also been the focus of limited investigation. Studies in the literature include examination of blood pressure levels, hormonal secretions, and hearing loss.

As a measure of stress response to aircraft noise, authors have looked at blood pressure readings to monitor children's health. Children who were chronically exposed to aircraft noise from a new airport near Munich, Germany, had modest (although significant) increases in blood pressure, significant increases in stress hormones, and a decline in quality of life (Evans *et al.* 1998). Children attending noisy schools had statistically significant average systolic and diastolic blood pressure ($p<0.03$). Systolic blood pressure means were 89.68 millimeters (mm) for children attending schools located in noisier environments compared to 86.77 mm for a control group. Similarly, diastolic blood pressure means for the noisier environment group were 47.84 mm and 45.16 mm for the control group (Cohen *et al.* 1980).

Although the literature appears limited, studies focused on the wide range of potential effects of aircraft noise on school children have also investigated hormonal levels between groups of children exposed to aircraft noise compared to those in a control group. Specifically, two studies analyzed cortisol and urinary catecholamine levels in school children as measurements of stress response to aircraft noise (Haines *et al.* 2001b and 2001c). In both instances, there were no differences between the aircraft-noise-exposed children and the control groups.

Other studies have reported hearing losses from exposure to aircraft noise. Noise-induced hearing loss was reportedly higher in children who attended a school located under a flight path near a Taiwan airport, as compared to children at another school far away (Chen *et al.* 1997). Another study reported that hearing ability was reduced significantly in individuals who lived near an airport and were frequently exposed to aircraft noise (Chen and Chen 1993). In that study, noise exposure near the airport was reportedly uniform, with DNL greater than 75 dB and maximum noise levels of about 87 dB during overflights. Conversely, several other studies that were reviewed reported no difference in hearing ability between children exposed to high levels of airport noise and children located in quieter areas (Fisch 1977, Andrus *et al.* 1975, Wu *et al.* 1995).

2.8 Effects on Domestic Animals and Wildlife

Hearing is critical to an animal's ability to react, compete, reproduce, hunt, forage, and survive in its environment. While the existing literature does include studies on possible effects of jet aircraft noise and sonic booms on wildlife, there appears to have been little concerted effort in developing quantitative comparisons of aircraft noise effects on normal auditory characteristics. Behavioral effects have been relatively well described, but the larger ecological context issues,

and the potential for drawing conclusions regarding effects on populations, has not been well developed.

The relationships between potential auditory/physiological effects and species interactions with their environments are not well understood. Manci *et al.* (1988) assert that the consequences physiological effects may have on behavioral patterns is vital to understanding the long-term effects of noise on wildlife. Questions regarding the effects (if any) on predator-prey interactions, reproductive success, and intra-inter specific behavior patterns remain.

The following discussion provides an overview of the existing literature on noise effects (particularly jet aircraft noise) on animal species. The literature reviewed here involves those studies that have focused on the observations of the behavioral effects that jet aircraft have on animals.

A great deal of research was conducted in the 1960s and 1970s on the effects of aircraft noise on the public and the potential for adverse ecological impacts. These studies were largely completed in response to the increase in air travel and as a result of the introduction of supersonic jet aircraft. According to Manci *et al.* (1988), the foundation of information created from that focus does not necessarily correlate or provide information specific to the impacts to wildlife in areas overflown by aircraft at supersonic speed or at low altitudes.

The abilities to hear sounds and noise and to communicate assist wildlife in maintaining group cohesiveness and survivorship. Social species communicate by transmitting calls of warning, introduction, and other types that are subsequently related to an individual's or group's responsiveness.

Animal species differ greatly in their responses to noise. Noise effects on domestic animals and wildlife are classified as primary, secondary, and tertiary. Primary effects are direct, physiological changes to the auditory system, and most likely include the masking of auditory signals. Masking is defined as the inability of an individual to hear important environmental signals that may arise from mates, predators, or prey. There is some potential that noise could disrupt a species' ability to communicate or could interfere with behavioral patterns (Manci *et al.* 1988). Although the effects are likely temporal, aircraft noise may cause masking of auditory signals within exposed faunal communities. Animals rely on hearing to avoid predators, obtain food, and communicate with, and attract, other members of their species. Aircraft noise may mask or interfere with these functions. Other primary effects, such as ear drum rupture or temporary and permanent hearing threshold shifts, are not as likely given the subsonic noise levels produced by aircraft overflights. Secondary effects may include non-auditory effects such as stress and hypertension; behavioral modifications; interference with mating or reproduction; and impaired ability to obtain adequate food, cover, or water. Tertiary effects are the direct

result of primary and secondary effects, and include population decline and habitat loss. Most of the effects of noise are mild enough that they may never be detectable as variables of change in population size or population growth against the background of normal variation (Bowles 1995). Other environmental variables (e.g., predators, weather, changing prey base, ground-based disturbance) also influence secondary and tertiary effects, and confound the ability to identify the ultimate factor in limiting productivity of a certain nest, area, or region (Smith *et al.* 1988). Overall, the literature suggests that species differ in their response to various types, durations, and sources of noise (Manci *et al.* 1988).

Many scientific studies have investigated the effects of aircraft noise on wildlife, and some have focused on wildlife "flight" due to noise. Apparently, animal responses to aircraft are influenced by many variables, including size, speed, proximity (both height above the ground and lateral distance), engine noise, color, flight profile, and radiated noise. The type of aircraft (e.g., fixed wing versus rotor-wing [helicopter]) and type of flight mission may also produce different levels of disturbance, with varying animal responses (Smith *et al.* 1988). Consequently, it is difficult to generalize animal responses to noise disturbances across species.

One result of the 1988 Manci *et al.*, literature review was the conclusion that, while behavioral observation studies were relatively limited, a general behavioral reaction in animals from exposure to aircraft noise is the startle response. The intensity and duration of the startle response appears to be dependent on which species is exposed, whether there is a group or an individual, and whether there have been some previous exposures. Responses range from flight, trampling, stampeding, jumping, or running, to movement of the head in the apparent direction of the noise source. Manci *et al.* (1988) reported that the literature indicated that avian species may be more sensitive to aircraft noise than mammals.

2.8.1 Domestic Animals

Although some studies report that the effects of aircraft noise on domestic animals is inconclusive, a majority of the literature reviewed indicates that domestic animals exhibit some behavioral responses to military overflights but generally seem to habituate to the disturbances over a period of time. Mammals in particular appear to react to noise at sound levels higher than 90 dB, with responses including the startle response, freezing (i.e., becoming temporarily stationary), and fleeing from the sound source. Many studies on domestic animals suggest that some species appear to acclimate to some forms of sound disturbance (Manci *et al.* 1988). Some studies have reported such primary and secondary effects as reduced milk production and rate of milk release, increased glucose concentrations, decreased levels of hemoglobin, increased heart rate, and a reduction in thyroid activity. These latter effects appear to represent a small percentage of the findings occurring in the existing literature.

Some reviewers have indicated that earlier studies, and claims by farmers linking adverse effects of aircraft noise on livestock, did not necessarily provide clear-cut evidence of cause and effect (Cottereau 1978). In contrast, many studies conclude that there is no evidence that aircraft overflights affect feed intake, growth, or production rates in domestic animals.

2.8.2 Summary

Some physiological/behavioral responses such as increased hormonal production, increased heart rate, and reduction in milk production have been described in a small percentage of studies. A majority of the studies focusing on these types of effects have reported short-term or no effects.

The literature does suggest that common responses include the "startle" or "fright" response and, ultimately, habituation. It has been reported that the intensities and durations of the startle response decrease with the numbers and frequencies of exposures, suggesting no long-term adverse effects. The majority of the literature suggests that domestic animal species (cows, horses, chickens) and wildlife species exhibit adaptation, acclimation, and habituation after repeated exposure to jet aircraft noise.

Animal responses to aircraft noise appear to be somewhat dependent on, or influenced by, the size, shape, speed, proximity (vertical and horizontal), engine noise, color, and flight profile of planes. Helicopters also appear to induce greater intensities and durations of disturbance behavior as compared to fixed-wing aircraft. Some studies showed that animals that had been previously exposed to jet aircraft noise exhibited greater degrees of alarm and disturbance to other objects creating noise, such as boats, people, and objects blowing across the landscape. Other factors influencing response to jet aircraft noise may include wind direction, speed, and local air turbulence; landscape structures (i.e., amount and type of vegetative cover); and, in the case of bird species, whether the animals are in the incubation/nesting phase.

2.9 Property Values

Property within a noise zone (or Accident Potential Zone) may be affected by the availability of federally guaranteed loans. According to U.S. Department of Housing and Urban Development (HUD), Federal Housing Administration (FHA), and Veterans Administration (VA) guidance, sites are acceptable for program assistance, subsidy, or insurance for housing in noise zones of less than 65 dB DNL, and sites are conditionally acceptable with special approvals and noise attenuation in the 65 to 75 dB DNL noise zone and the greater than 75 dB DNL noise zone. HUD's position is that noise is not the only determining factor for site acceptability, and properties should not be rejected only because of airport influences if there is evidence of acceptability within the market and if use of the dwelling is expected to continue. Similar to the Navy's and USAF's Air Installation Compatible Use Zone Program, HUD, FHA, and VA

recommend sound attenuation for housing in the higher noise zones and written disclosures to all prospective buyers or lessees of property within a noise zone (or Accident Potential Zone).

Newman and Beattie (1985) reviewed the literature to assess the effect of aircraft noise on property values. One paper by Nelson (1978), reviewed by Newman and Beattie, suggested a 1.8 to 2.3 percent decrease in property value per decibel at three separate airports, while at another period of time, they found only a 0.8 percent devaluation per decibel change in DNL. However, Nelson also noted a decline in noise depreciation over time which he theorized could be due to either noise sensitive people being replaced by less sensitive people or the increase in commercial value of the property near airports; both ideas were supported by Crowley (1978). Ultimately, Newman and Beattie summarized that while an effect of noise was observed, noise is only one of the many factors that is part of a decision to move close to, or away from, an airport, but which is sometimes considered an advantage due to increased opportunities for employment or ready access to the airport itself. With all the issues associated with determining property values, their reviews found that decreases in property values usually range from 0.5 to 2 percent per decibel increase of cumulative noise exposure.

More recently Fidell *et al.* (1996) studied the influences of aircraft noise on actual sale prices of residential properties in the vicinity of two military facilities and found that equations developed for one area to predict residential sale prices in areas unaffected by aircraft noise worked equally well when applied to predicting sale prices of homes in areas with aircraft noise in excess of 65 dB DNL. Thus, the model worked equally well in predicting sale prices in areas with and without aircraft noise exposure. This indicates that aircraft noise had no meaningful effect on residential property values. In some cases, the average sale prices of noise exposed properties were somewhat higher than those elsewhere in the same area. In the vicinity of Davis-Monthan Air Force Base (AFB) in Tucson, Arizona, Fidell found the homes near the AFB were much older, smaller, and in poorer condition than homes elsewhere. These factors caused the equations developed for predicting sale prices in areas further away from the base to be inapplicable with those nearer the AFB. However, again Fidell found that, similar to other researchers, differences in sale prices between homes with and without aircraft noise were frequently due to factors other than noise itself.

2.9.1 Noise Effects on Structures

Normally, the most sensitive components of a structure to airborne noise are the windows and, infrequently, the plastered walls and ceilings. An evaluation of the peak sound pressures impinging on the structure is normally used to determine the possibility of damage. In general, with peak sound levels above 130 dB, there is the possibility of the excitation of structural component resonances. While certain frequencies (such as 30 Hz for window breakage) may be of more concern than other frequencies, conservatively, only sounds lasting more than one

second above a sound level of 130 dB are potentially damaging to structural components (CHABA 1977).

Noise-induced structural vibration may also cause annoyance to dwelling occupants because of induced secondary vibrations, or rattling of objects within the dwelling such as hanging pictures, dishes, plaques, and bric-a-brac. Window panes may also vibrate noticeably when exposed to high levels of airborne noise. In general, such noise- induced vibrations occur at peak sound levels of 110 dB or greater. Thus, assessments of noise exposure levels for compatible land use should also be protective of noise-induced secondary vibrations.

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Appendix B2

Noise Modeling Input Data, Fresno-Yosemite IAP

FRESNO ARRIVALS AND DEPARTURES BY RUNWAY AND PROFILE

BASED F-16C AIRCRAFT WITH F100-PW220 ENGINE

Arrivals

Profile	*Track*	*Day*	*Evening*	*Night*	*Total*	*Annual Operations*
F1611LA1OH	11LA1 - ARRIVAL RUNWAY 11L TRACK 1 OVERHEAD	0.754	0.057	0.000	0.811	296
F1611LA2	11LA2 - ARRIVAL RUNWAY 11L TRACK 2 STRAIGHT IN	0.251	0.140	0.008	0.399	146
F1611LA4BF	11LA4 - ARRIVAL RUNWAY 11L TRACK 4 SFO	0.039	0.000	0.000	0.039	14
F1611LA4HF	11LA4 - ARRIVAL RUNWAY 11L TRACK 4 SFO	0.041	0.000	0.000	0.041	15
F1611LA4LF	11LA4 - ARRIVAL RUNWAY 11L TRACK 4 SFO	0.039	0.000	0.000	0.039	14
F1629RA1BF	29RA1 - ARRIVAL RUNWAY 29RL TRACK 1 SFO	0.116	0.000	0.000	0.116	42
F1629RA1HF	29RA1 - ARRIVAL RUNWAY 29RL TRACK 1 SFO	0.119	0.000	0.000	0.119	43
F1629RA1LF	29RA1 - ARRIVAL RUNWAY 29RL TRACK 1 SFO	0.116	0.000	0.000	0.116	42
F1629RA2	29RA2 - ARRIVAL RUNWAY 29R TRACK 2 STRAIGHT IN	0.810	0.049	0.034	0.893	326
F1629RA5OH	29RA5 - ARRIVAL RUNWAY 29R TRACK 5 OVERHEAD	3.241	0.197	0.014	3.452	1,260
	Total:	5.526	0.443	0.056	6.025	2,198
	Runway 11L:	20.34%	44.47%	14.29%	22.06%	
	Runway 29R:	79.66%	55.53%	85.71%	77.94%	
	Total:	91.72%	7.35%	0.93%		

Closed Patterns

Profile	*Track*	*Day*	*Evening*	*Night*	*Total*	*Annual Operations*
F1611lCP1	11LCP1 - LOW APPROACH RUNWAY 11L TRACK 1	0.193	0.000	0.000	0.193	70
F1629RCP1	29RCP1 - LOW APPROACH RUNWAY 29R TRACK 1	0.579	0.000	0.000	0.579	211
	Total:	0.772	0.000	0.000	0.772	281
	Runway 11L:	25.00%	0.00%	0.00%	25.00%	
	Runway 29R:	75.00%	0.00%	0.00%	75.00%	
	Total:	100.00%	0.00%	0.00%		

Departures

Profile	*Track*	*Day*	*Evening*	*Night*	*Total*	*Annual Operations*
F1611LD6	11LD6 - DEPARTURE RUNWAY 11L TRACK D6 (ISGOF)	1.120	0.140	0.000	1.260	460
F1611LD8	11LD8 - DEPARTURE RUNWAY 11L TRACK D8 (r230)	0.221	0.000	0.000	0.221	81
F1629LD1	29LD1 - DEPARTURE RUNWAY 29L TRACK D1 (IMOJU)	0.050	0.000	0.000	0.050	18
F1629LD2	29LD2 - DEPARTURE RUNWAY 29L TRACK D2 (r230)	0.020	0.000	0.000	0.020	7
F1629RD8	29RD8 - DEPARTURE RUNWAY 29R TRACK D8 (IMOJU)	3.465	0.250	0.000	3.715	1,356
F1629RD9	29RD9 - DEPARTURE RUNWAY 29R TRACK D9 (r230)	0.650	0.109	0.000	0.759	277
	Total:	5.526	0.499	0.000	6.025	2,198
	Runway 11L:	24.27%	28.06%	0.00%	24.58%	
	Runway 29L:	1.27%	0.00%	0.00%	1.16%	
	Runway 29R:	74.47%	71.94%	0.00%	74.26%	
	Total:	91.72%	8.28%	0.00%		

PROPOSED BASED F-15E AIRCRAFT WITH F100-PW-220 ENGINE

Arrivals

Profile	*Track*	*Day*	*Evening*	*Night*	*Total*	*Annual Operations*
F1511LA1OH	11LA1 - ARRIVAL RUNWAY 11L TRACK 1 OVERHEAD	0.843	0.057	0.000	0.900	327
F1511LA2	11LA2 - ARRIVAL RUNWAY 11L TRACK 2 STRAIGHT IN	0.281	0.140	0.008	0.429	157
F1529RA2	29RA2 - ARRIVAL RUNWAY 29R TRACK 2 STRAIGHT IN	0.881	0.049	0.034	0.964	352
F1529RA5OH	29RA5 - ARRIVAL RUNWAY 29R TRACK 5 OVERHEAD	3.521	0.197	0.014	3.732	1,362
	Total:	5.526	0.443	0.056	6.025	2,198
	Runway 11L:	20.34%	44.45%	14.29%	22.06%	
	Runway 29R:	79.66%	55.55%	85.71%	77.94%	
	Total:	91.72%	7.36%	0.93%		

Closed Patterns

Profile	*Track*	*Day*	*Evening*	*Night*	*Total*	*Annual Operations*
F1511lCP1	11LCP1 - LOW APPROACH RUNWAY 11L TRACK 1	0.193	0.000	0.000	0.193	70
F1529RCP1	29RCP1 - LOW APPROACH RUNWAY 29R TRACK 1	0.579	0.000	0.000	0.579	211
	Total:	0.772	0.000	0.000	0.772	282
	Runway 11L:	25.00%	0.00%	0.00%	25.00%	
	Runway 29R:	75.00%	0.00%	0.00%	75.00%	
	Total:	100.00%	0.00%	0.00%		

Departures

Profile	*Track*	*Day*	*Evening*	*Night*	*Total*	*Annual Operations*
F1511LD6	11LD6 - DEPARTURE RUNWAY 11L TRACK D6 (ISGOF)	1.120	0.140	0.000	1.260	460
F1511LD8	11LD8 - DEPARTURE RUNWAY 11L TRACK D8 (r230)	0.221	0.000	0.000	0.221	81
F1529LD1	29LD1 - DEPARTURE RUNWAY 29L TRACK D1 (IMOJU)	0.050	0.000	0.000	0.050	18
F1529LD2	29LD2 - DEPARTURE RUNWAY 29L TRACK D2 (r230)	0.020	0.000	0.000	0.020	7
F1529RD8	29RD8 - DEPARTURE RUNWAY 29R TRACK D8 (IMOJU)	3.465	0.250	0.000	3.715	1,255
F1529RD9	29RD9 - DEPARTURE RUNWAY 29R TRACK D9 (r230)	0.650	0.109	0.000	0.759	277
	Total:	5.526	0.499	0.000	6.025	2,198
	Runway 11L:	24.27%	28.06%	0.00%	24.58%	
	Runway 29L:	1.27%	0.00%	0.00%	1.16%	
	Runway 29R:	74.47%	71.94%	0.00%	74.26%	
	Total:	91.72%	8.28%	0.00%		

ALTERNATIVE 2. 24 BASED F-15E AIRCRAFT WITH F100-PW-220 ENGINE

Arrivals

Profile	*Track*	*Day*	*Evening*	*Night*	*Total*	*Annual Operations*
F1511LA1OH	11LA1 - ARRIVAL RUNWAY 11L TRACK 1 OVERHEAD	1.149	0.088	0.000	1.237	452
F1511LA2	11LA2 - ARRIVAL RUNWAY 11L TRACK 2 STRAIGHT IN	0.431	0.000	0.000	0.431	157
F1529RA2	29RA2 - ARRIVAL RUNWAY 29R TRACK 2 STRAIGHT IN	2.156	0.200	0.071	2.427	886
F1529RA5OH	29RA5 - ARRIVAL RUNWAY 29R TRACK 5 OVERHEAD	3.448	0.287	0.000	3.735	1,363
	Total:	7.184	0.575	0.071	7.830	2,858
	Runway 11L:	22.00%	0.00%	22.00%	22.00%	
	Runway 29R:	78.00%	0.00%	78.00%	78.00%	
	Total:	97.00%	0.00%	3.00%		

Closed Patterns

Profile	*Track*	*Day*	*Evening*	*Night*	*Total*	*Annual Operations*
F15CA	32C1 - STANDARD RADAR	0.236	0.007	0.000	0.243	86
F15CB	32C5 - INSIDE DOWNWIND	0.942	0.028	0.000	0.970	354
	Total:	1.178	0.035	0.000	1.213	440
	Runway 11L:	25.00%	0.00%	0.00%	25.00%	
	Runway 29R:	75.00%	0.00%	0.00%	75.00%	
	Total:	100.00%	0.00%	0.00%		

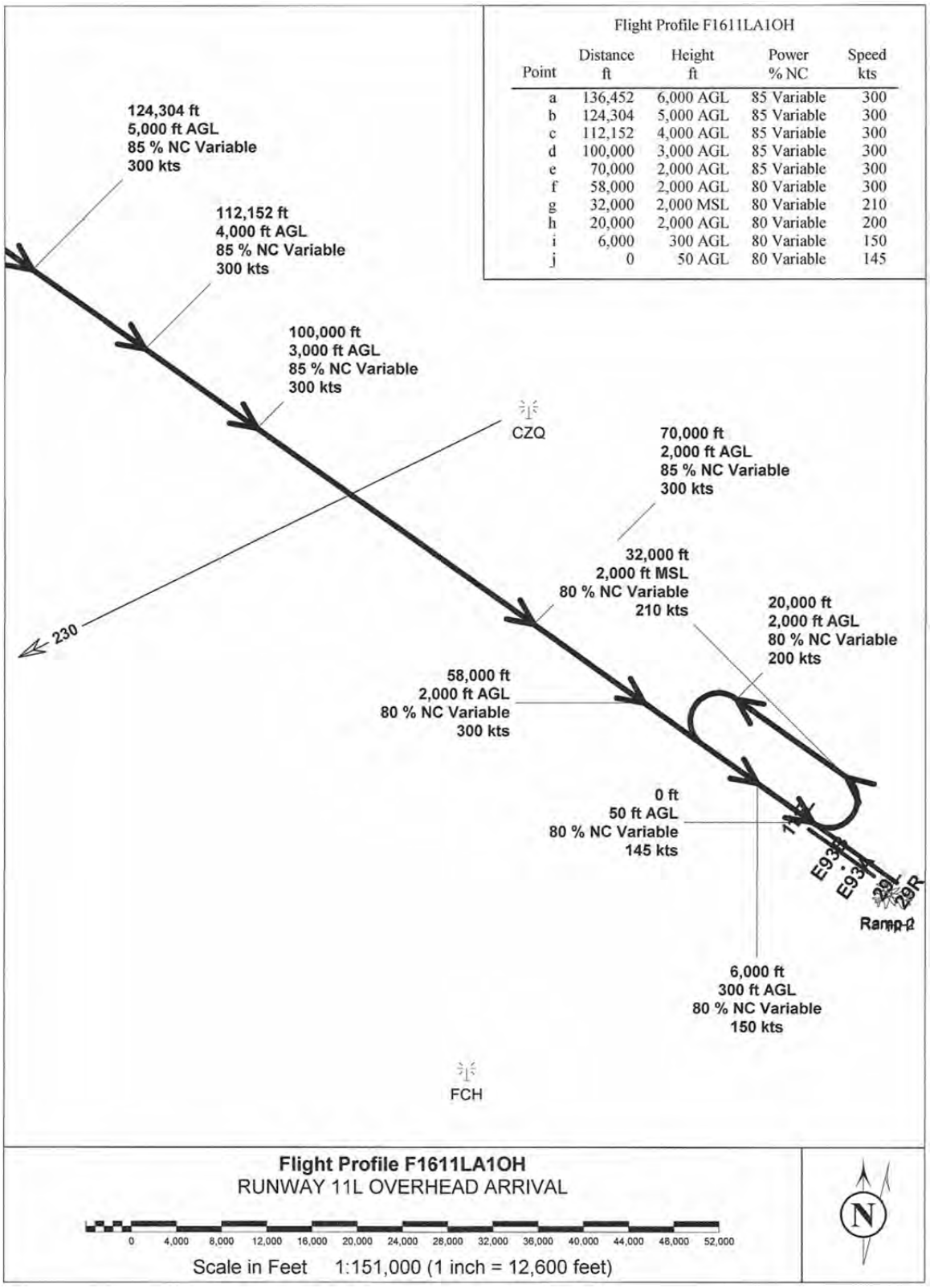
Departures

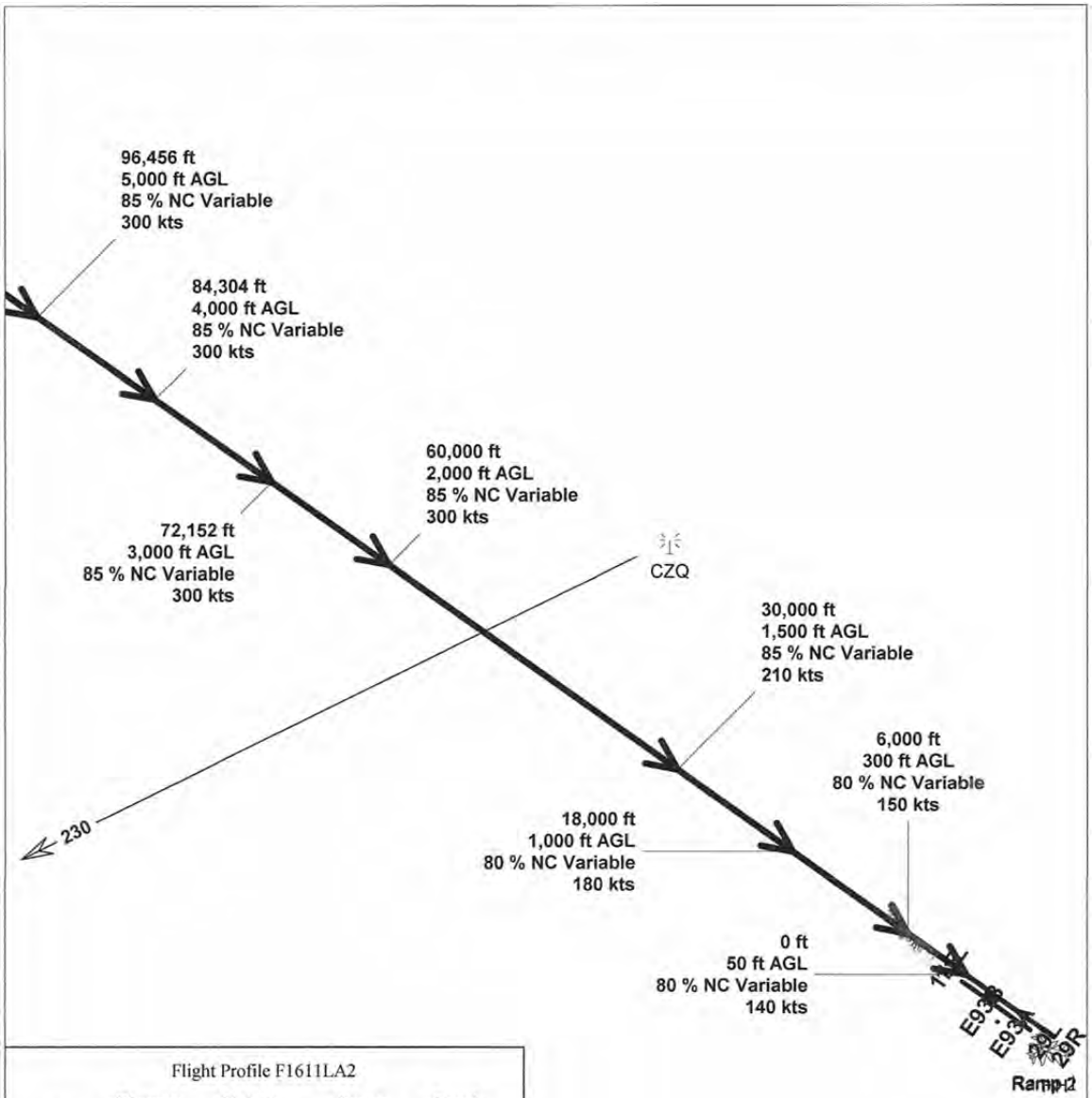
Profile	*Track*	*Day*	*Evening*	*Night*	*Total*	*Annual Operations*
F1511LD6	11LD6 - DEPARTURE RUNWAY 11L TRACK D6 (ISGOF)	1.437	0.116	0.000	1.553	567
F1511LD8	11LD8 - DEPARTURE RUNWAY 11L TRACK D8 (r230)	0.360	0.000	0.000	0.360	131
F1529LD1	29LD1 - DEPARTURE RUNWAY 29L TRACK D1 (IMOJU)	0.140	0.000	0.000	0.140	51
F1529LD2	29LD2 - DEPARTURE RUNWAY 29L TRACK D2 (r230)	0.074	0.000	0.000	0.074	27
F1529RD8	29RD8 - DEPARTURE RUNWAY 29R TRACK D8 (IMOJU)	4.167	0.487	0.000	4.654	1,699
F1529RD9	29RD9 - DEPARTURE RUNWAY 29R TRACK D9 (r230)	1.006	0.046	0.000	1.052	384
	Total:	7.184	0.649	0.000	7.833	2,859
	Runway 11L:	25.00%	0.00%	0.00%	25.00%	
	Runway 29L:	1.88%	0.00%	0.00%	1.88%	
	Runway 29R:	73.12%	0.00%	0.00%	73.12%	
	Total:	100.00%	0.00%	0.00%		

Individual Flight Profiles For Based F-16 Aircraft at Fresno

Flight Profile F1611LA1OH

Point	Distance ft	Height ft	Power % NC	Speed kts
a	136,452	6,000 AGL	85 Variable	300
b	124,304	5,000 AGL	85 Variable	300
c	112,152	4,000 AGL	85 Variable	300
d	100,000	3,000 AGL	85 Variable	300
e	70,000	2,000 AGL	85 Variable	300
f	58,000	2,000 AGL	80 Variable	300
g	32,000	2,000 MSL	80 Variable	210
h	20,000	2,000 AGL	80 Variable	200
i	6,000	300 AGL	80 Variable	150
j	0	50 AGL	80 Variable	145





Flight Profile F1611LA2

Point	Distance ft	Height ft	Power % NC	Speed kts
a	108,608	6,000 AGL	85 Variable	300
b	96,456	5,000 AGL	85 Variable	300
c	84,304	4,000 AGL	85 Variable	300
d	72,152	3,000 AGL	85 Variable	300
e	60,000	2,000 AGL	85 Variable	300
f	30,000	1,500 AGL	85 Variable	210
g	18,000	1,000 AGL	80 Variable	180
h	6,000	300 AGL	80 Variable	150
i	0	50 AGL	80 Variable	140

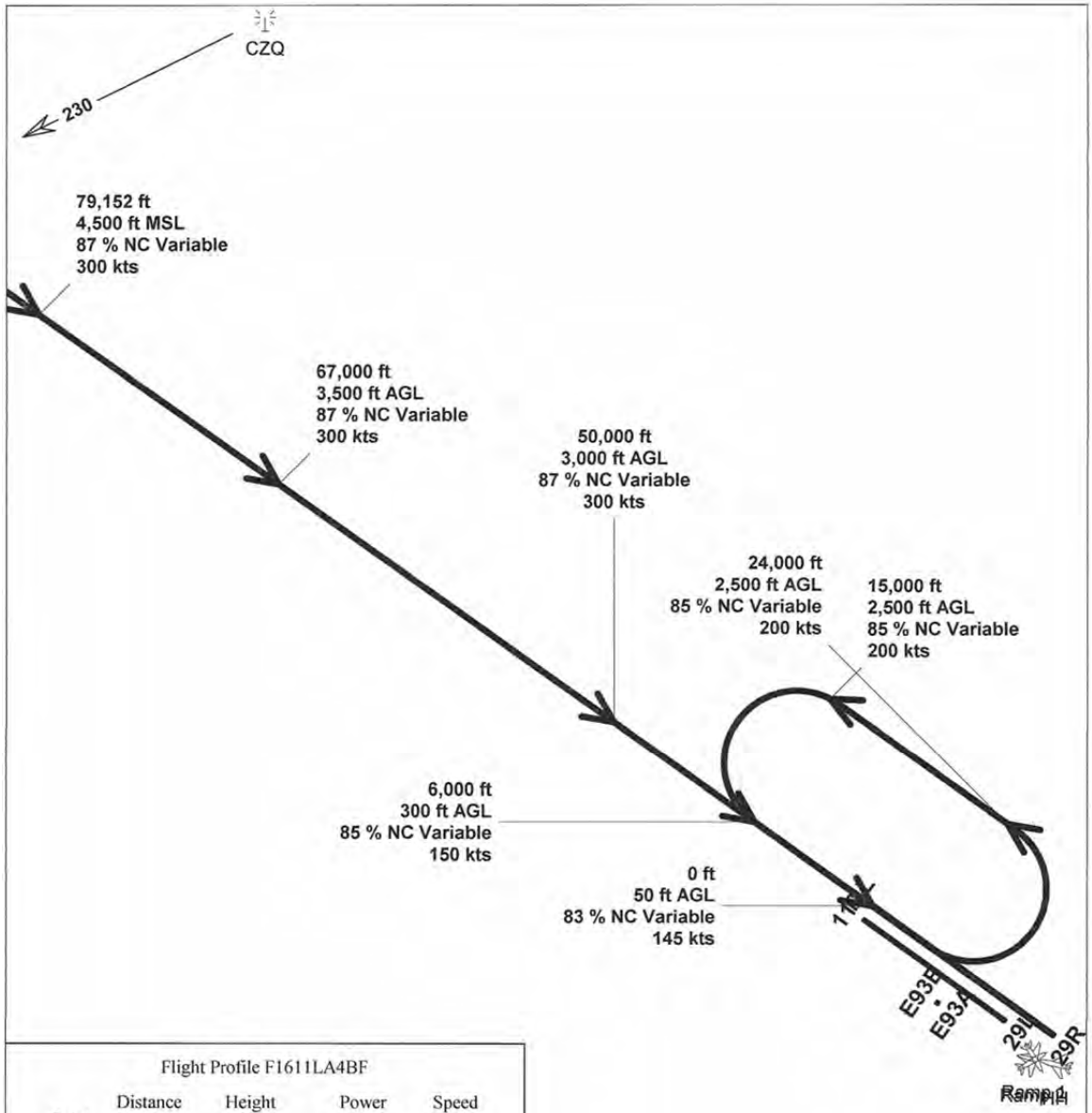
FCH

Flight Profile F1611LA2
RUNWAY 11L STRAIGHT IN ARRIVAL

0 10,000 20,000 30,000 40,000 50,000

Scale in Feet 1:170,000 (1 inch = 14,200 feet)

N



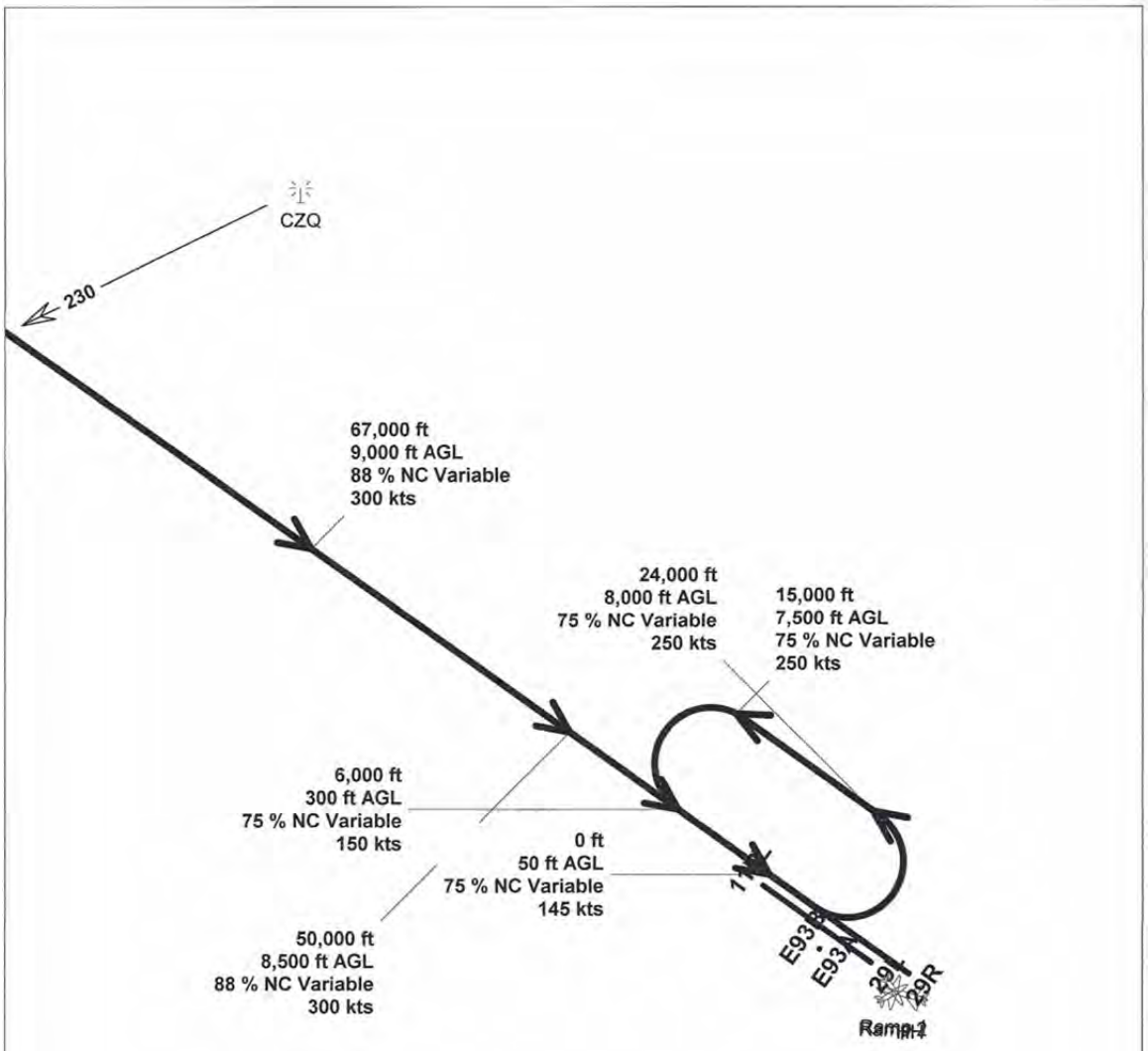
Flight Profile F1611LA4BF

Point	Distance ft	Height ft	Power % NC	Speed kts
a	103,456	6,500 AGL	87 Variable	300
b	91,304	5,500 AGL	87 Variable	300
c	79,152	4,500 MSL	87 Variable	300
d	67,000	3,500 AGL	87 Variable	300
e	50,000	3,000 AGL	87 Variable	300
f	24,000	2,500 AGL	85 Variable	200
g	15,000	2,500 AGL	85 Variable	200
h	6,000	300 AGL	85 Variable	150
i	0	50 AGL	83 Variable	145

Flight Profile F1611LA4BF
RUNWAY 11L SFO BASE KEY ARRIVAL

0 4,000 8,000 12,000 16,000 20,000 24,000

Scale in Feet 1:82,700 (1 inch = 6,900 feet)



Flight Profile F1611LA4HF

Point	Distance ft	Height ft	Power % NC	Speed kts
a	67,000	9,000 AGL	88 Variable	300
b	50,000	8,500 AGL	88 Variable	300
c	24,000	8,000 AGL	75 Variable	250
d	15,000	7,500 AGL	75 Variable	250
e	6,000	300 AGL	75 Variable	150
f	0	50 AGL	75 Variable	145

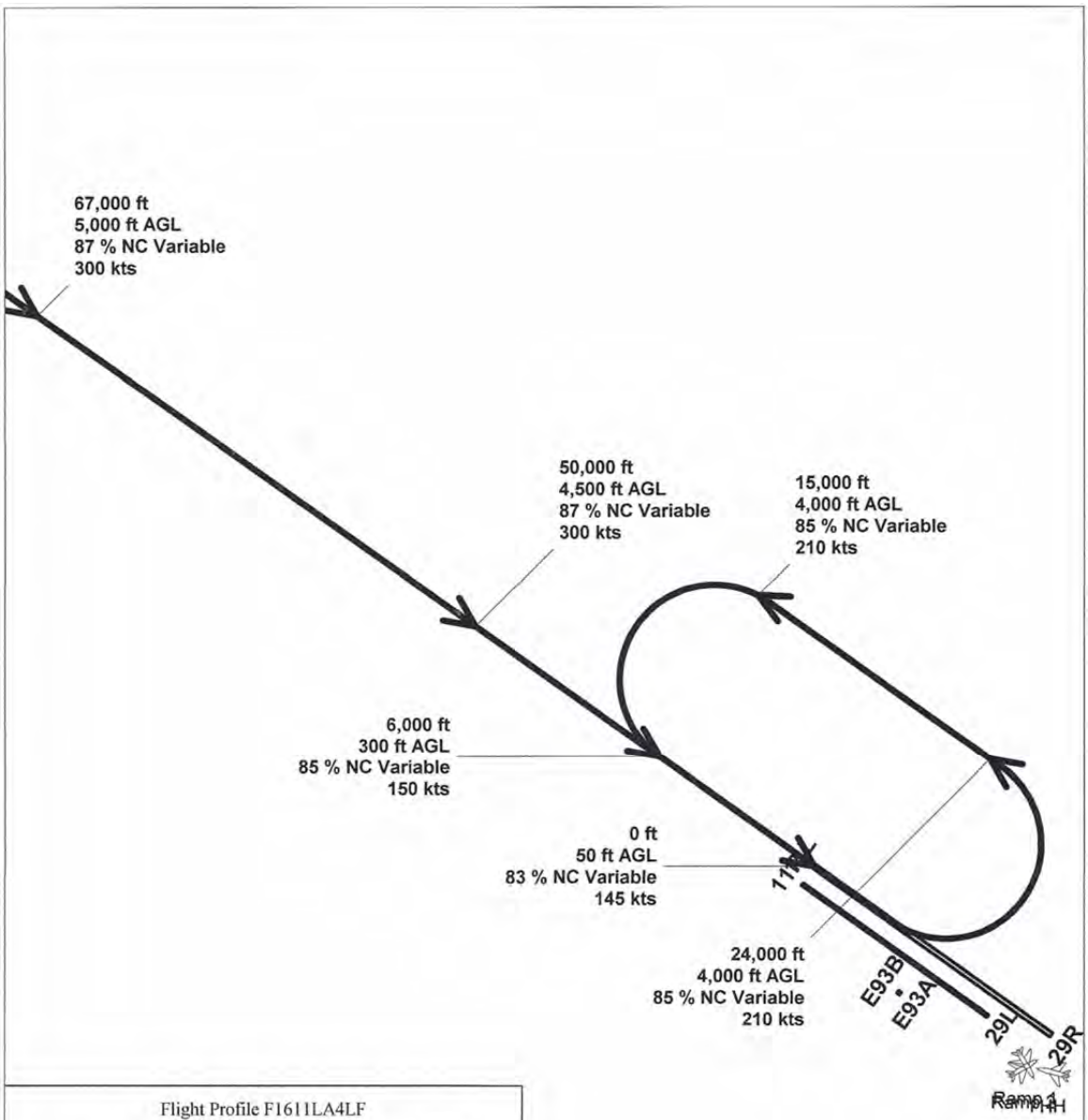
FCH

Flight Profile F1611LA4HF
RUNWAY 11L SFO HIGH KEY ARRIVAL

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000 32,000 36,000

Scale in Feet 1:113,000 (1 inch = 9,410 feet)

N



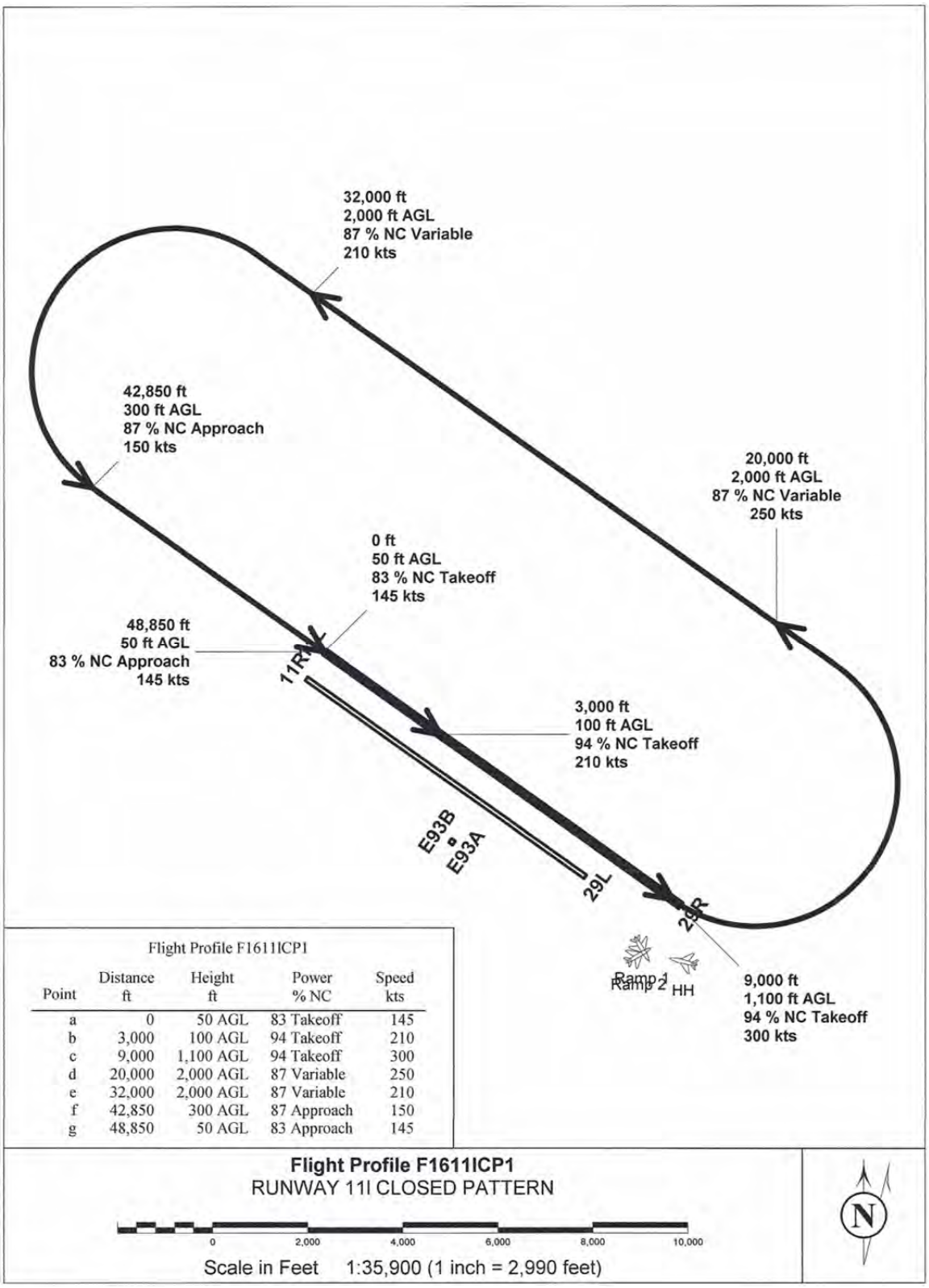
Flight Profile F1611LA4LF

Point	Distance ft	Height ft	Power % NC	Speed kts
a	79,152	6,000 AGL	87 Variable	300
b	67,000	5,000 AGL	87 Variable	300
c	50,000	4,500 AGL	87 Variable	300
d	24,000	4,000 AGL	85 Variable	210
e	15,000	4,000 AGL	85 Variable	210
f	6,000	300 AGL	85 Variable	150
g	0	50 AGL	83 Variable	145

Flight Profile F1611LA4LF
RUNWAY 11L SFO LOW KEY ARRIVAL

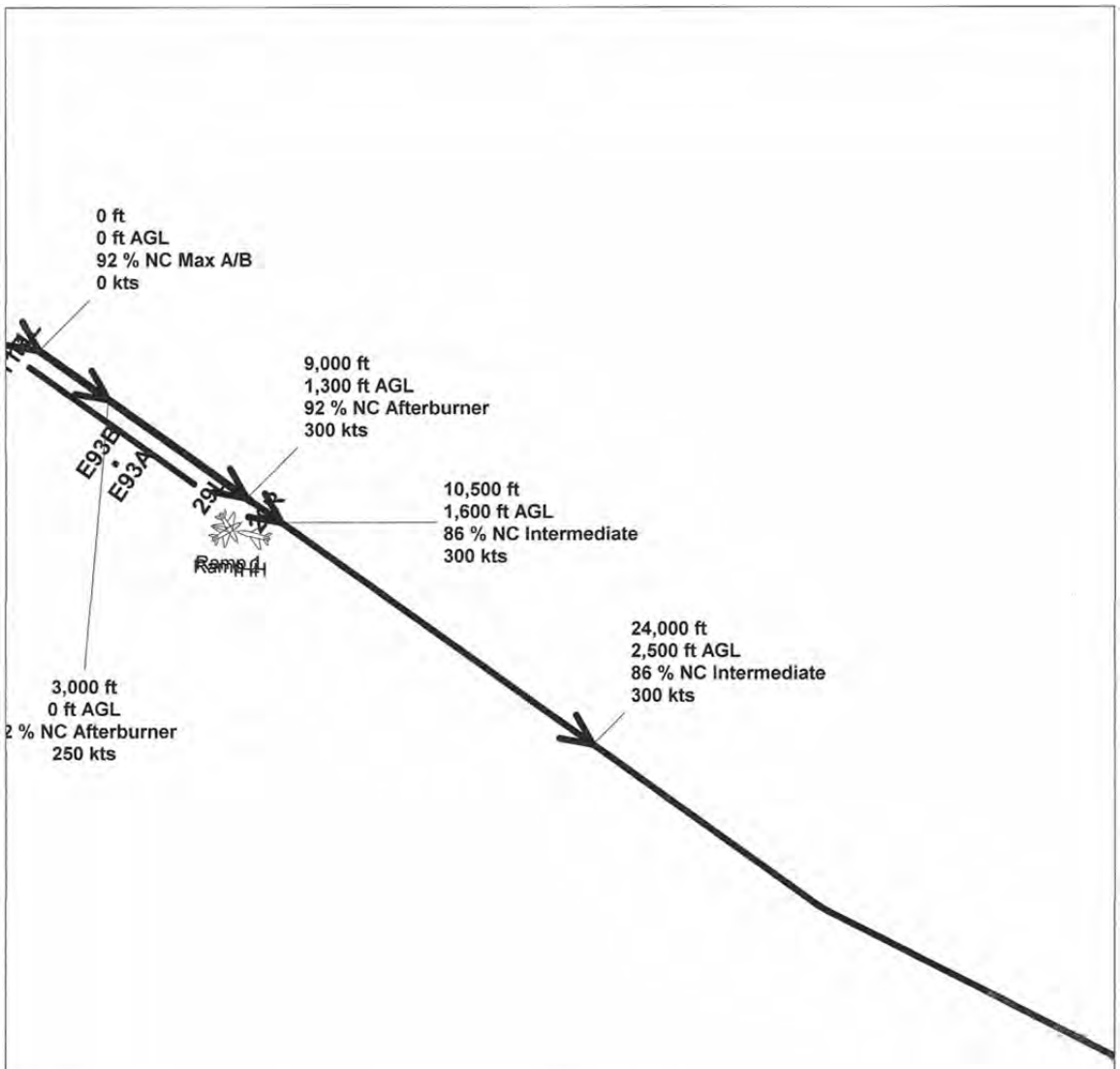
0 4,000 8,000 12,000 16,000 20,000

Scale in Feet 1:63,200 (1 inch = 5,270 feet)



Flight Profile F1611ICP1

Point	Distance ft	Height ft	Power % NC	Speed kts
a	0	50 AGL	83 Takeoff	145
b	3,000	100 AGL	94 Takeoff	210
c	9,000	1,100 AGL	94 Takeoff	300
d	20,000	2,000 AGL	87 Variable	250
e	32,000	2,000 AGL	87 Variable	210
f	42,850	300 AGL	87 Approach	150
g	48,850	50 AGL	83 Approach	145



Flight Profile F1611LD6

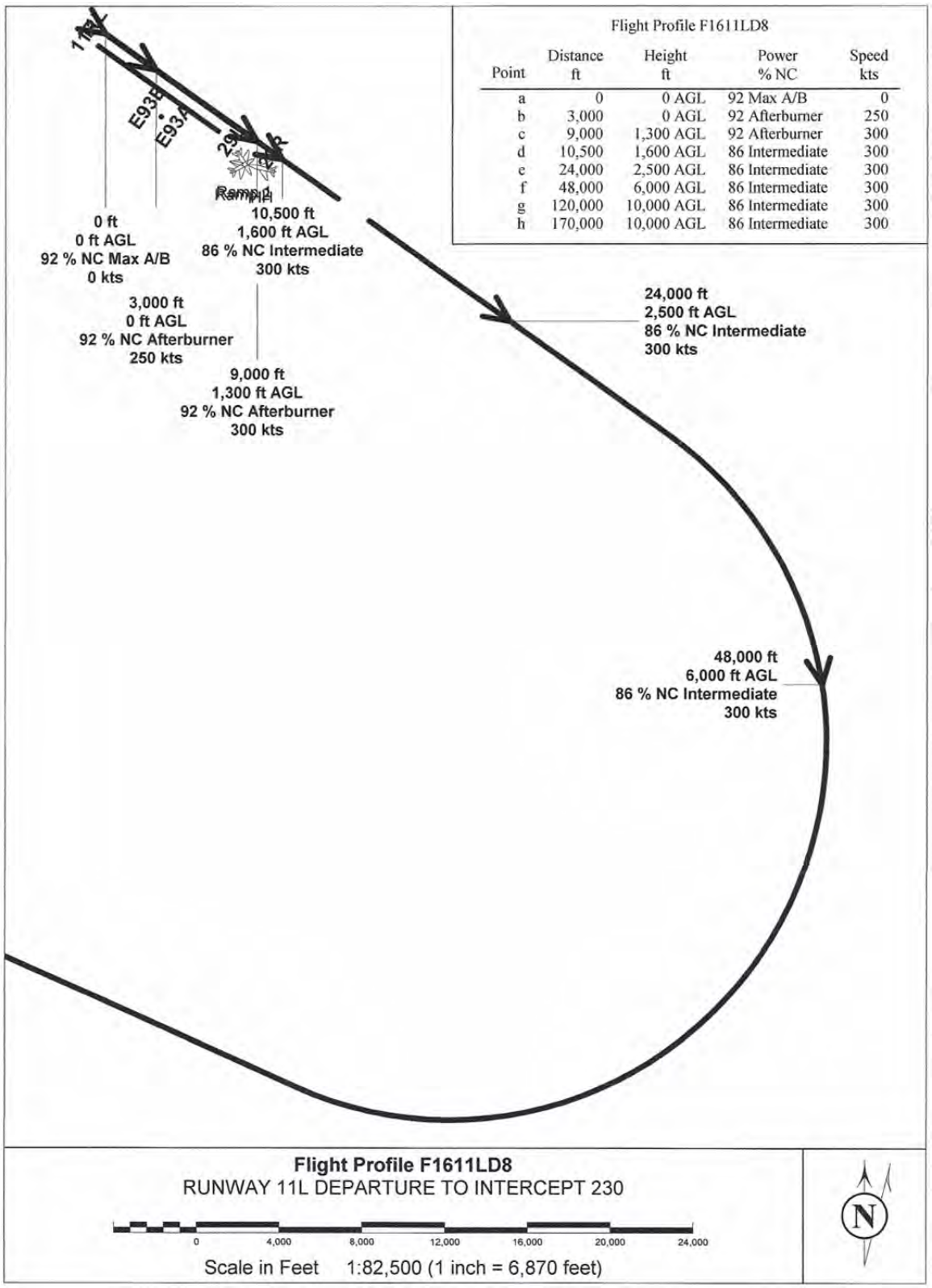
Point	Distance ft	Height ft	Power % NC	Speed kts
a	0	0 AGL	92 Max A/B	0
b	3,000	0 AGL	92 Afterburner	250
c	9,000	1,300 AGL	92 Afterburner	300
d	10,500	1,600 AGL	86 Intermediate	300
e	24,000	2,500 AGL	86 Intermediate	300
f	48,000	6,000 AGL	86 Intermediate	300
g	119,000	10,000 AGL	86 Intermediate	300

Flight Profile F1611LD6
RUNWAY 11L DEPARTURE TO 120

0 4,000 8,000 12,000 16,000 20,000

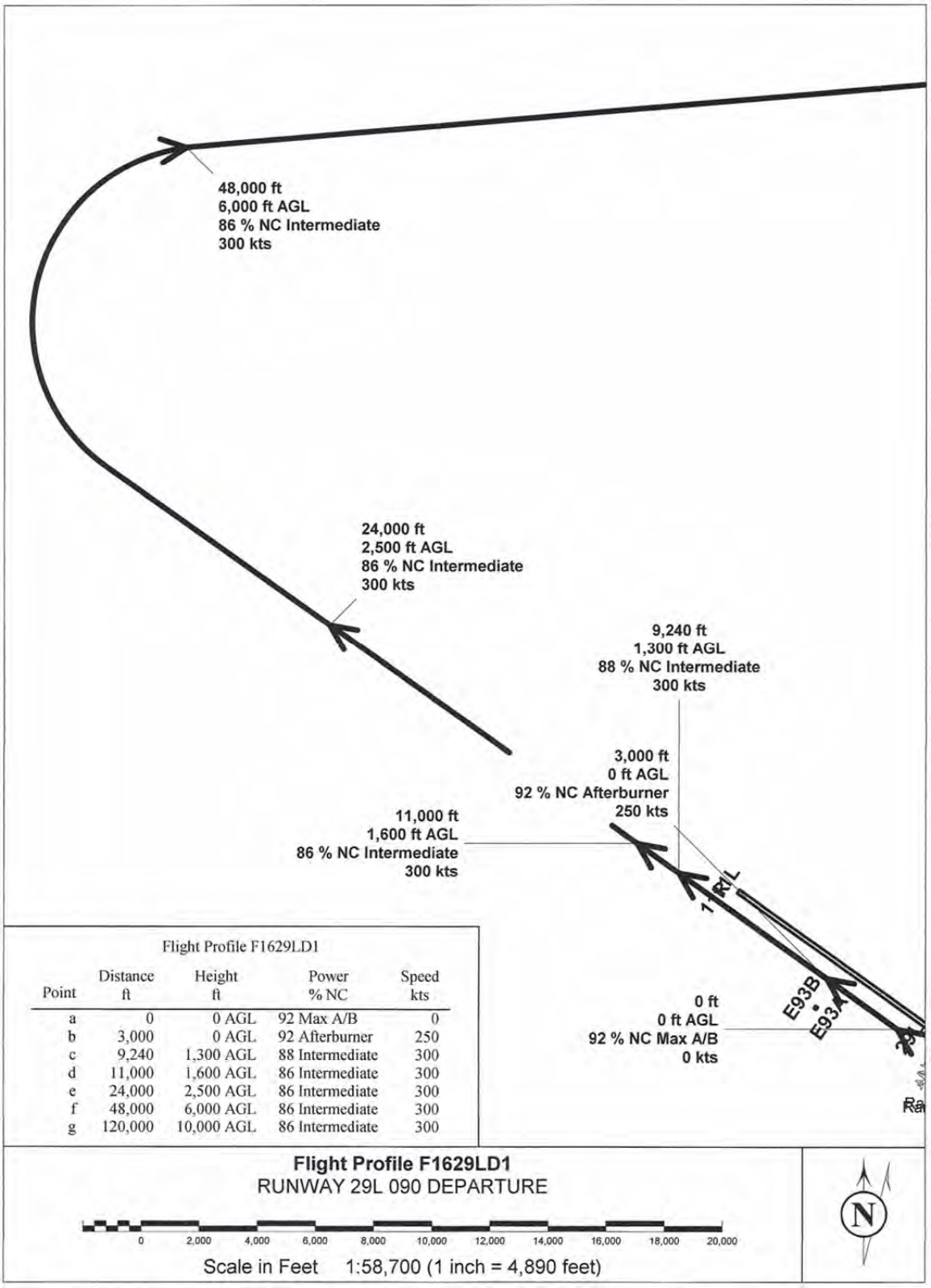
Scale in Feet 1:72,500 (1 inch = 6,040 feet)

N



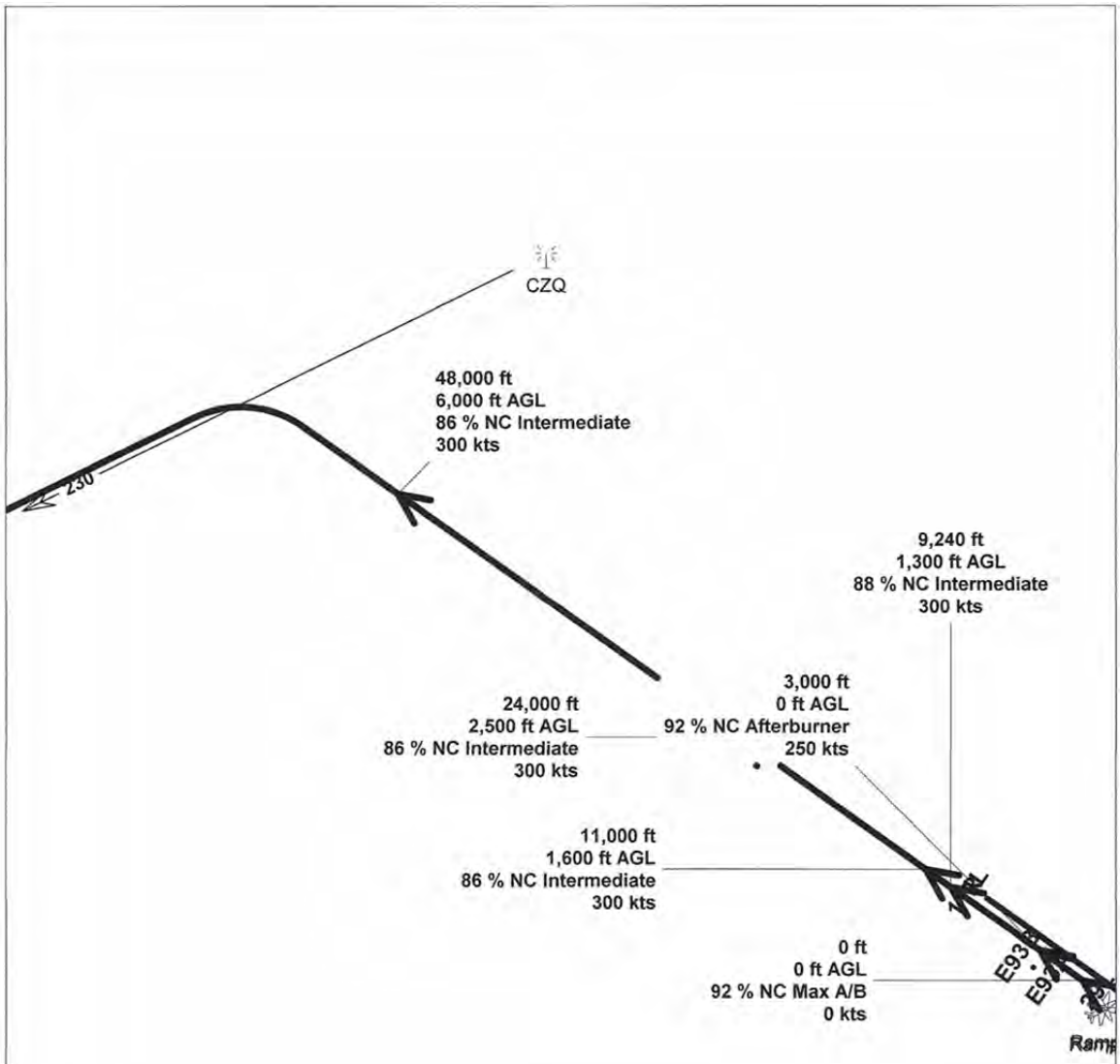
Flight Profile F1611LD8

Point	Distance ft	Height ft	Power % NC	Speed kts
a	0	0 AGL	92 Max A/B	0
b	3,000	0 AGL	92 Afterburner	250
c	9,000	1,300 AGL	92 Afterburner	300
d	10,500	1,600 AGL	86 Intermediate	300
e	24,000	2,500 AGL	86 Intermediate	300
f	48,000	6,000 AGL	86 Intermediate	300
g	120,000	10,000 AGL	86 Intermediate	300
h	170,000	10,000 AGL	86 Intermediate	300



Flight Profile F1629LD1

Point	Distance ft	Height ft	Power % NC	Speed kts
a	0	0 AGL	92 Max A/B	0
b	3,000	0 AGL	92 Afterburner	250
c	9,240	1,300 AGL	88 Intermediate	300
d	11,000	1,600 AGL	86 Intermediate	300
e	24,000	2,500 AGL	86 Intermediate	300
f	48,000	6,000 AGL	86 Intermediate	300
g	120,000	10,000 AGL	86 Intermediate	300



Flight Profile F1629LD2

Point	Distance ft	Height ft	Power % NC	Speed kts
a	0	0 AGL	92 Max A/B	0
b	3,000	0 AGL	92 Afterburner	250
c	9,240	1,300 AGL	88 Intermediate	300
d	11,000	1,600 AGL	86 Intermediate	300
e	24,000	2,500 AGL	86 Intermediate	300
f	48,000	6,000 AGL	86 Intermediate	300
g	120,000	10,000 AGL	86 Intermediate	300

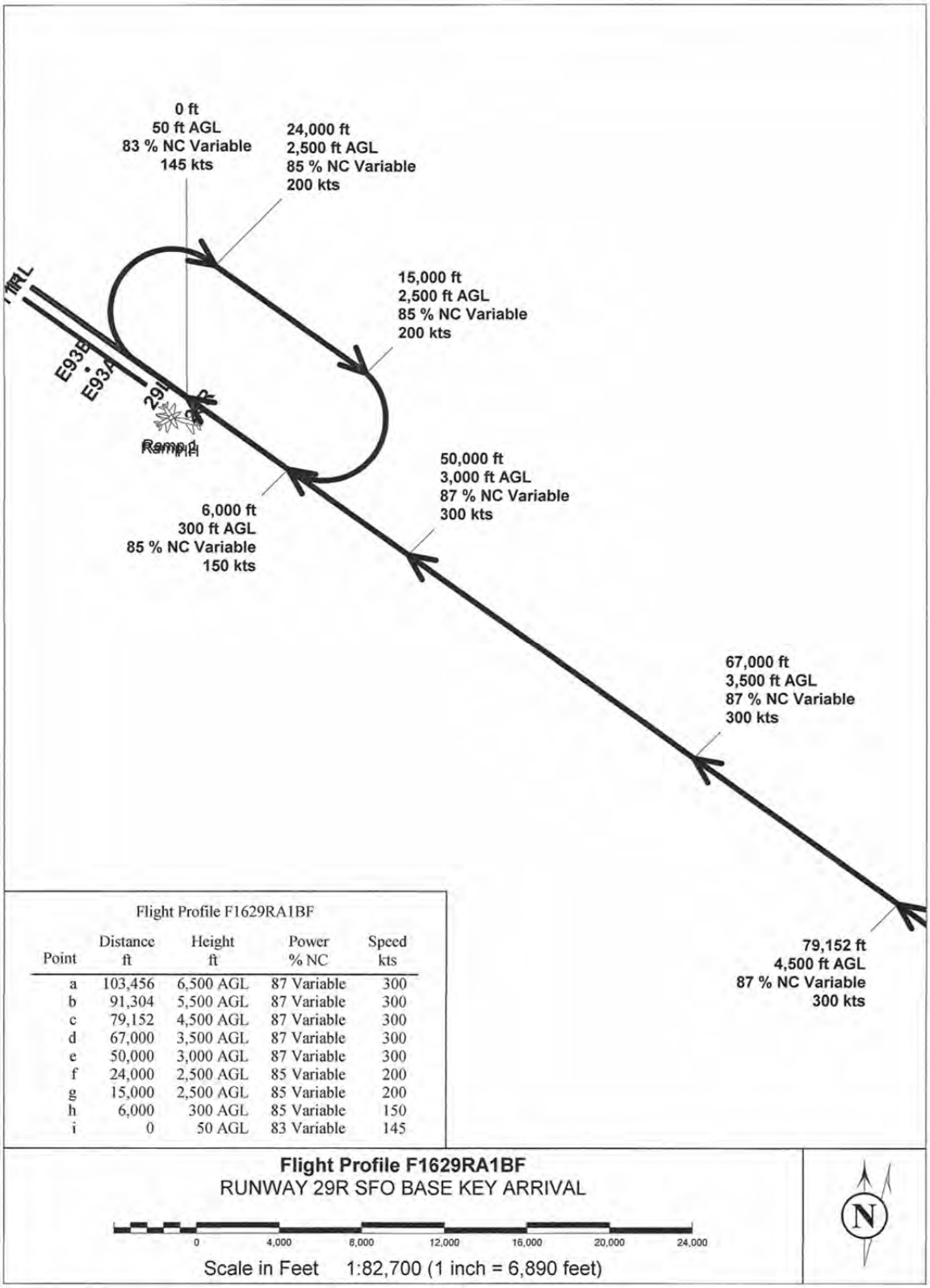
FCH

Flight Profile F1629LD2
RUNWAY 29L 230 DEPARTURE

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000 32,000 36,000 40,000

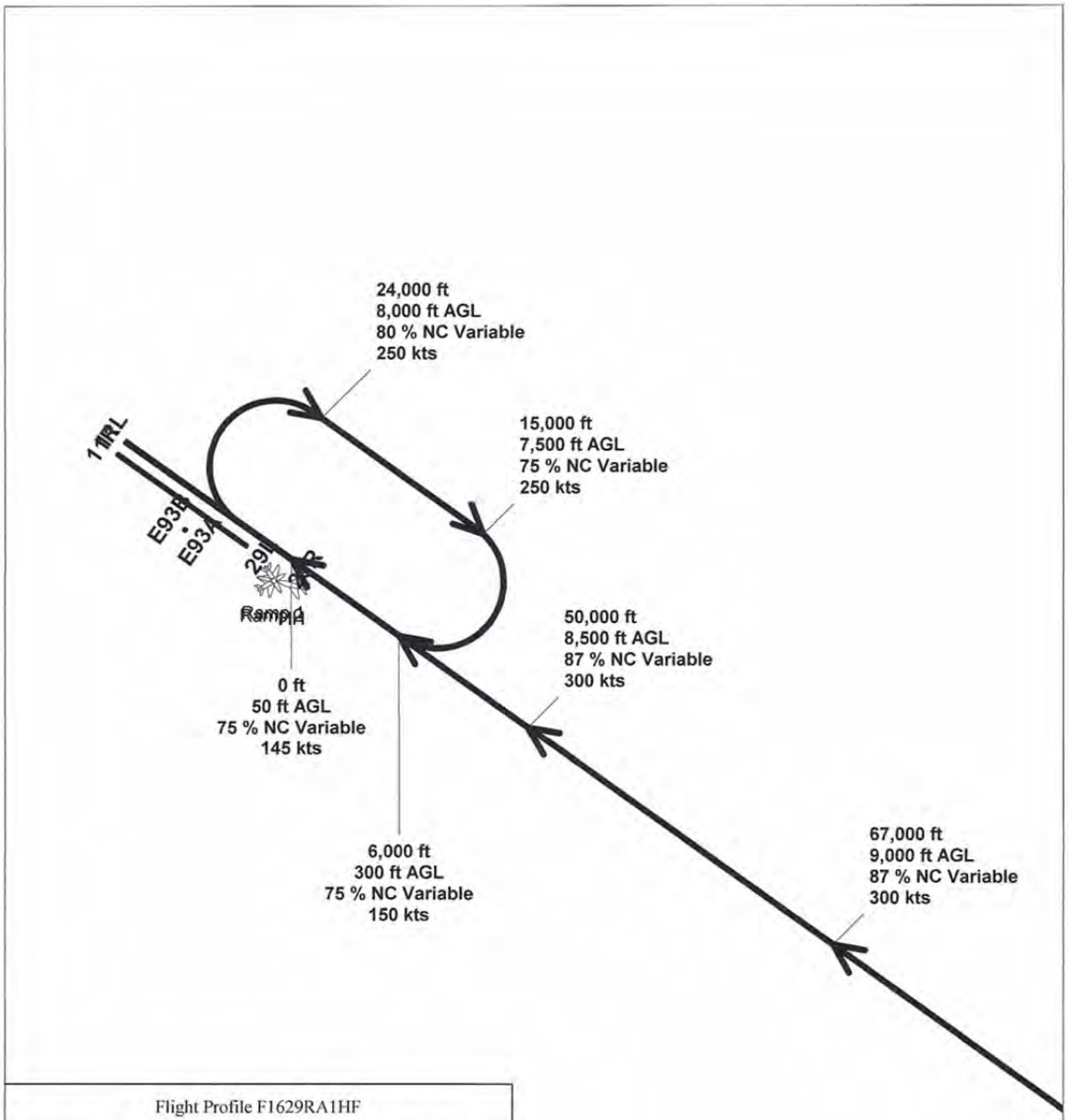
Scale in Feet 1:117,000 (1 inch = 9,790 feet)

N



Flight Profile F1629RA1BF

Point	Distance ft	Height ft	Power % NC	Speed kts
a	103,456	6,500 AGL	87 Variable	300
b	91,304	5,500 AGL	87 Variable	300
c	79,152	4,500 AGL	87 Variable	300
d	67,000	3,500 AGL	87 Variable	300
e	50,000	3,000 AGL	87 Variable	300
f	24,000	2,500 AGL	85 Variable	200
g	15,000	2,500 AGL	85 Variable	200
h	6,000	300 AGL	85 Variable	150
i	0	50 AGL	83 Variable	145



Flight Profile F1629RA1HF

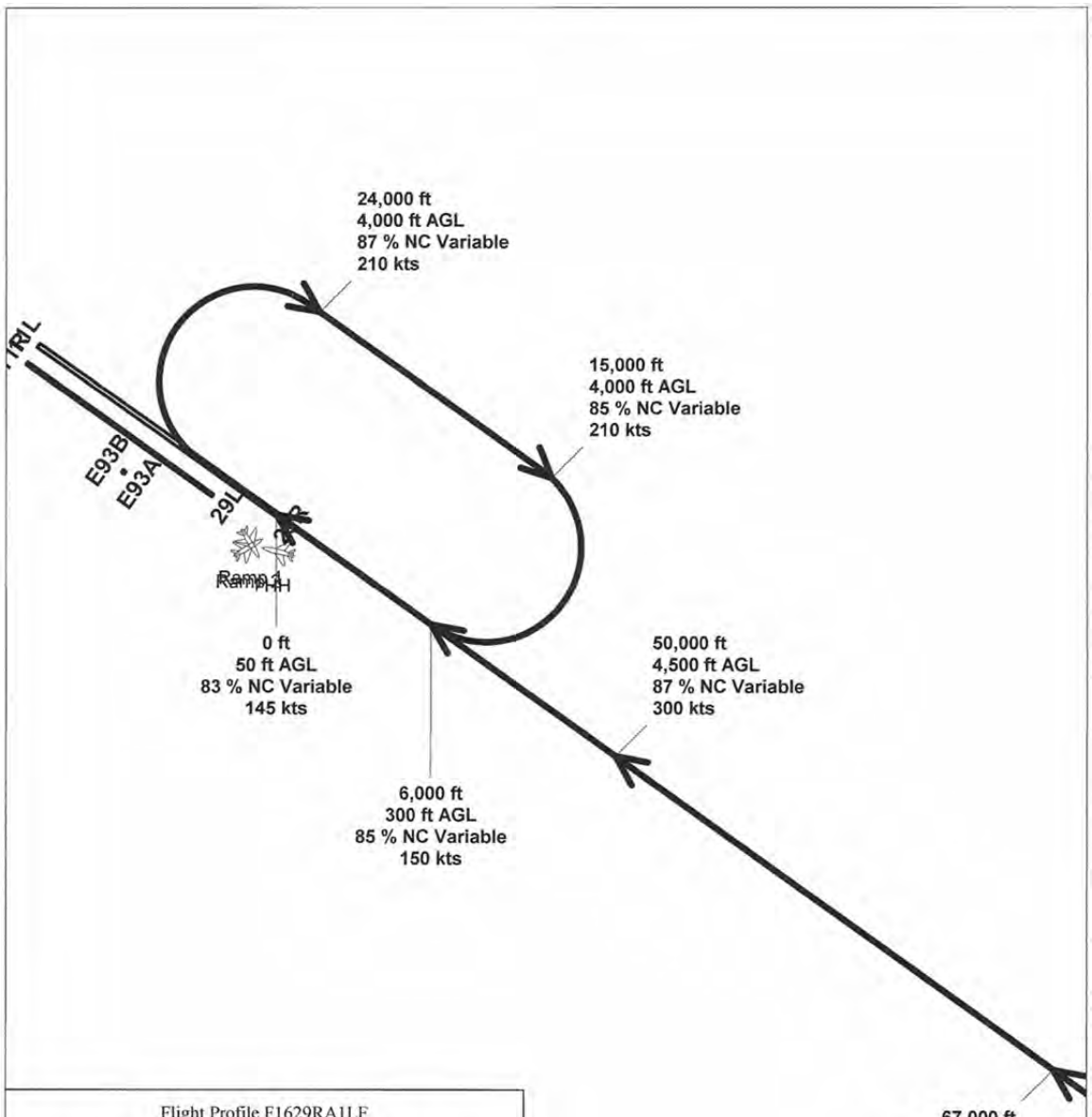
Point	Distance ft	Height ft	Power % NC	Speed kts
a	67,000	9,000 AGL	87 Variable	300
b	50,000	8,500 AGL	87 Variable	300
c	24,000	8,000 AGL	80 Variable	250
d	15,000	7,500 AGL	75 Variable	250
e	6,000	300 AGL	75 Variable	150
f	0	50 AGL	75 Variable	145

Flight Profile F1629RA1HF
RUNWAY 29R SFO HIGH KEY ARRIVAL

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000

Scale in Feet 1:88,700 (1 inch = 7,390 feet)

N



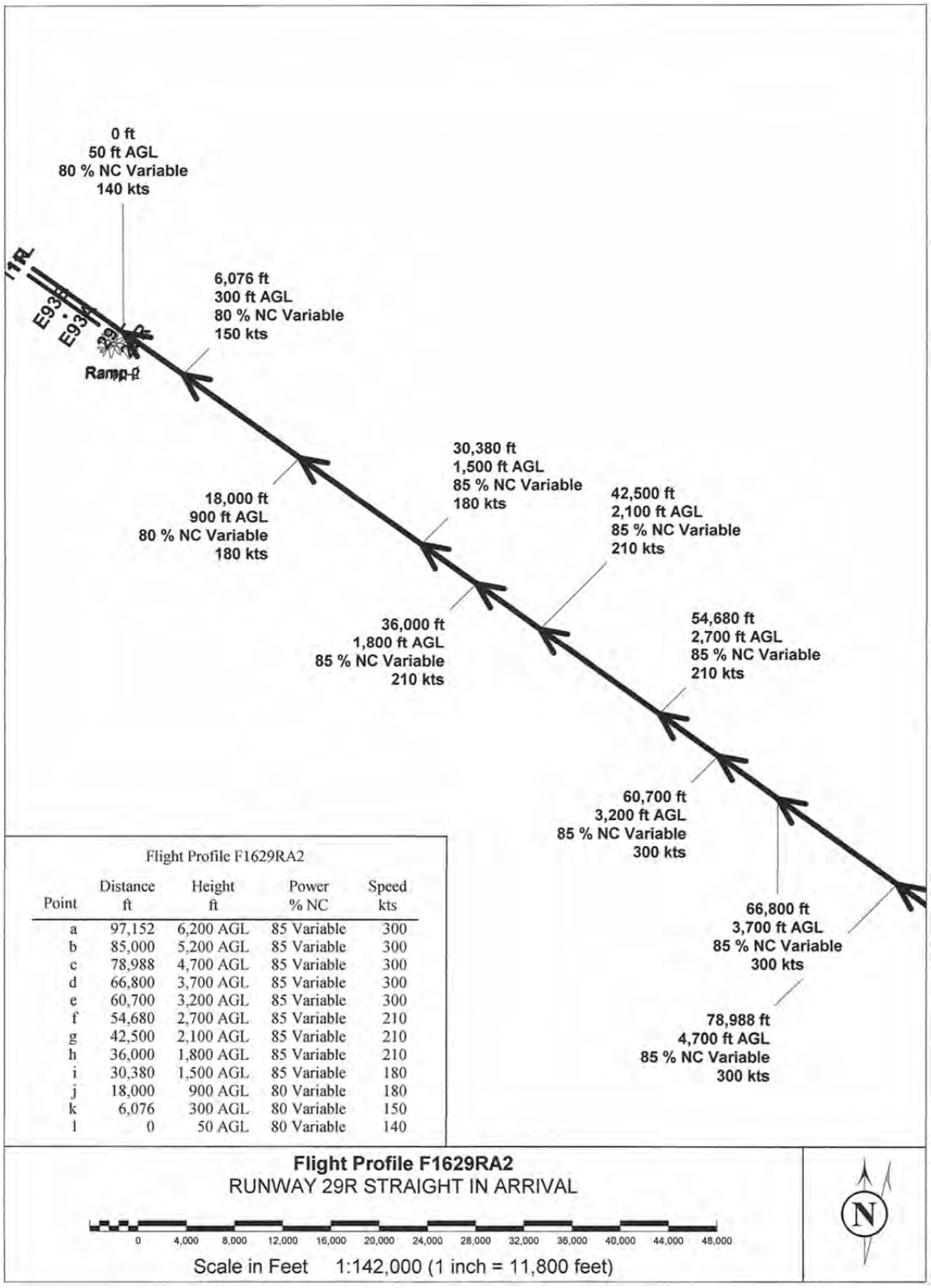
Flight Profile F1629RA1LF

Point	Distance ft	Height ft	Power % NC	Speed kts
a	79,152	6,000 AGL	87 Variable	300
b	67,000	5,000 AGL	87 Variable	300
c	50,000	4,500 AGL	87 Variable	300
d	24,000	4,000 AGL	87 Variable	210
e	15,000	4,000 AGL	85 Variable	210
f	6,000	300 AGL	85 Variable	150
g	0	50 AGL	83 Variable	145

Flight Profile F1629RA1LF
RUNWAY 29R SFO LOW KEY ARRIVAL

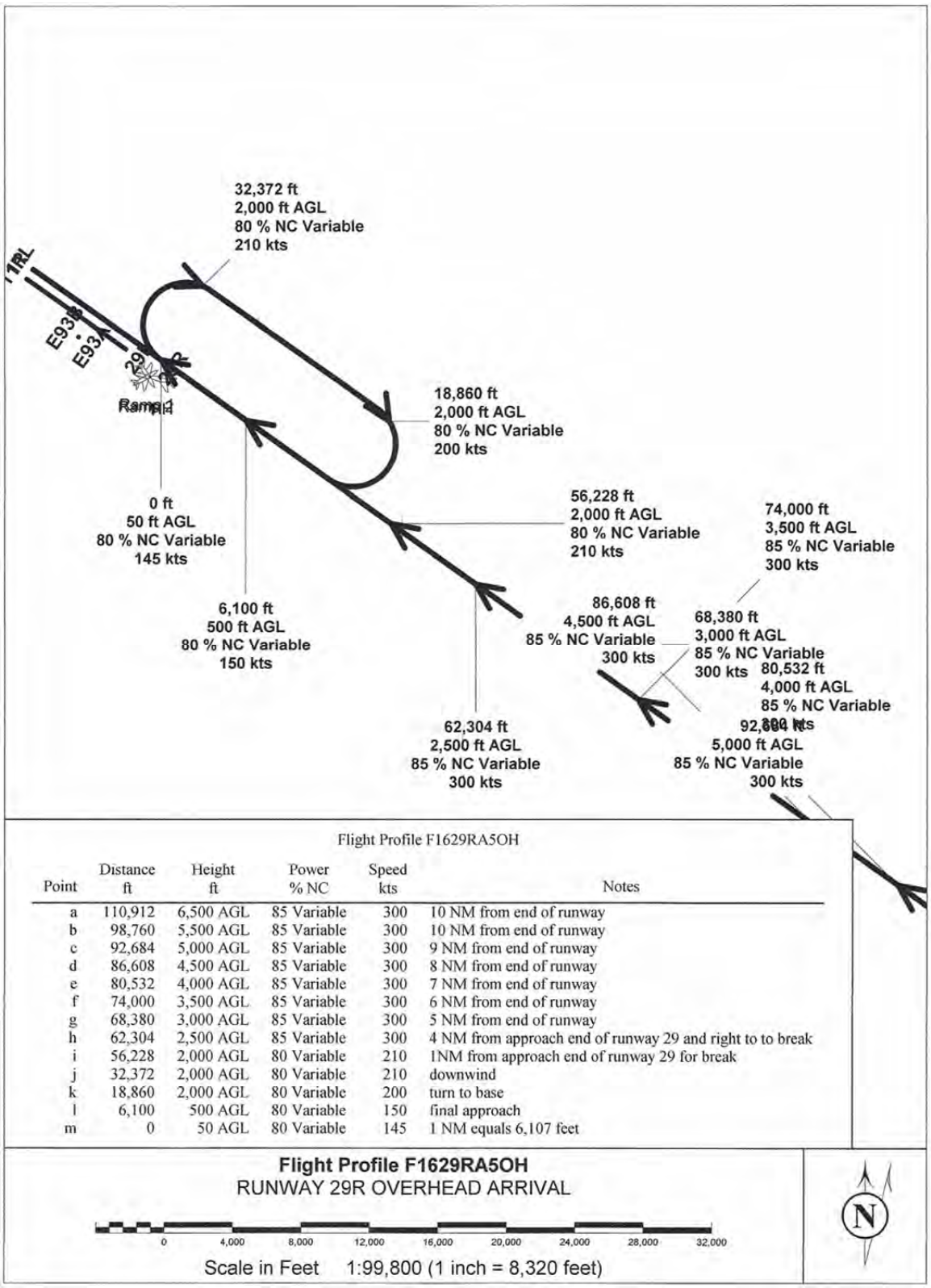
0 4,000 8,000 12,000 16,000 20,000

Scale in Feet 1:63,200 (1 inch = 5,260 feet)



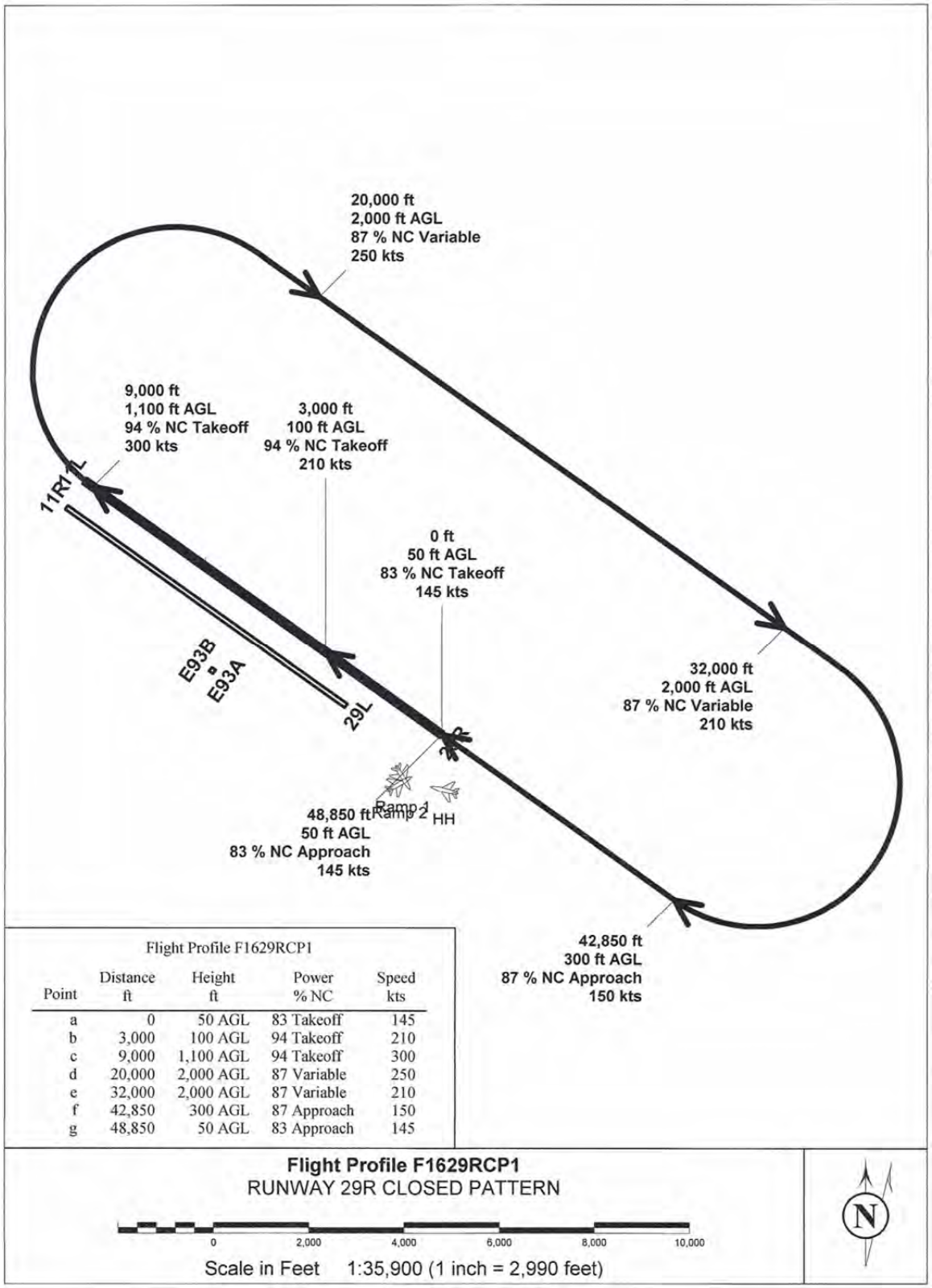
Flight Profile F1629RA2

Point	Distance ft	Height ft	Power % NC	Speed kts
a	97,152	6,200 AGL	85 Variable	300
b	85,000	5,200 AGL	85 Variable	300
c	78,988	4,700 AGL	85 Variable	300
d	66,800	3,700 AGL	85 Variable	300
e	60,700	3,200 AGL	85 Variable	300
f	54,680	2,700 AGL	85 Variable	210
g	42,500	2,100 AGL	85 Variable	210
h	36,000	1,800 AGL	85 Variable	210
i	30,380	1,500 AGL	85 Variable	180
j	18,000	900 AGL	80 Variable	180
k	6,076	300 AGL	80 Variable	150
l	0	50 AGL	80 Variable	140



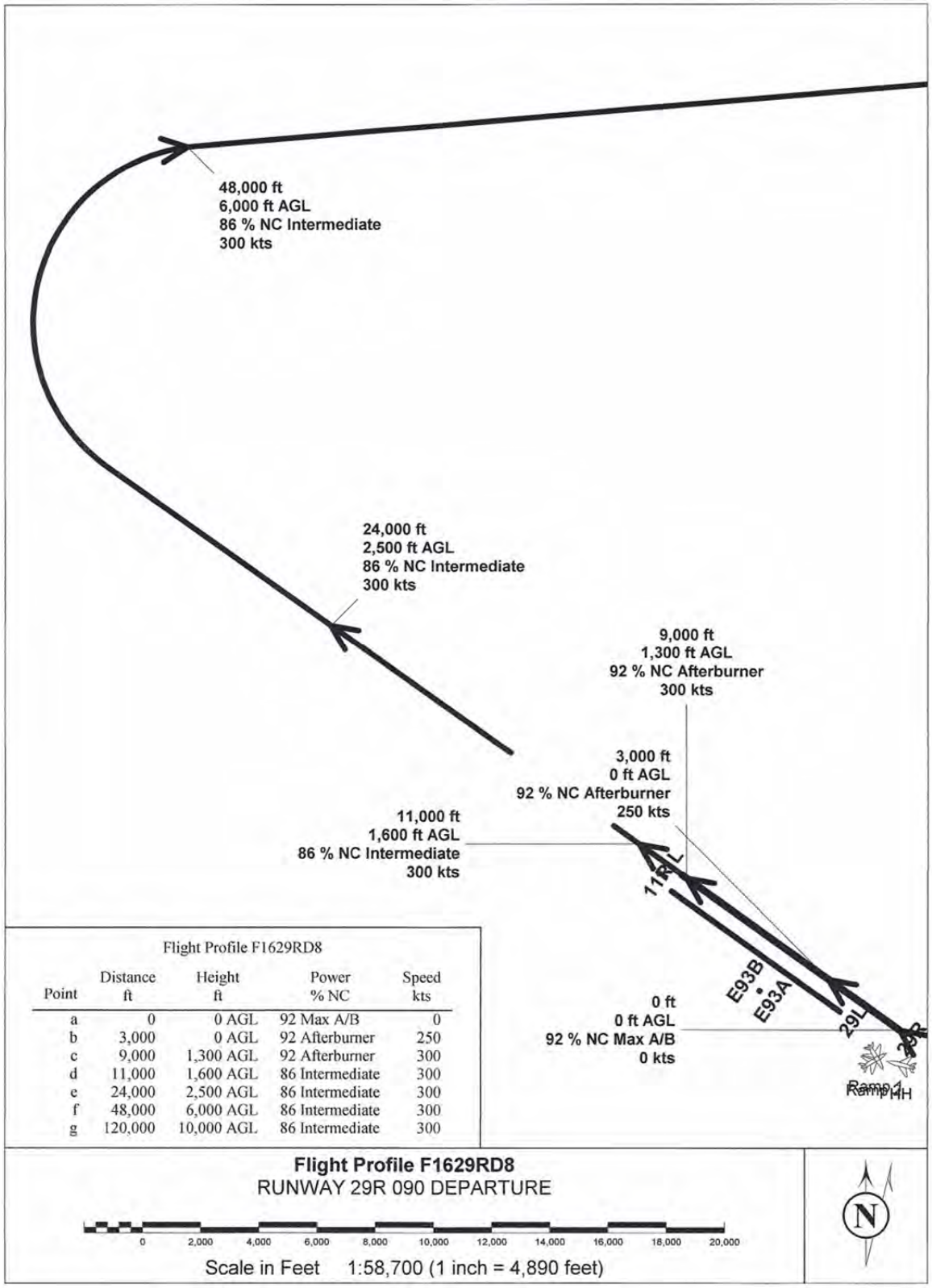
Flight Profile F1629RA5OH

Point	Distance ft	Height ft	Power % NC	Speed kts	Notes
a	110,912	6,500 AGL	85 Variable	300	10 NM from end of runway
b	98,760	5,500 AGL	85 Variable	300	10 NM from end of runway
c	92,684	5,000 AGL	85 Variable	300	9 NM from end of runway
d	86,608	4,500 AGL	85 Variable	300	8 NM from end of runway
e	80,532	4,000 AGL	85 Variable	300	7 NM from end of runway
f	74,000	3,500 AGL	85 Variable	300	6 NM from end of runway
g	68,380	3,000 AGL	85 Variable	300	5 NM from end of runway
h	62,304	2,500 AGL	85 Variable	300	4 NM from approach end of runway 29 and right to to break
i	56,228	2,000 AGL	80 Variable	210	1NM from approach end of runway 29 for break
j	32,372	2,000 AGL	80 Variable	210	downwind
k	18,860	2,000 AGL	80 Variable	200	turn to base
l	6,100	500 AGL	80 Variable	150	final approach
m	0	50 AGL	80 Variable	145	1 NM equals 6,107 feet



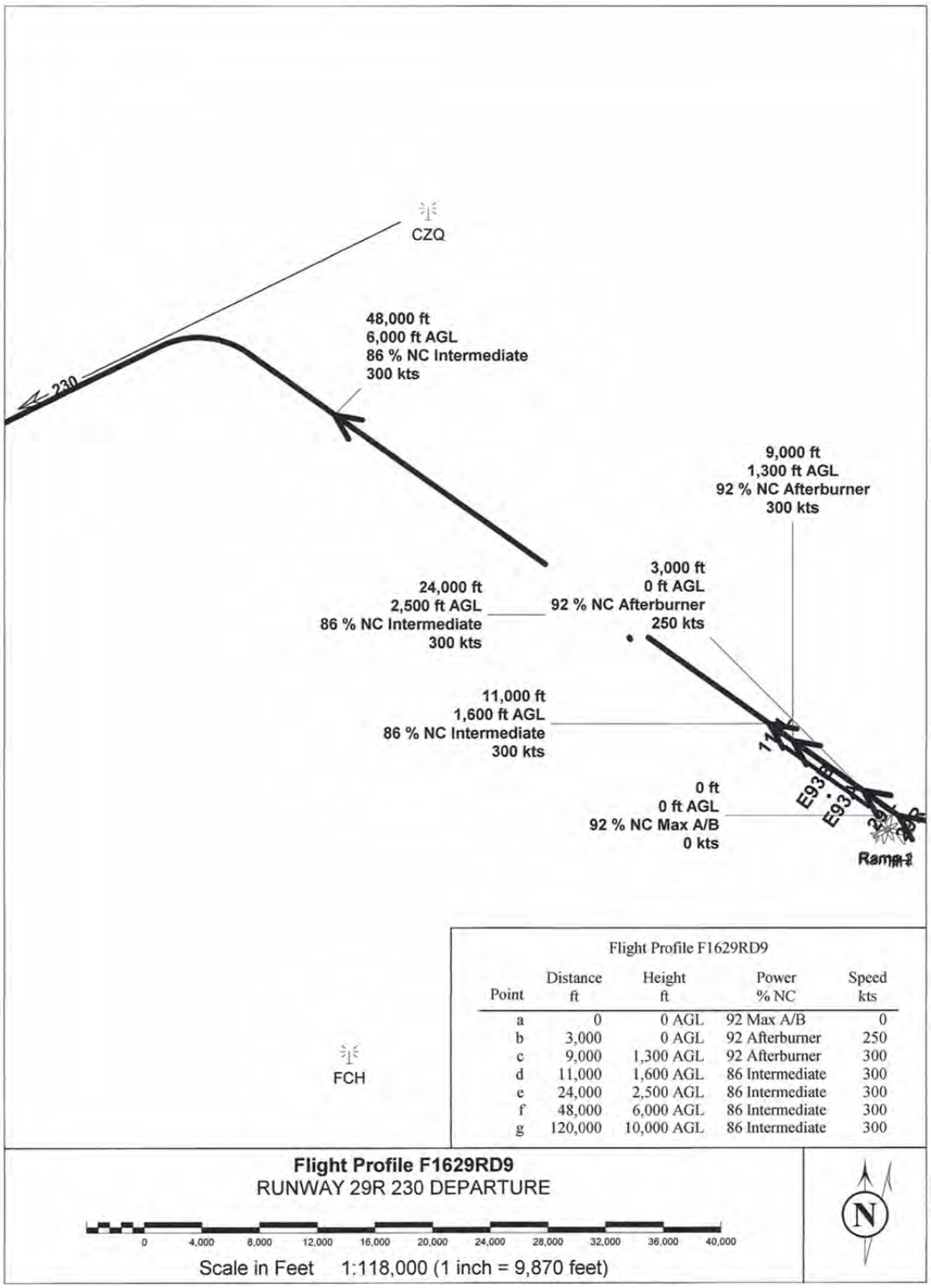
Flight Profile F1629RCP1

Point	Distance ft	Height ft	Power % NC	Speed kts
a	0	50 AGL	83 Takeoff	145
b	3,000	100 AGL	94 Takeoff	210
c	9,000	1,100 AGL	94 Takeoff	300
d	20,000	2,000 AGL	87 Variable	250
e	32,000	2,000 AGL	87 Variable	210
f	42,850	300 AGL	87 Approach	150
g	48,850	50 AGL	83 Approach	145



Flight Profile F1629RD8

Point	Distance ft	Height ft	Power % NC	Speed kts
a	0	0 AGL	92 Max A/B	0
b	3,000	0 AGL	92 Afterburner	250
c	9,000	1,300 AGL	92 Afterburner	300
d	11,000	1,600 AGL	86 Intermediate	300
e	24,000	2,500 AGL	86 Intermediate	300
f	48,000	6,000 AGL	86 Intermediate	300
g	120,000	10,000 AGL	86 Intermediate	300



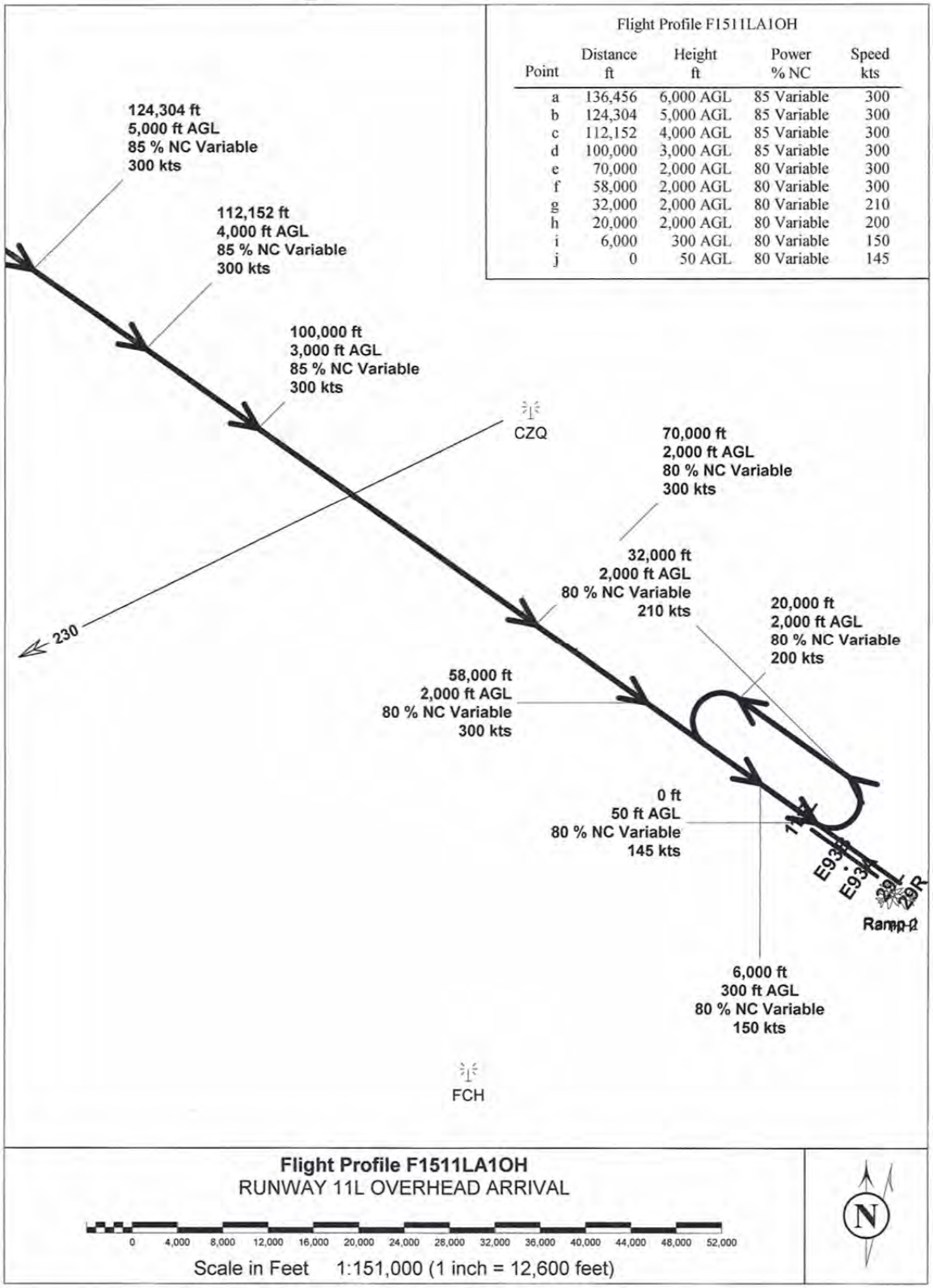
Flight Profile F1629RD9

Point	Distance ft	Height ft	Power % NC	Speed kts
a	0	0 AGL	92 Max A/B	0
b	3,000	0 AGL	92 Afterburner	250
c	9,000	1,300 AGL	92 Afterburner	300
d	11,000	1,600 AGL	86 Intermediate	300
e	24,000	2,500 AGL	86 Intermediate	300
f	48,000	6,000 AGL	86 Intermediate	300
g	120,000	10,000 AGL	86 Intermediate	300

Individual Flight Profiles
For Proposed F-15 Aircraft at Fresno

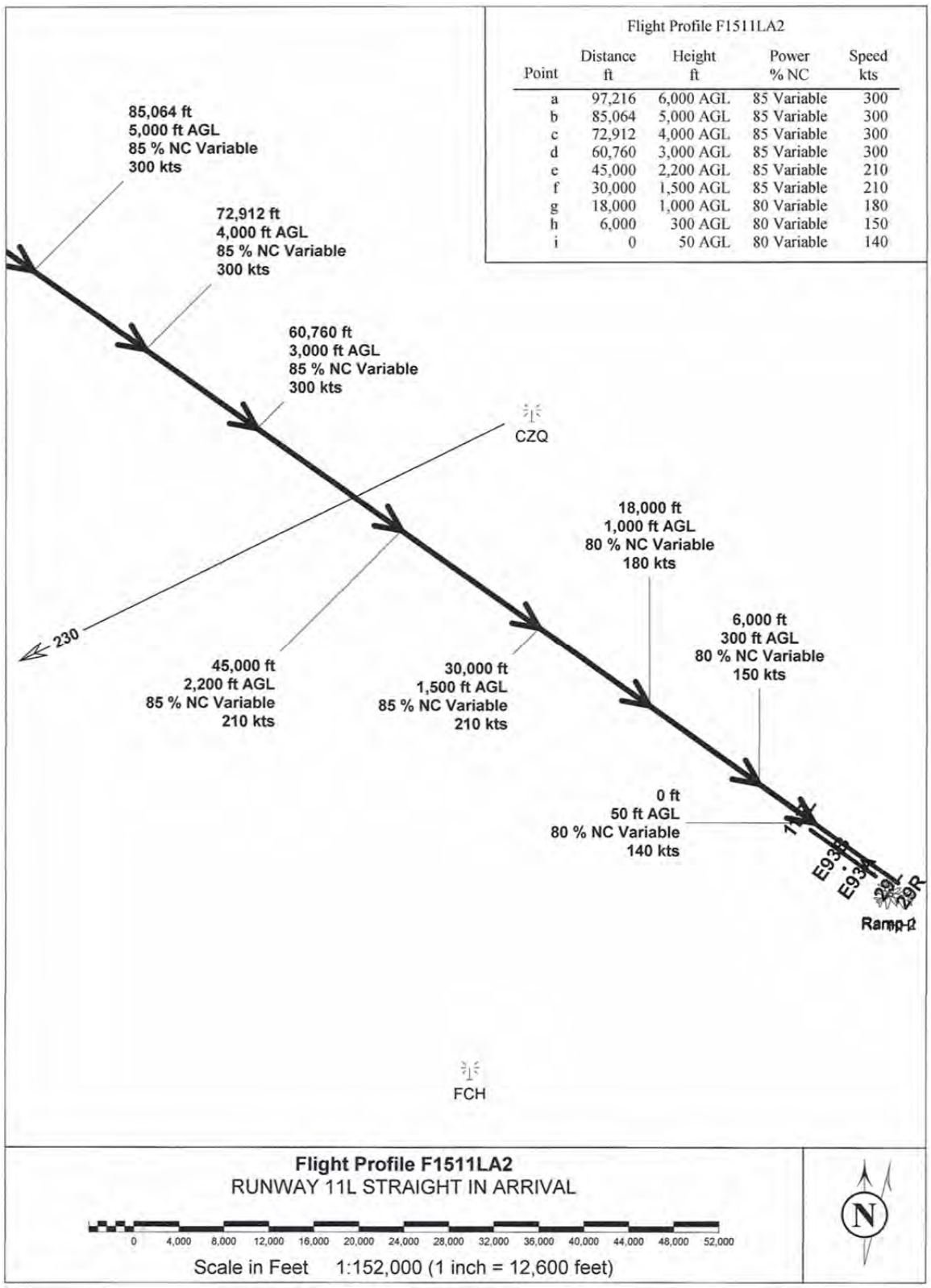
Flight Profile F1511LA1OH

Point	Distance ft	Height ft	Power % NC	Speed kts
a	136,456	6,000 AGL	85 Variable	300
b	124,304	5,000 AGL	85 Variable	300
c	112,152	4,000 AGL	85 Variable	300
d	100,000	3,000 AGL	85 Variable	300
e	70,000	2,000 AGL	80 Variable	300
f	58,000	2,000 AGL	80 Variable	300
g	32,000	2,000 AGL	80 Variable	210
h	20,000	2,000 AGL	80 Variable	200
i	6,000	300 AGL	80 Variable	150
j	0	50 AGL	80 Variable	145



Flight Profile F1511LA2

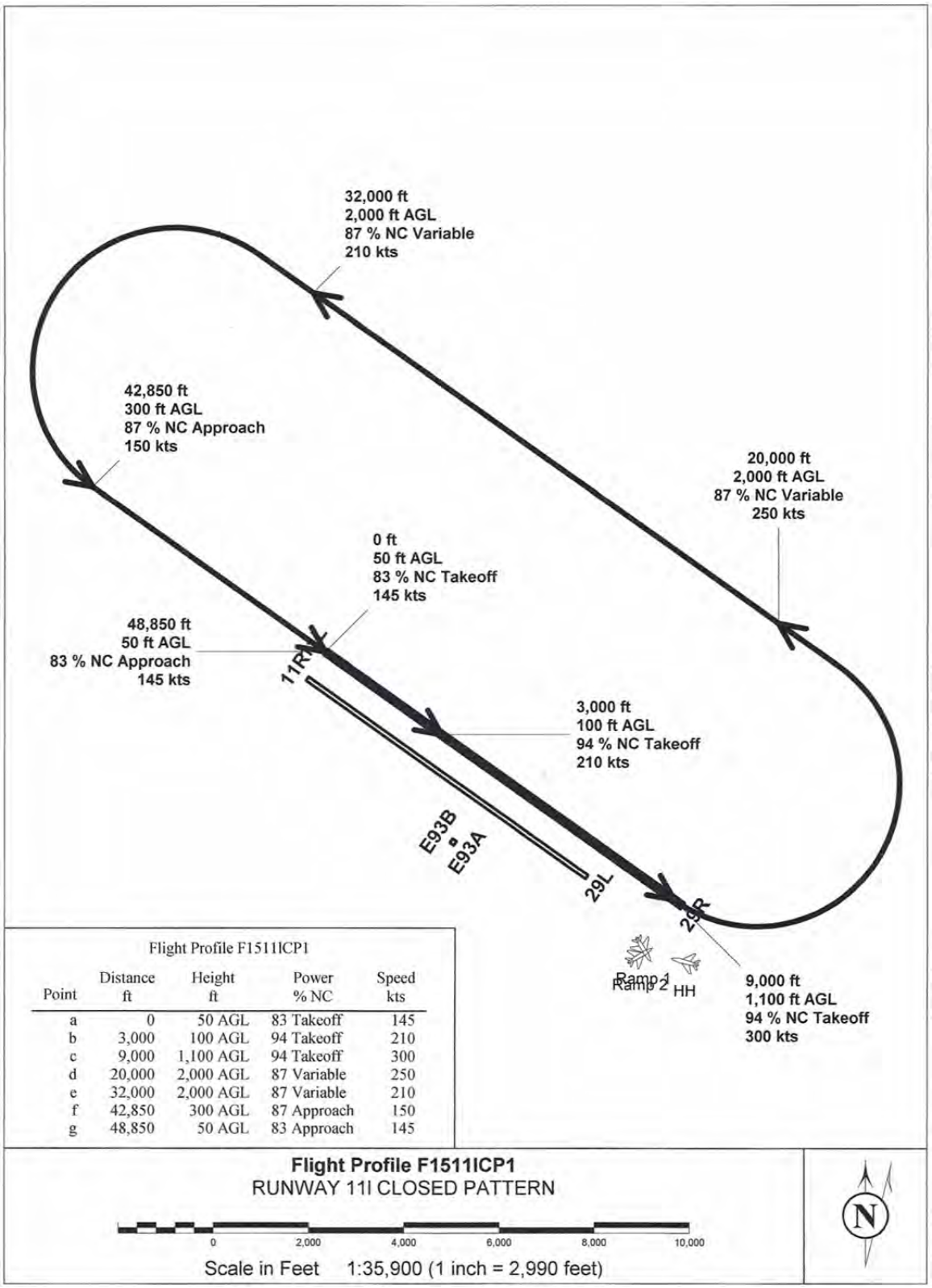
Point	Distance ft	Height ft	Power % NC	Speed kts
a	97,216	6,000 AGL	85 Variable	300
b	85,064	5,000 AGL	85 Variable	300
c	72,912	4,000 AGL	85 Variable	300
d	60,760	3,000 AGL	85 Variable	300
e	45,000	2,200 AGL	85 Variable	210
f	30,000	1,500 AGL	85 Variable	210
g	18,000	1,000 AGL	80 Variable	180
h	6,000	300 AGL	80 Variable	150
i	0	50 AGL	80 Variable	140



Flight Profile F1511LA2
RUNWAY 11L STRAIGHT IN ARRIVAL

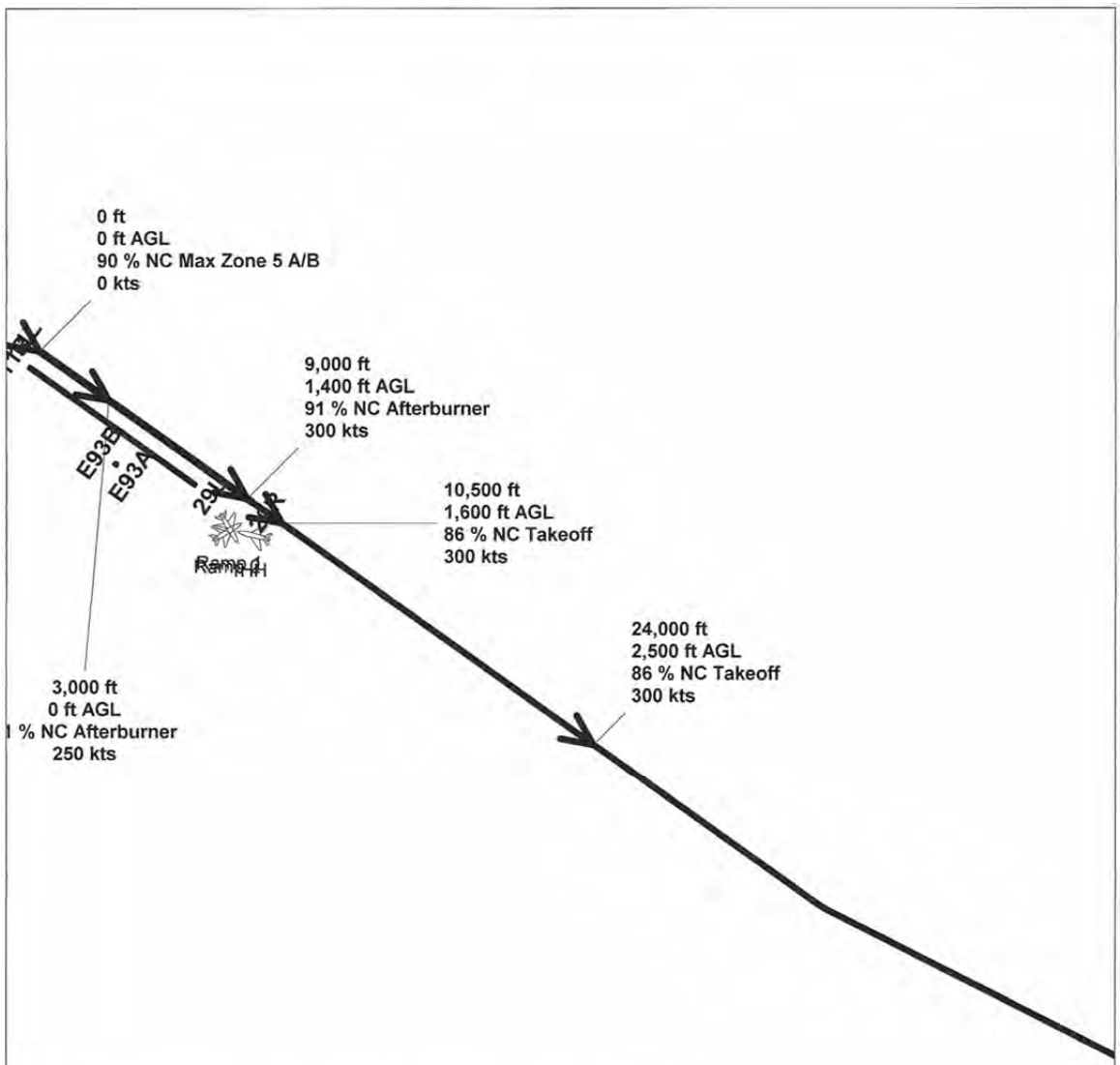
0 4,000 8,000 12,000 16,000 20,000 24,000 28,000 32,000 36,000 40,000 44,000 48,000 52,000

Scale in Feet 1:152,000 (1 inch = 12,600 feet)



Flight Profile F1511ICP1

Point	Distance ft	Height ft	Power % NC	Speed kts
a	0	50 AGL	83 Takeoff	145
b	3,000	100 AGL	94 Takeoff	210
c	9,000	1,100 AGL	94 Takeoff	300
d	20,000	2,000 AGL	87 Variable	250
e	32,000	2,000 AGL	87 Variable	210
f	42,850	300 AGL	87 Approach	150
g	48,850	50 AGL	83 Approach	145



Flight Profile F1511LD6

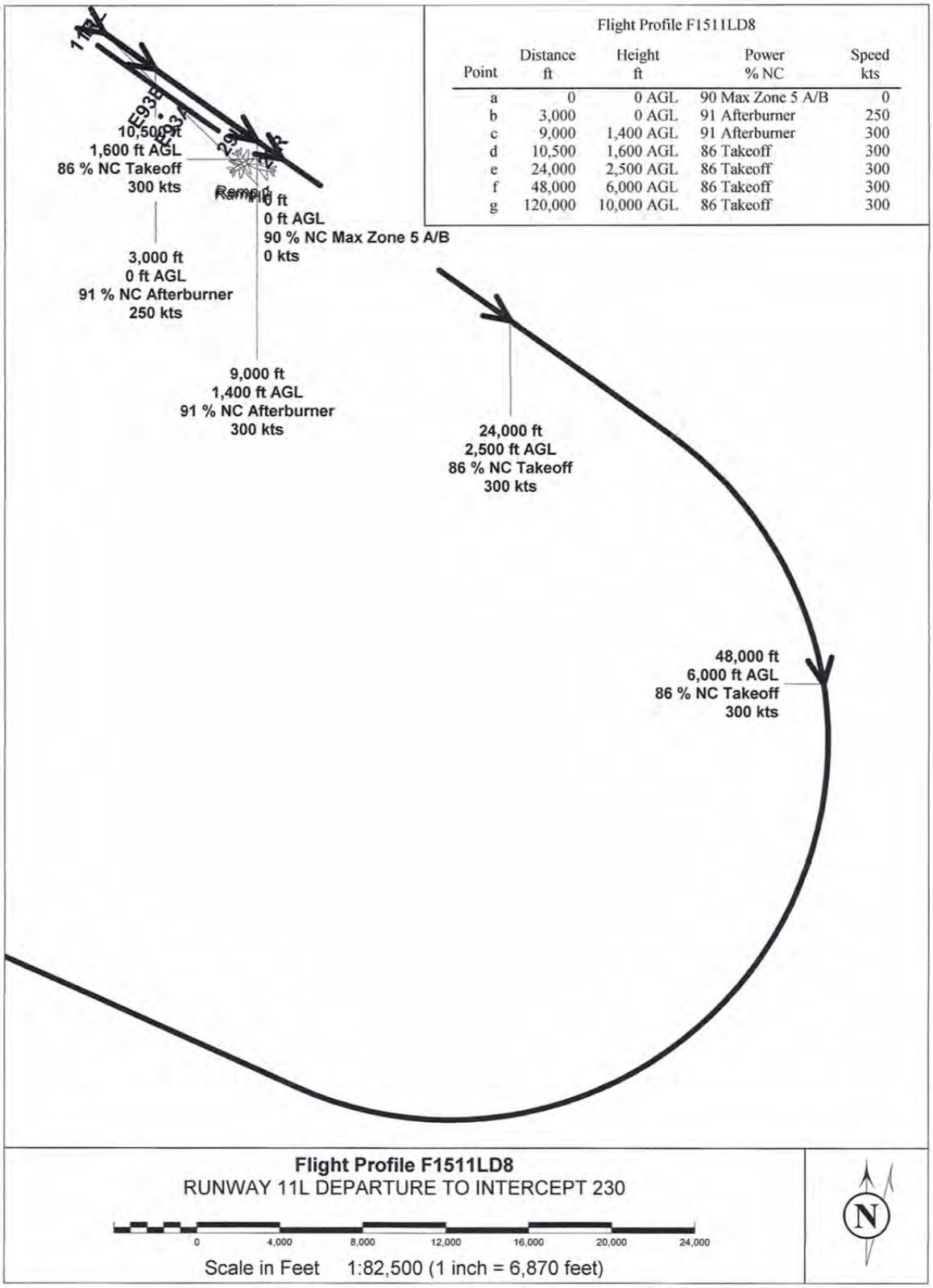
Point	Distance ft	Height ft	Power % NC	Speed kts
a	0	0 AGL	90 Max Zone 5 A/B	0
b	3,000	0 AGL	91 Afterburner	250
c	9,000	1,400 AGL	91 Afterburner	300
d	10,500	1,600 AGL	86 Takeoff	300
e	24,000	2,500 AGL	86 Takeoff	300
f	48,000	6,000 AGL	86 Takeoff	300
g	119,000	10,000 AGL	86 Takeoff	300

Flight Profile F1511LD6
RUNWAY 11L DEPARTURE TO 120

0 4,000 8,000 12,000 16,000 20,000

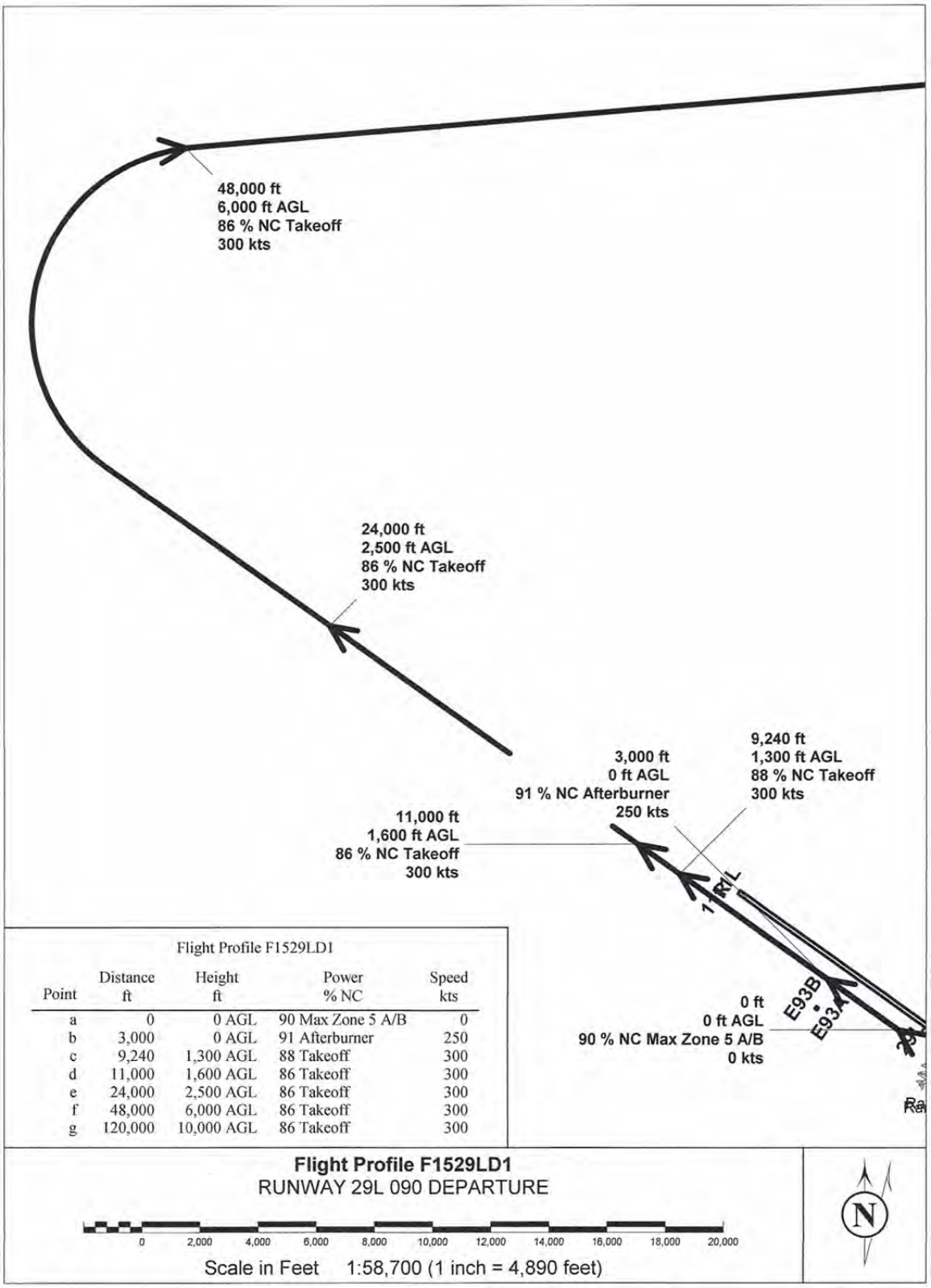
Scale in Feet 1:72,500 (1 inch = 6,040 feet)

N



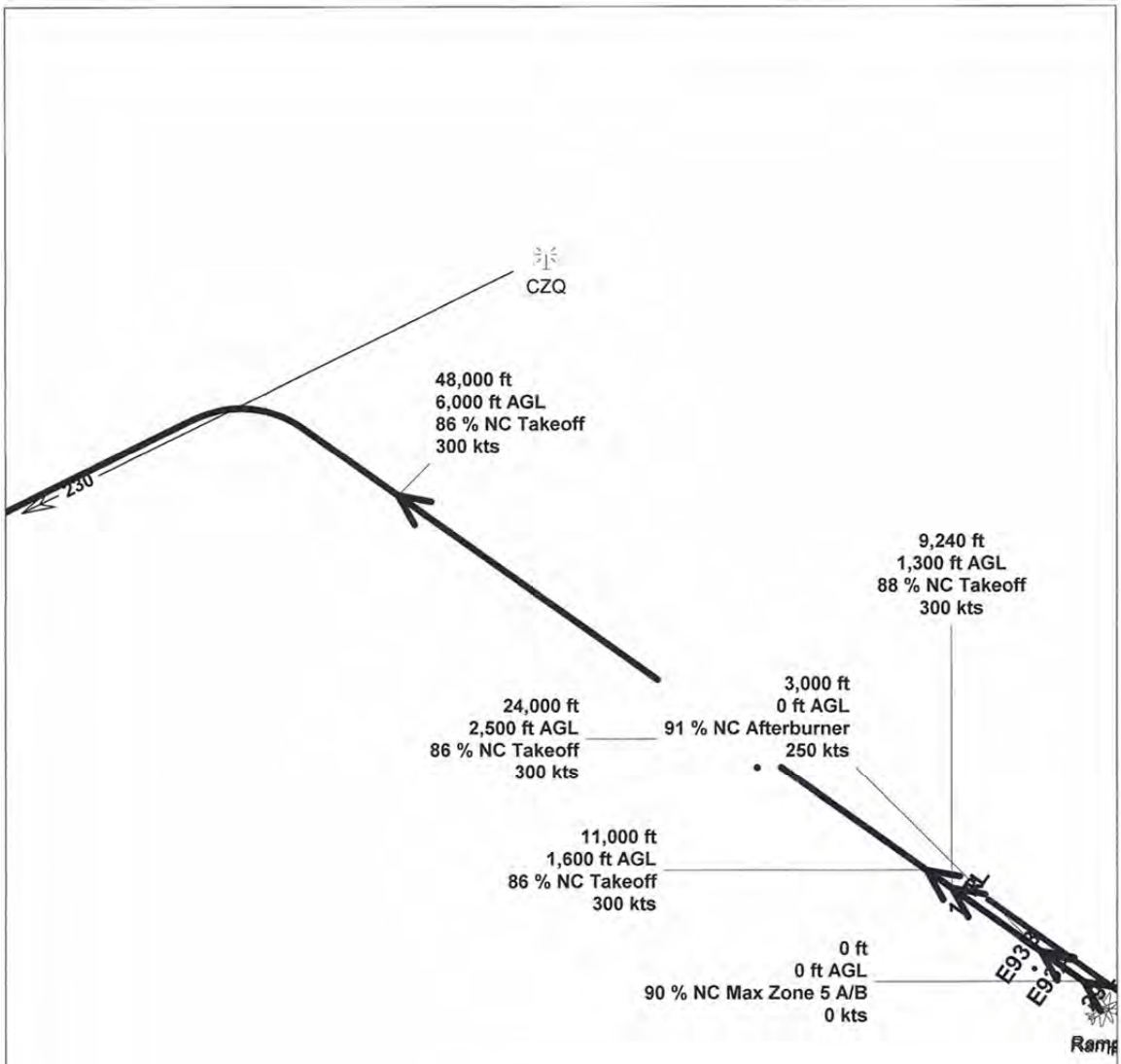
Flight Profile F1511LD8

Point	Distance ft	Height ft	Power % NC	Speed kts
a	0	0 AGL	90 Max Zone 5 A/B	0
b	3,000	0 AGL	91 Afterburner	250
c	9,000	1,400 AGL	91 Afterburner	300
d	10,500	1,600 AGL	86 Takeoff	300
e	24,000	2,500 AGL	86 Takeoff	300
f	48,000	6,000 AGL	86 Takeoff	300
g	120,000	10,000 AGL	86 Takeoff	300



Flight Profile F1529LD1

Point	Distance ft	Height ft	Power % NC	Speed kts
a	0	0 AGL	90 Max Zone 5 A/B	0
b	3,000	0 AGL	91 Afterburner	250
c	9,240	1,300 AGL	88 Takeoff	300
d	11,000	1,600 AGL	86 Takeoff	300
e	24,000	2,500 AGL	86 Takeoff	300
f	48,000	6,000 AGL	86 Takeoff	300
g	120,000	10,000 AGL	86 Takeoff	300



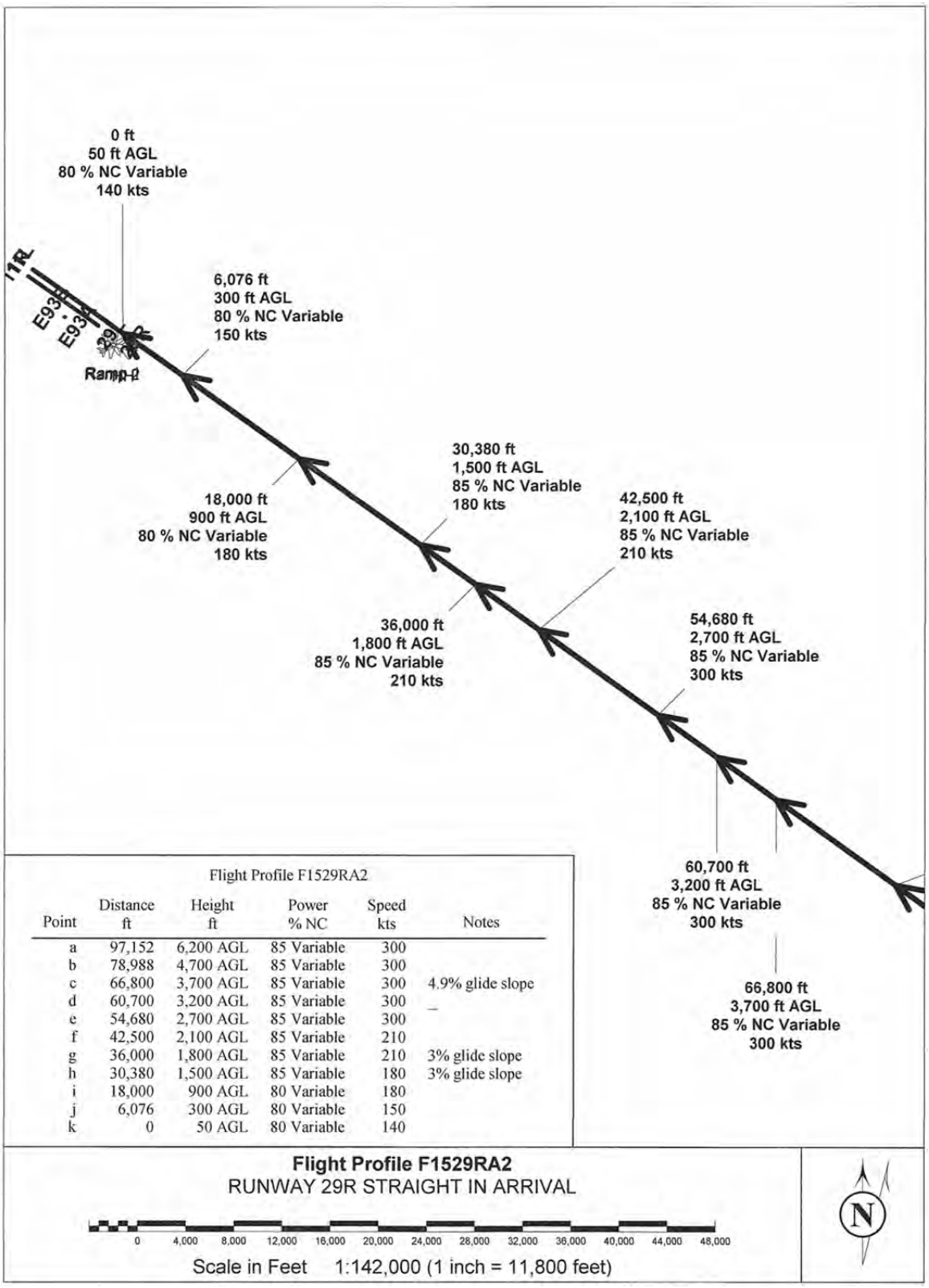
Flight Profile F1529LD2

Point	Distance ft	Height ft	Power % NC	Speed kts
a	0	0 AGL	90 Max Zone 5 A/B	0
b	3,000	0 AGL	91 Afterburner	250
c	9,240	1,300 AGL	88 Takeoff	300
d	11,000	1,600 AGL	86 Takeoff	300
e	24,000	2,500 AGL	86 Takeoff	300
f	48,000	6,000 AGL	86 Takeoff	300
g	120,000	10,000 AGL	86 Takeoff	300

Flight Profile F1529LD2
RUNWAY 29L 230 DEPARTURE

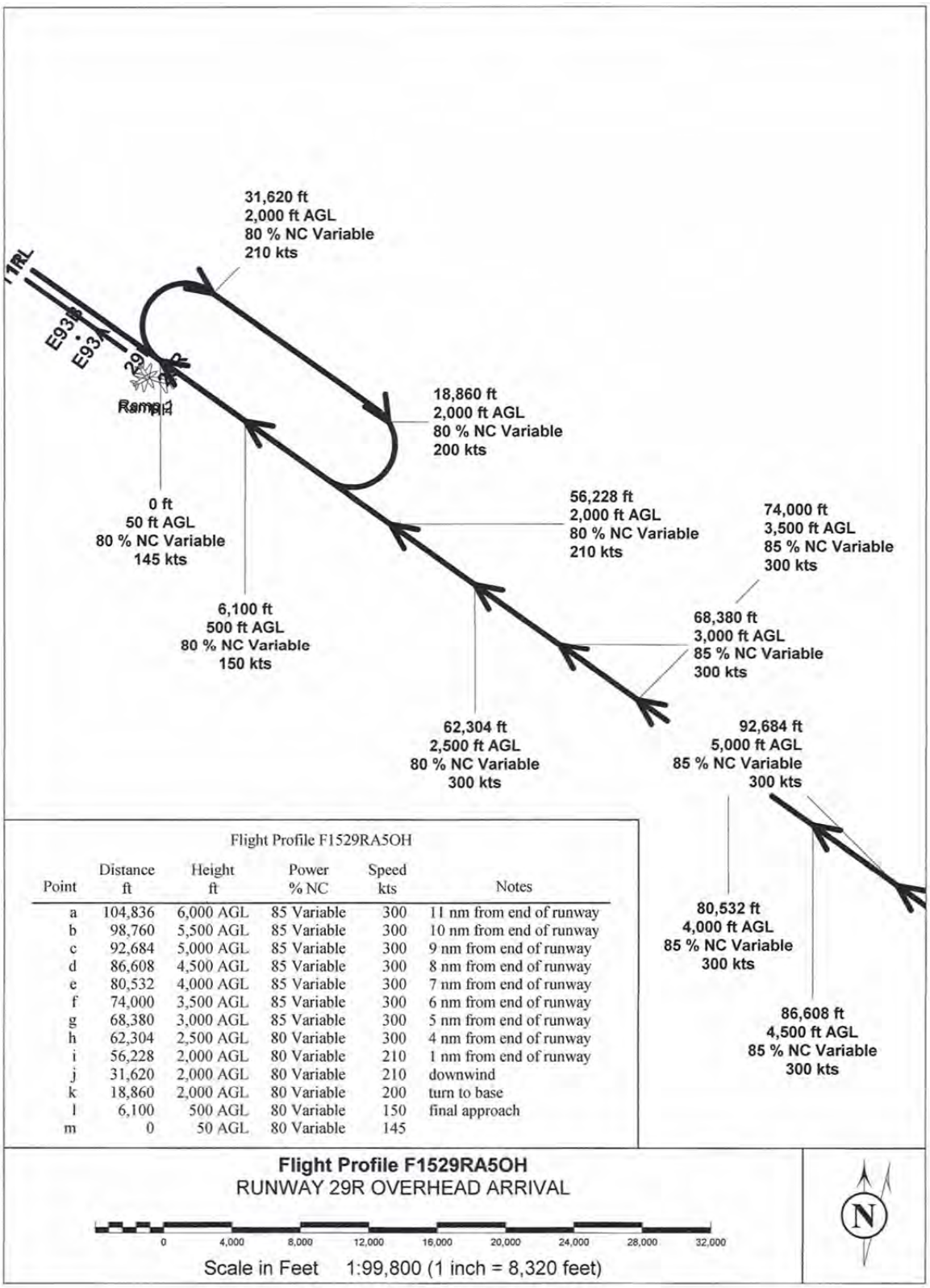
0 4,000 8,000 12,000 16,000 20,000 24,000 28,000 32,000 36,000 40,000

Scale in Feet 1:117,000 (1 inch = 9,790 feet)



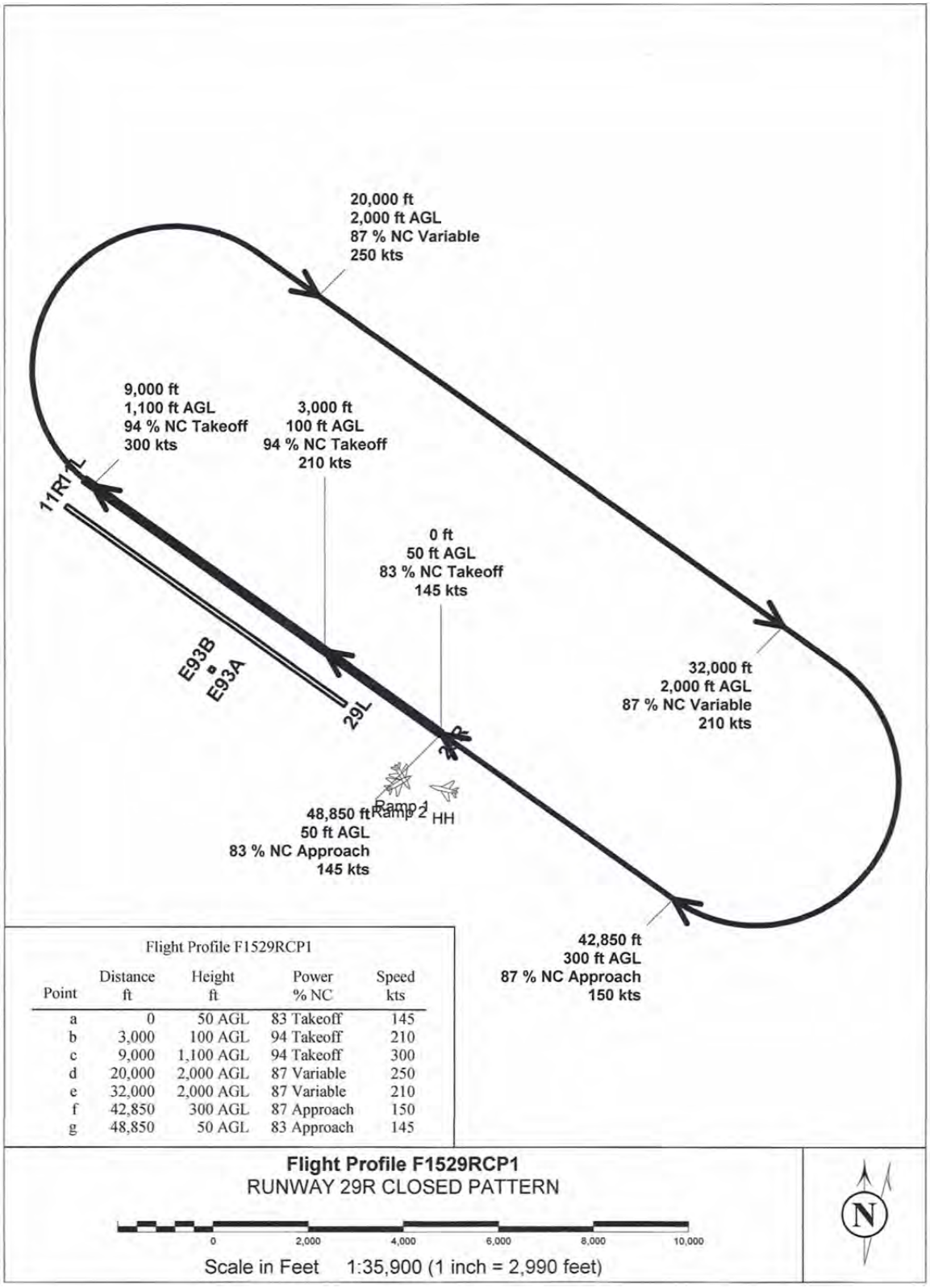
Flight Profile F1529RA2

Point	Distance ft	Height ft	Power % NC	Speed kts	Notes
a	97,152	6,200 AGL	85 Variable	300	
b	78,988	4,700 AGL	85 Variable	300	
c	66,800	3,700 AGL	85 Variable	300	4.9% glide slope
d	60,700	3,200 AGL	85 Variable	300	–
e	54,680	2,700 AGL	85 Variable	300	
f	42,500	2,100 AGL	85 Variable	210	
g	36,000	1,800 AGL	85 Variable	210	3% glide slope
h	30,380	1,500 AGL	85 Variable	180	3% glide slope
i	18,000	900 AGL	80 Variable	180	
j	6,076	300 AGL	80 Variable	150	
k	0	50 AGL	80 Variable	140	



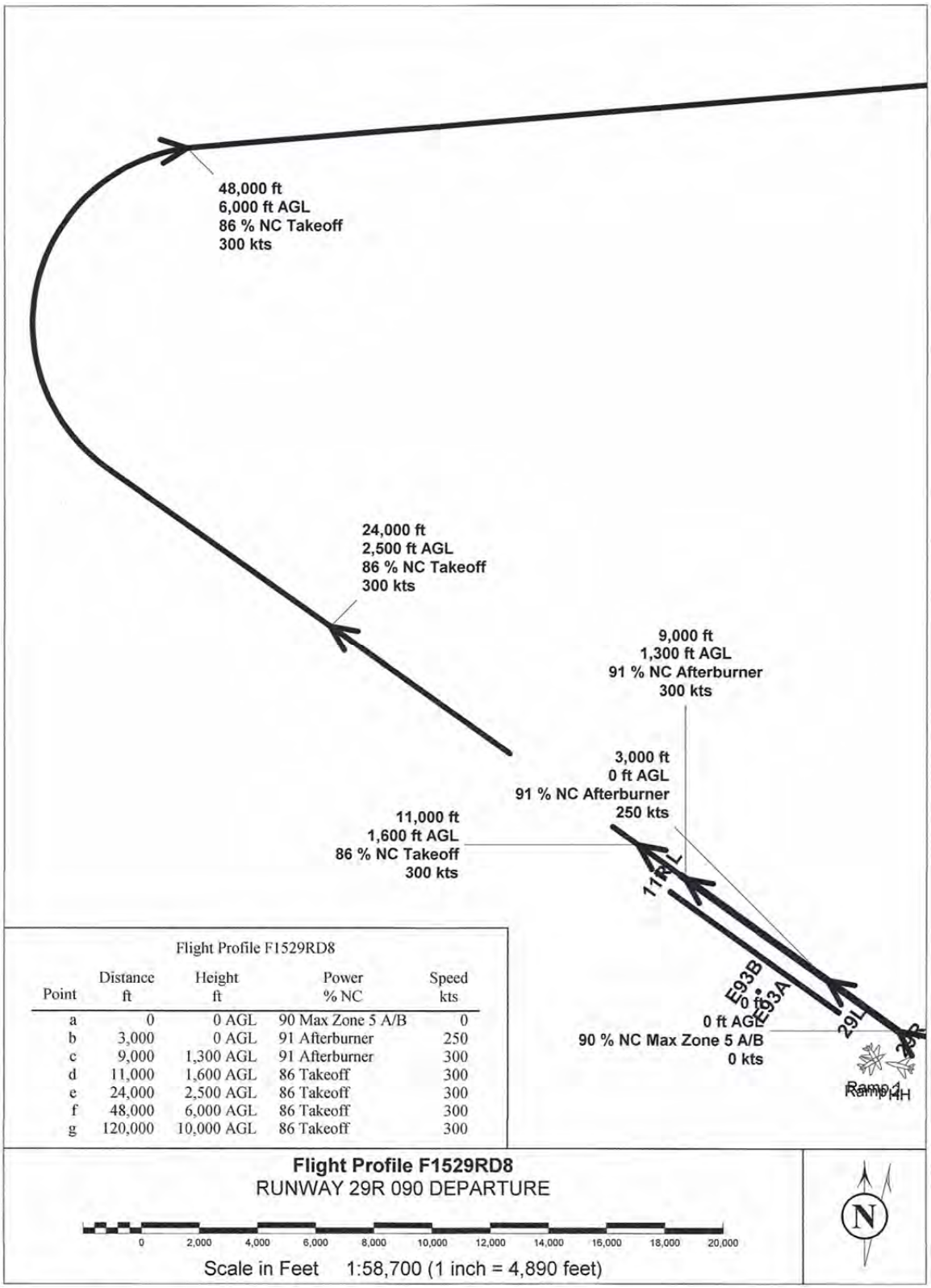
Flight Profile F1529RA5OH

Point	Distance ft	Height ft	Power % NC	Speed kts	Notes
a	104,836	6,000 AGL	85 Variable	300	11 nm from end of runway
b	98,760	5,500 AGL	85 Variable	300	10 nm from end of runway
c	92,684	5,000 AGL	85 Variable	300	9 nm from end of runway
d	86,608	4,500 AGL	85 Variable	300	8 nm from end of runway
e	80,532	4,000 AGL	85 Variable	300	7 nm from end of runway
f	74,000	3,500 AGL	85 Variable	300	6 nm from end of runway
g	68,380	3,000 AGL	85 Variable	300	5 nm from end of runway
h	62,304	2,500 AGL	80 Variable	300	4 nm from end of runway
i	56,228	2,000 AGL	80 Variable	210	1 nm from end of runway
j	31,620	2,000 AGL	80 Variable	210	downwind
k	18,860	2,000 AGL	80 Variable	200	turn to base
l	6,100	500 AGL	80 Variable	150	final approach
m	0	50 AGL	80 Variable	145	



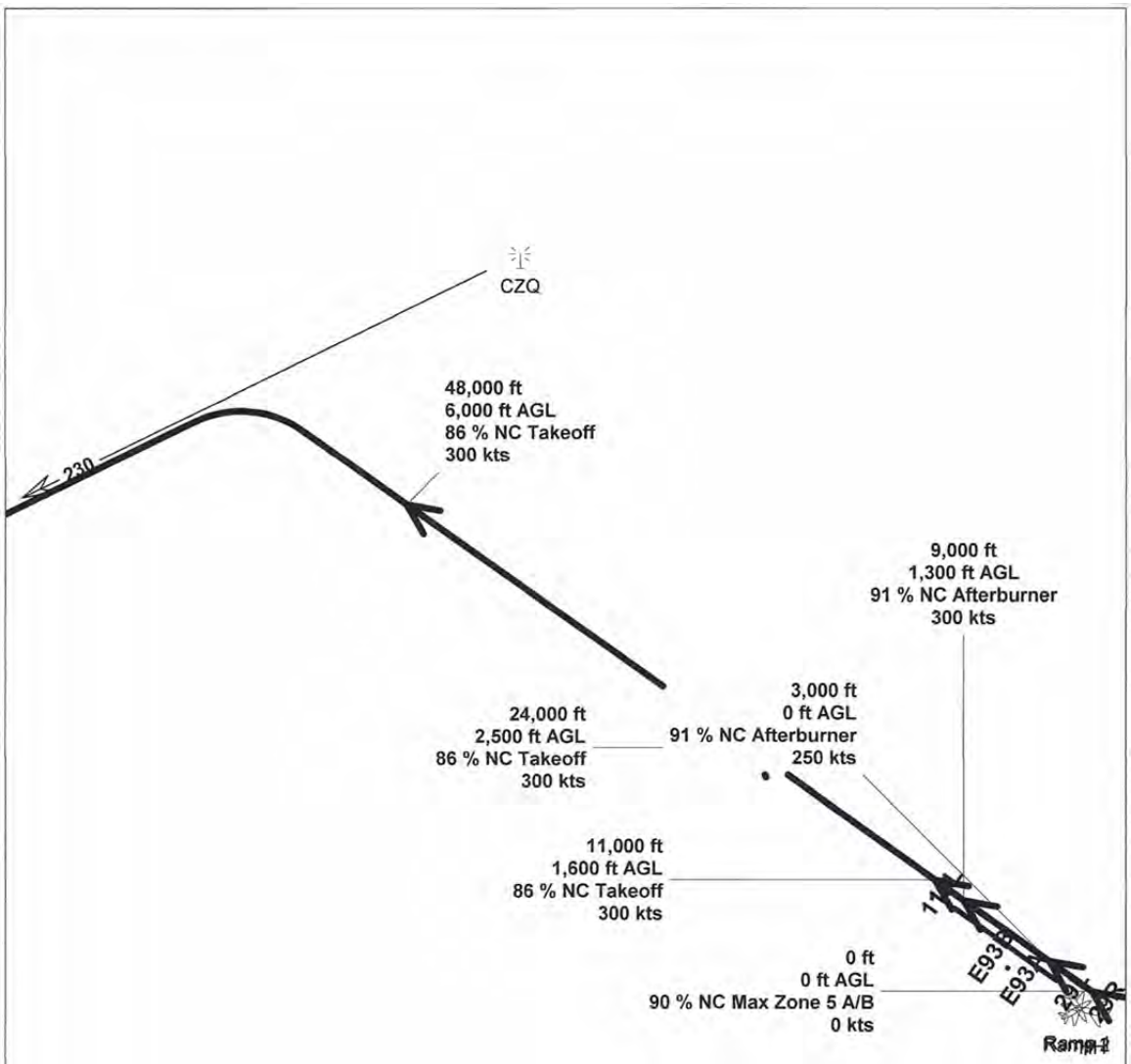
Flight Profile F1529RCP1

Point	Distance ft	Height ft	Power % NC	Speed kts
a	0	50 AGL	83 Takeoff	145
b	3,000	100 AGL	94 Takeoff	210
c	9,000	1,100 AGL	94 Takeoff	300
d	20,000	2,000 AGL	87 Variable	250
e	32,000	2,000 AGL	87 Variable	210
f	42,850	300 AGL	87 Approach	150
g	48,850	50 AGL	83 Approach	145



Flight Profile F1529RD8

Point	Distance ft	Height ft	Power % NC	Speed kts
a	0	0 AGL	90 Max Zone 5 A/B	0
b	3,000	0 AGL	91 Afterburner	250
c	9,000	1,300 AGL	91 Afterburner	300
d	11,000	1,600 AGL	86 Takeoff	300
e	24,000	2,500 AGL	86 Takeoff	300
f	48,000	6,000 AGL	86 Takeoff	300
g	120,000	10,000 AGL	86 Takeoff	300



Flight Profile F1529RD9

Point	Distance ft	Height ft	Power % NC	Speed kts
a	0	0 AGL	90 Max Zone 5 A/B	0
b	3,000	0 AGL	91 Afterburner	250
c	9,000	1,300 AGL	91 Afterburner	300
d	11,000	1,600 AGL	86 Takeoff	300
e	24,000	2,500 AGL	86 Takeoff	300
f	48,000	6,000 AGL	86 Takeoff	300
g	120,000	10,000 AGL	86 Takeoff	300

Flight Profile F1529RD9
RUNWAY 29R 230 DEPARTURE

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000 32,000 36,000 40,000

Scale in Feet 1:118,000 (1 inch = 9,870 feet)

N

Appendix C

Air Quality

APPENDIX C AIR QUALITY

This appendix provides assumptions used to calculate emissions for the Alternative #1 and Alternative #2, as well as tables showing the emission calculations. Emissions from these categories of sources were calculated based on guidance from the United States Air Force (USAF) in their *Air Emissions Factor Guide to Air Force Mobile Sources* (Air Force Center for Engineering and the Environment [AFCEE] 2009), utilizing the latest air emissions modeling tools. Each category of emissions is discussed in the sections below.

C.1 Construction Assumptions

It was assumed that each construction project associated with the Proposed Action would be constructed in a single year. For the projects, the following assumptions were made:

- The new Aircraft Corrosion Control Hangar (Project HAYW109006) would be constructed on existing paved area and would not require site preparation or grading activities. The building would be a tilt-up prefabricated building.
- The addition to the existing munitions storage space (Project HAYW069175) would involve a paved area outside.
- The addition to the existing Munitions Storage Facility would be constructed on existing paved area and would not require site preparation or grading activities.
- The addition to the existing Non-Destructive Inspection (NDI) Shop would be constructed on existing paved area and would not require site preparation or grading activities.

Air emissions were modeled for construction activities using the URBEMIS Model (Rimpo and Associates 2007), which is the latest emissions modeling tool within the state of California that was developed to address emissions from construction projects. Outputs from the URBEMIS Model are included as attachments to this appendix.

Operational emissions from sources operating in association with the Proposed Action include aircraft operations, aircraft ground equipment, engine testing, and personal vehicle use. Calculation methodologies for each emission category and assumptions used to calculate emissions for the 144th Fighter Wing (144 FW) are discussed below.

C.2 Aircraft Operations

The methodology for estimating aircraft emissions involves evaluating the type of operations for each type of aircraft, the number of hours of operation for each aircraft type, the type of engine in each aircraft, and the mode of operation for each type of aircraft engine. Aircraft emissions

are calculated based on the type of aircraft, the engine model, the operational mode and time-in-mode (TIM) for each mode, the power setting associated with each operational mode, the fuel flow rate associated with each power setting, engine-specific emission factors, the mixing zone height, and the number of landing-takeoff (LTO) cycles conducted during the course of a year. As TIM and fuel flow for each power setting varies among aircraft engines and airframes, the calculation procedure was repeated for individual aircraft types.

The types of aircraft and numbers and type of operations were obtained from the 144 FW for both existing conditions (F-16 aircraft) and Alternative #1/Alternative #2 (F-15 aircraft). For operations at Fresno-Yosemite International Airport (IAP), the operational profiles from the noise modeling analysis conducted for the Proposed Action were used to calculate emissions, accounting for the mode of operation for aircraft engines, engine speed, and elevation above ground level.

As discussed in the USAF guidance document, because estimating emissions using an LTO approach accounts for exhaust emissions associated with aircraft operations occurring both on the ground and up to the mixing zone height, the choice of a mixing zone height will have a direct impact on total emissions. Mixing zone height is used to adjust the TIM during the approach and climb out modes of an LTO when calculating emissions. Thus a shallow mixing zone height will result in a shorter TIM (and fewer emissions), and a high mixing zone height will result in a longer TIM (and more emissions). While emissions occurring anywhere within this zone will impact ground-level pollutant concentrations, emissions occurring above it will generally not be mixed to the ground. Because atmospheric stability (and hence inversions) are a function of temperature, mixing zone height varies depending on location, hour, and season, and is affected by local topography, time of day, and time of year. United States Environmental Protection Agency (USEPA) guidance notes that in most instances where nitrogen oxides (NO_x) emissions are not a local air quality concern, a default mixing zone height of 3,000 feet can be used. If, however, NO_x emissions are considered an important component of the emission inventory, specific mixing height data must be gathered and used. The Federal Aviation Administration (FAA) has adopted this USEPA default value in its recommended procedures. For purposes of maximizing the accuracy of the inventory, location specific climate and meteorological data should be used where available to determine seasonal or annual average mixing height.

For conservative purposes, the mixing height was assumed to be 3,000 feet above ground level (AGL).

Emissions were calculated for individual flight operations as follows:

Emissions = TIM/60 x FFR/1000 x EI x NE x N

Where,

TIM = Time spent in each mode (min/cycle)

60 = Factor for converting minutes into hours

FFR = Fuel flow rate per engine (lb/hr)

1000 = Factor for converting lb/hr to 1000 lb/hr

EI = Emission factor (lb/1000 lb)

NE = Number of engines/aircraft.

N = number of operations.

For both the F-16 and F-15 aircraft, the 144 FW confirmed that the engine model in the aircraft is the F100-PW-220 engine. The F-16 aircraft are equipped with one engine, and the F-15 aircraft are equipped with two engines. Based on the flight profiles for the two aircraft provided for the noise analysis, training flight profiles would have the same TIM and same profiles, with the exception of certain types of approaches conducted by the F16 aircraft currently.

Emission calculations for the baseline condition, Alternative #1, and Alternative #2 are provided in this appendix.

C.2 Aircraft Ground Equipment

Aircraft ground equipment (AGE) includes onsite mobile support equipment such as tow tractors, reciprocating engines, and gas turbines used to support aircraft operations. Based on information from the *Air Emissions Factor Guide to Air Force Mobile Sources* (AFCEE 2009), the *U.S. Air Force Air Conformity Applicability Model* (USAF 2010) and the FAA's *Emissions and Dispersion Modeling System* (FAA 2009), the AGE used for both the F-16 and F-15 aircraft are the same and would be used for the same amount of time for each departure and arrival. Emissions for AGE were calculated assuming AGE usage rates per LTO from the *Air Emissions Factor Guide*. Specific model numbers and pieces of equipment were obtained from the *Final 2007 Air Emissions Inventory - 144th Fighter Wing* (Science Applications International Corporation [SAIC] 2009).

Emission estimates for AGE are provided in this appendix.

C.3 Engine Testing

Emissions from engine testing within the hush house are covered under San Joaquin Valley Air Pollution Control District Permit Number C-216-1-2. The permit allows testing and limits fuel use to 80,000 gallons per year. Because testing within the hush house is covered under the New Source Review requirements of the San Joaquin Valley Air Pollution Control District, the emissions are not subject to the General Conformity Rule as they are presumed to conform with a rule that is within the State Implementation Plan (SIP).

Engine testing outside the hush house is anticipated to involve testing at idle. The TIM for these tests for the Baseline, Alternative #1, and Alternative #2 were obtained from the noise analysis. Emissions from engine testing were calculated in the same manner as emissions for aircraft operations. Emission estimates are provided in this appendix.

C.4 Ground Vehicles

Emissions from ground vehicles were calculated using emission factors from the California Air Resources Board's EMFAC2007 Model. Ground vehicles operations associated with the Baseline, Alternative #1, and Alternative #2 were calculated based on estimates of personnel that would be associated with the Proposed Action at each installation. It was assumed that vehicles would travel 0.2 mile on base (SAIC 2009) and 9.57 miles off base (URBEMIS Model assumption). Emission estimates include emissions from startups, hot soak, diurnal evaporative emissions, resting loss, and running loss, as well as running exhaust emissions in grams per mile. Emission estimates are provided in this appendix.

References

Air Force Center for Environmental Excellence (AFCEE). 2009. *Air Emissions Factor Guide to Air Force Mobile Sources*.

California Air Resources Board. 2007. EMFAC2007 Emissions Model.

Rimpo and Associates. 2007. URBEMIS Model, Version 9.2.4.

Science Applications International Corporation (SAIC). 2009. *Final 2007 Air Emissions Inventory - 144th Fighter Wing*.

South Coast Air Quality Management District. 2008. OFFROAD Emission Factors.

United States Air Force (USAF). 2010. *U.S. Air Force Air Conformity Applicability Model*.

United States Environmental Protection Agency (USEPA). 1992. *Procedures for Emission Inventory Preparation – Volume IV: Mobile Sources, Chapter 5,* EPA420-R-92-009. December.

_____. 1995. *Compilation of Air Pollutant Emission Factors*. AP-42, Fifth Edition, January.

United States Department of Transportation, Federal Aviation Administration (FAA). 2000. *Consideration of Air Quality Impacts of Airplane Operations at or Above 3000 Feet AGL,* FAA-AEE-00-01, September.

_____. 2009. *Emissions and Dispersion Modeling System*.

Villalvozo, Leland. 2011. Personal communication, San Joaquin Valley Air Pollution Control District, August 31.

URBEMIS Model Outputs

1/28/2012 3:52:57 PM

Urbemis 2007 Version 9.2.4

Combined Annual Emissions Reports (Tons/Year)

File Name:

Project Name: Fresno ANG NDI

Project Location: Fresno County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2012 TOTALS (tons/year unmitigated)	0.02	0.17	0.10	0.00	0.00	0.01	0.01	0.00	0.01	0.01	20.41
2013 TOTALS (tons/year unmitigated)	0.13	0.81	0.52	0.00	0.00	0.05	0.05	0.00	0.04	0.04	103.48

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2

1/28/2012 3:52:57 PM

2012	0.02	0.17	0.10	0.00	0.00	0.01	0.01	0.00	0.01	0.01	20.41
Building 11/01/2012-10/31/2013	0.02	0.17	0.10	0.00	0.00	0.01	0.01	0.00	0.01	0.01	20.41
Building Off Road Diesel	0.02	0.17	0.10	0.00	0.00	0.01	0.01	0.00	0.01	0.01	19.21
Building Vendor Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.73
Building Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.46
2013	0.13	0.81	0.52	0.00	0.00	0.05	0.05	0.00	0.04	0.04	103.48
Building 11/01/2012-10/31/2013	0.11	0.81	0.52	0.00	0.00	0.05	0.05	0.00	0.04	0.04	103.45
Building Off Road Diesel	0.10	0.79	0.49	0.00	0.00	0.05	0.05	0.00	0.04	0.04	97.38
Building Vendor Trips	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.73
Building Worker Trips	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.35
Coating 10/01/2013-10/31/2013	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
Architectural Coating	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03

Phase Assumptions

Phase: Building Construction 11/1/2012 - 10/31/2013 - Default Building Construction Description

Off-Road Equipment:

1 Cranes (399 hp) operating at a 0.43 load factor for 4 hours per day

2 Forklifts (145 hp) operating at a 0.3 load factor for 6 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

Phase: Architectural Coating 10/1/2013 - 10/31/2013 - Default Architectural Coating Description

Rule: Residential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 130

Rule: Residential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 130

Rule: Nonresidential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Nonresidential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

1/31/2012 12:31:36 PM

Urbemis 2007 Version 9.2.4

Combined Annual Emissions Reports (Tons/Year)

File Name: C:\Urbemis\Urbemis 9.2.2\Projects\Fresno ANG EA Arm DeArml.urb924

Project Name: Fresno ANG Arm DeArm Pads

Project Location: Fresno County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2013 TOTALS (tons/year unmitigated)	0.25	1.76	1.22	0.00	0.24	0.12	0.35	0.05	0.11	0.16	200.61
2013 TOTALS (tons/year mitigated)	0.25	1.76	1.22	0.00	0.08	0.12	0.20	0.02	0.11	0.12	200.61
Percent Reduction	0.00	0.00	0.00	0.00	64.33	0.00	43.26	64.14	0.00	20.43	0.00

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2013	0.25	1.76	1.22	0.00	0.24	0.12	0.35	0.05	0.11	0.16	200.61

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Fine Grading 01/01/2013-03/31/2013	0.08	0.66	0.38	0.00	0.18	0.03	0.21	0.04	0.03	0.07	75.19
Fine Grading Dust	0.00	0.00	0.00	0.00	0.18	0.00	0.18	0.04	0.00	0.04	0.00
Fine Grading Off Road Diesel	0.08	0.66	0.36	0.00	0.00	0.03	0.03	0.00	0.03	0.03	71.91
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.28
Asphalt 04/01/2013-06/30/2013	0.05	0.33	0.27	0.00	0.00	0.03	0.03	0.00	0.03	0.03	37.92
Paving Off-Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.05	0.33	0.22	0.00	0.00	0.03	0.03	0.00	0.02	0.02	31.82
Paving On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.27
Paving Worker Trips	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.83
Fine Grading 06/01/2013-06/30/2013	0.03	0.21	0.12	0.00	0.06	0.01	0.07	0.01	0.01	0.02	23.50
Fine Grading Dust	0.00	0.00	0.00	0.00	0.06	0.00	0.06	0.01	0.00	0.01	0.00
Fine Grading Off Road Diesel	0.03	0.21	0.11	0.00	0.00	0.01	0.01	0.00	0.01	0.01	22.47
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.03
Asphalt 07/01/2013-11/30/2013	0.09	0.56	0.45	0.00	0.00	0.05	0.05	0.00	0.04	0.04	63.99
Paving Off-Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.09	0.55	0.37	0.00	0.00	0.05	0.05	0.00	0.04	0.04	53.86
Paving On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.27
Paving Worker Trips	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.87

Phase Assumptions

Phase: Fine Grading 1/1/2013 - 3/31/2013 - Default Fine Site Grading Description

Total Acres Disturbed: 0.9

1/31/2012 12:31:36 PM

Maximum Daily Acreage Disturbed: 0.28

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Graders (174 hp) operating at a 0.61 load factor for 6 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 6 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Fine Grading 6/1/2013 - 6/30/2013 - Default Building Construction Description

Total Acres Disturbed: 0.9

Maximum Daily Acreage Disturbed: 0.28

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Graders (174 hp) operating at a 0.61 load factor for 6 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 6 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Paving 4/1/2013 - 6/30/2013 - Default Paving Description

Acres to be Paved: 0.45

Off-Road Equipment:

4 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 6 hours per day

1 Pavers (100 hp) operating at a 0.62 load factor for 7 hours per day

1 Rollers (95 hp) operating at a 0.56 load factor for 7 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

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Phase: Paving 7/1/2013 - 11/30/2013 - Default Architectural Coating Description

Acres to be Paved: 0.45

Off-Road Equipment:

4 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 6 hours per day

1 Pavers (100 hp) operating at a 0.62 load factor for 7 hours per day

1 Rollers (95 hp) operating at a 0.56 load factor for 7 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

Construction Mitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Mitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2

1/31/2012 12:31:36 PM

2013	0.25	1.76	1.22	0.00	0.08	0.12	0.20	0.02	0.11	0.12	200.61
Fine Grading 01/01/2013-03/31/2013	0.08	0.66	0.38	0.00	0.06	0.03	0.10	0.01	0.03	0.04	75.19
Fine Grading Dust	0.00	0.00	0.00	0.00	0.06	0.00	0.06	0.01	0.00	0.01	0.00
Fine Grading Off Road Diesel	0.08	0.66	0.36	0.00	0.00	0.03	0.03	0.00	0.03	0.03	71.91
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.28
Asphalt 04/01/2013-06/30/2013	0.05	0.33	0.27	0.00	0.00	0.03	0.03	0.00	0.03	0.03	37.92
Paving Off-Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.05	0.33	0.22	0.00	0.00	0.03	0.03	0.00	0.02	0.02	31.82
Paving On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.27
Paving Worker Trips	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.83
Fine Grading 06/01/2013-06/30/2013	0.03	0.21	0.12	0.00	0.02	0.01	0.03	0.00	0.01	0.01	23.50
Fine Grading Dust	0.00	0.00	0.00	0.00	0.02	0.00	0.02	0.00	0.00	0.00	0.00
Fine Grading Off Road Diesel	0.03	0.21	0.11	0.00	0.00	0.01	0.01	0.00	0.01	0.01	22.47
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.03
Asphalt 07/01/2013-11/30/2013	0.09	0.56	0.45	0.00	0.00	0.05	0.05	0.00	0.04	0.04	63.99
Paving Off-Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.09	0.55	0.37	0.00	0.00	0.05	0.05	0.00	0.04	0.04	53.86
Paving On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.27
Paving Worker Trips	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.87

Construction Related Mitigation Measures

The following mitigation measures apply to Phase: Fine Grading 1/1/2013 - 3/31/2013 - Default Fine Site Grading Description

1/31/2012 12:31:36 PM

For Soil Stablizing Measures, the Water exposed surfaces 3x daily watering mitigation reduces emissions by:

PM10: 61% PM25: 61%

For Unpaved Roads Measures, the Reduce speed on unpaved roads to less than 15 mph mitigation reduces emissions by:

PM10: 44% PM25: 44%

For Unpaved Roads Measures, the Manage haul road dust 3x daily watering mitigation reduces emissions by:

PM10: 61% PM25: 61%

The following mitigation measures apply to Phase: Fine Grading 6/1/2013 - 6/30/2013 - Default Building Construction Description

For Soil Stablizing Measures, the Water exposed surfaces 3x daily watering mitigation reduces emissions by:

PM10: 61% PM25: 61%

For Unpaved Roads Measures, the Reduce speed on unpaved roads to less than 15 mph mitigation reduces emissions by:

PM10: 44% PM25: 44%

For Unpaved Roads Measures, the Manage haul road dust 3x daily watering mitigation reduces emissions by:

PM10: 61% PM25: 61%

1/28/2012 3:44:48 PM

Urbemis 2007 Version 9.2.4

Combined Annual Emissions Reports (Tons/Year)

File Name:

Project Name: Fresno ANG Munitions Storage

Project Location: Fresno County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2012 TOTALS (tons/year unmitigated)	0.06	0.47	0.27	0.00	0.04	0.02	0.07	0.01	0.02	0.03	50.52
2012 TOTALS (tons/year mitigated)	0.06	0.47	0.27	0.00	0.02	0.02	0.04	0.00	0.02	0.02	50.52
Percent Reduction	0.00	0.00	0.00	0.00	64.44	0.00	41.95	64.33	0.00	19.16	0.00
2013 TOTALS (tons/year unmitigated)	0.11	0.84	0.59	0.00	0.00	0.05	0.05	0.00	0.04	0.04	118.27
2013 TOTALS (tons/year mitigated)	0.11	0.84	0.59	0.00	0.00	0.05	0.05	0.00	0.04	0.04	118.27
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2

1/28/2012 3:44:48 PM

2012	0.06	0.47	0.27	0.00	0.04	0.02	0.07	0.01	0.02	0.03	50.52
Fine Grading 11/01/2012-12/31/2012	0.06	0.47	0.27	0.00	0.04	0.02	0.07	0.01	0.02	0.03	50.52
Fine Grading Dust	0.00	0.00	0.00	0.00	0.04	0.00	0.04	0.01	0.00	0.01	0.00
Fine Grading Off Road Diesel	0.06	0.47	0.25	0.00	0.00	0.02	0.02	0.00	0.02	0.02	48.32
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.20
2013	0.11	0.84	0.59	0.00	0.00	0.05	0.05	0.00	0.04	0.04	118.27
Building 01/01/2013-10/31/2013	0.11	0.84	0.59	0.00	0.00	0.05	0.05	0.00	0.04	0.04	118.27
Building Off Road Diesel	0.10	0.79	0.49	0.00	0.00	0.05	0.05	0.00	0.04	0.04	97.38
Building Vendor Trips	0.00	0.05	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.82
Building Worker Trips	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.07

Phase Assumptions

Phase: Fine Grading 11/1/2012 - 12/31/2012 - Default Fine Site Grading Description

Total Acres Disturbed: 0.39

Maximum Daily Acreage Disturbed: 0.1

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Graders (174 hp) operating at a 0.61 load factor for 6 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 6 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Building Construction 1/1/2013 - 10/31/2013 - Default Building Construction Description

Off-Road Equipment:

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1 Cranes (399 hp) operating at a 0.43 load factor for 4 hours per day

2 Forklifts (145 hp) operating at a 0.3 load factor for 6 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

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Construction Mitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Mitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2012	0.06	0.47	0.27	0.00	0.02	0.02	0.04	0.00	0.02	0.02	50.52
Fine Grading 11/01/2012-12/31/2012	0.06	0.47	0.27	0.00	0.02	0.02	0.04	0.00	0.02	0.02	50.52
Fine Grading Dust	0.00	0.00	0.00	0.00	0.02	0.00	0.02	0.00	0.00	0.00	0.00
Fine Grading Off Road Diesel	0.06	0.47	0.25	0.00	0.00	0.02	0.02	0.00	0.02	0.02	48.32
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.20
2013	0.11	0.84	0.59	0.00	0.00	0.05	0.05	0.00	0.04	0.04	118.27
Building 01/01/2013-10/31/2013	0.11	0.84	0.59	0.00	0.00	0.05	0.05	0.00	0.04	0.04	118.27
Building Off Road Diesel	0.10	0.79	0.49	0.00	0.00	0.05	0.05	0.00	0.04	0.04	97.38
Building Vendor Trips	0.00	0.05	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.82
Building Worker Trips	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.07

Construction Related Mitigation Measures

The following mitigation measures apply to Phase: Fine Grading 11/1/2012 - 12/31/2012 - Default Fine Site Grading Description

For Soil Stablizing Measures, the Water exposed surfaces 3x daily watering mitigation reduces emissions by:

PM10: 61% PM25: 61%

For Unpaved Roads Measures, the Reduce speed on unpaved roads to less than 15 mph mitigation reduces emissions by:

PM10: 44% PM25: 44%

For Unpaved Roads Measures, the Manage haul road dust 3x daily watering mitigation reduces emissions by:

PM10: 61% PM25: 61%

1/28/2012 3:33:22 PM

Urbemis 2007 Version 9.2.4

Combined Annual Emissions Reports (Tons/Year)

File Name:

Project Name: Fresno ANG Corrosion Control

Project Location: Fresno County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2012 TOTALS (tons/year unmitigated)	0.06	0.47	0.27	0.00	0.04	0.02	0.07	0.01	0.02	0.03	50.52
2012 TOTALS (tons/year mitigated)	0.06	0.47	0.27	0.00	0.02	0.02	0.04	0.00	0.02	0.02	50.52
Percent Reduction	0.00	0.00	0.00	0.00	64.44	0.00	41.95	64.33	0.00	19.16	0.00
2013 TOTALS (tons/year unmitigated)	0.19	1.34	0.98	0.00	0.00	0.09	0.09	0.00	0.08	0.08	180.48
2013 TOTALS (tons/year mitigated)	0.19	1.34	0.98	0.00	0.00	0.09	0.09	0.00	0.08	0.08	180.48
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2014 TOTALS (tons/year unmitigated)	0.13	0.23	0.17	0.00	0.00	0.01	0.01	0.00	0.01	0.01	35.12
2014 TOTALS (tons/year mitigated)	0.13	0.23	0.17	0.00	0.00	0.01	0.01	0.00	0.01	0.01	35.12
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2012	0.06	0.47	0.27	0.00	0.04	0.02	0.07	0.01	0.02	0.03	50.52
Fine Grading 11/01/2012-12/31/2012	0.06	0.47	0.27	0.00	0.04	0.02	0.07	0.01	0.02	0.03	50.52
Fine Grading Dust	0.00	0.00	0.00	0.00	0.04	0.00	0.04	0.01	0.00	0.01	0.00
Fine Grading Off Road Diesel	0.06	0.47	0.25	0.00	0.00	0.02	0.02	0.00	0.02	0.02	48.32
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.20
2013	0.19	1.34	0.98	0.00	0.00	0.09	0.09	0.00	0.08	0.08	180.48
Building 01/01/2013-03/31/2014	0.13	1.01	0.71	0.00	0.00	0.06	0.06	0.00	0.05	0.05	142.76
Building Off Road Diesel	0.12	0.95	0.58	0.00	0.00	0.06	0.06	0.00	0.05	0.05	116.59
Building Vendor Trips	0.00	0.06	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	16.06
Building Worker Trips	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.11
Asphalt 04/01/2013-06/30/2013	0.05	0.33	0.27	0.00	0.00	0.03	0.03	0.00	0.03	0.03	37.72
Paving Off-Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.05	0.33	0.22	0.00	0.00	0.03	0.03	0.00	0.02	0.02	31.82
Paving On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06
Paving Worker Trips	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.83

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2014	0.13	0.23	0.17	0.00	0.00	0.01	0.01	0.00	0.01	0.01	35.12
Building 01/01/2013-03/31/2014	0.03	0.23	0.17	0.00	0.00	0.01	0.01	0.00	0.01	0.01	35.01
Building Off Road Diesel	0.03	0.21	0.14	0.00	0.00	0.01	0.01	0.00	0.01	0.01	28.59
Building Vendor Trips	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.94
Building Worker Trips	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.48
Coating 01/01/2014-03/30/2014	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12
Architectural Coating	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12

Phase Assumptions

Phase: Fine Grading 11/1/2012 - 12/31/2012 - Default Fine Site Grading Description

Total Acres Disturbed: 0.41

Maximum Daily Acreage Disturbed: 0.1

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Graders (174 hp) operating at a 0.61 load factor for 6 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 6 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Paving 4/1/2013 - 6/30/2013 - Default Paving Description

Acres to be Paved: 0.1

Off-Road Equipment:

4 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 6 hours per day

1 Pavers (100 hp) operating at a 0.62 load factor for 7 hours per day

1 Rollers (95 hp) operating at a 0.56 load factor for 7 hours per day

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1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

Phase: Building Construction 1/1/2013 - 3/31/2014 - Default Building Construction Description

Off-Road Equipment:

1 Cranes (399 hp) operating at a 0.43 load factor for 4 hours per day

2 Forklifts (145 hp) operating at a 0.3 load factor for 6 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

Phase: Architectural Coating 1/1/2014 - 3/30/2014 - Default Architectural Coating Description

Rule: Residential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 130

Rule: Residential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 130

Rule: Nonresidential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Nonresidential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Construction Mitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Mitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2012	0.06	0.47	0.27	0.00	0.02	0.02	0.04	0.00	0.02	0.02	50.52
Fine Grading 11/01/2012-12/31/2012	0.06	0.47	0.27	0.00	0.02	0.02	0.04	0.00	0.02	0.02	50.52
Fine Grading Dust	0.00	0.00	0.00	0.00	0.02	0.00	0.02	0.00	0.00	0.00	0.00
Fine Grading Off Road Diesel	0.06	0.47	0.25	0.00	0.00	0.02	0.02	0.00	0.02	0.02	48.32
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.20

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2013	0.19	1.34	0.98	0.00	0.00	0.09	0.09	0.00	0.08	0.08	180.48
Building 01/01/2013-03/31/2014	0.13	1.01	0.71	0.00	0.00	0.06	0.06	0.00	0.05	0.05	142.76
Building Off Road Diesel	0.12	0.95	0.58	0.00	0.00	0.06	0.06	0.00	0.05	0.05	116.59
Building Vendor Trips	0.00	0.06	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	16.06
Building Worker Trips	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.11
Asphalt 04/01/2013-06/30/2013	0.05	0.33	0.27	0.00	0.00	0.03	0.03	0.00	0.03	0.03	37.72
Paving Off-Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.05	0.33	0.22	0.00	0.00	0.03	0.03	0.00	0.02	0.02	31.82
Paving On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06
Paving Worker Trips	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.83
2014	0.13	0.23	0.17	0.00	0.00	0.01	0.01	0.00	0.01	0.01	35.12
Building 01/01/2013-03/31/2014	0.03	0.23	0.17	0.00	0.00	0.01	0.01	0.00	0.01	0.01	35.01
Building Off Road Diesel	0.03	0.21	0.14	0.00	0.00	0.01	0.01	0.00	0.01	0.01	28.59
Building Vendor Trips	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.94
Building Worker Trips	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.48
Coating 01/01/2014-03/30/2014	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12
Architectural Coating	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12

Construction Related Mitigation Measures

The following mitigation measures apply to Phase: Fine Grading 11/1/2012 - 12/31/2012 - Default Fine Site Grading Description

For Soil Stablizing Measures, the Water exposed surfaces 3x daily watering mitigation reduces emissions by:

PM10: 61% PM25: 61%

For Unpaved Roads Measures, the Reduce speed on unpaved roads to less than 15 mph mitigation reduces emissions by:

PM10: 44% PM25: 44%

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For Unpaved Roads Measures, the Manage haul road dust 3x daily watering mitigation reduces emissions by:

PM10: 61% PM25: 61%

Emission Calculations

Table 1. Annual Flight Operations for 144th Fighter Wing - Baseline, Fresno

Aircraft Type	Engine Model	Type of Operation (Flight Profile)	Baseline Total Number of Operations	Segment Length, feet	Height above AGL, ft	Power Setting	Modeled Power Setting	Average speed per segment, feet/sec	No. of Engines	Time in Mode, seconds	Time in Mode, hours	Total Time In Mode (TIM) Total TIM = TIM x #of Operations: Idle (hr)	Approach (hr)	Intermediate (hr)	Military (hr)	AB-5 (hr)
F-16C/D	F100-PW-220															
		Departures =	**2,199**						1							
		F1611LD6	460													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	141.8333				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					1.8170
		b-c		6000	1400	91	Military	464.145		12.9270	0.0036				1.6518	
		c-d		1500	1600	91	Military	506.340		2.9624	0.0008				0.3785	
		d-e		13500	2500	86	Intermediate	506.340		26.6619	0.0074			3.4068		
		e-f		5772	3000	86	Intermediate	506.340		11.3995	0.0032			1.4566		
		F1611LD8	81													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	24.9750				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.3199
		b-c		6000	1400	91	Military	464.145		12.9270	0.0036				0.2909	
		c-d		1500	1600	91	Military	506.340		2.9624	0.0008				0.0667	
		d-e		13500	2500	86	Intermediate	506.340		26.6619	0.0074			0.5999		
		e-3000		3428.571429	3000	86	Intermediate	506.340		6.7713	0.0019			0.1524		
		F1629LD1	18													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	5.5500				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.0711
		b-c		6240	1300	91	Military	464.145		13.4441	0.0037				0.0672	
		c-d		1760	1600	88	Military	506.340		3.4759	0.0010				0.0174	
		d-e		13000	2500	86	Intermediate	506.340		25.6744	0.0071			0.1284		
		e-3000		3428.571429	3000	86	Intermediate	506.340		6.7713	0.0019			0.0339		
		F1629LD2	7													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	2.1583				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.0276
		b-c		6240	1300	91	Military	464.145		13.4441	0.0037				0.0261	
		c-d		1760	1600	88	Military	506.34		3.4759	0.0010				0.0068	
		d-e		13000	2500	86	Intermediate	506.34		25.6744	0.0071			0.0499		
		e-3000		3428.571429	3000	86	Intermediate	506.34		6.7713	0.0019			0.0132		
		F1629RD8	1,356													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	418.1000				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					5.3561
		b-c		6000	1300	91	Military	464.145		12.9270	0.0036				4.8692	
		c-d		2000	1600	91	Military	506.34		3.9499	0.0011				1.4878	
		d-e		13000	2500	86	Intermediate	506.34		25.6744	0.0071			9.6707		
		e-3000		3428.571429	3000	86	Intermediate	506.34		6.7713	0.0019			2.5505		
		F1629RD9	277													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	85.4083				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					1.0941
		b-c		6000	1300	91	Military	464.145		12.9270	0.0036				0.9947	
		c-d		2000	1600	88	Military	506.34		3.9499	0.0011				0.3039	
		d-e		13000	2500	86	Intermediate	506.34		25.6744	0.0071			1.9755		
		e-3000		3428.571429	3000	86	Intermediate	506.34		6.7713	0.0019			0.5210		
		Arrivals =	**2,198**													
		F1611LA1OH	296													
	Segment	a-b		30000	3000	85	Approach	506.340		59.2487	0.0165		4.8716			
		b-c		12000	2000	85	Approach	506.340		23.6995	0.0066		1.9486			
		c-d		26000	2000	80	Approach	430.389		60.4105	0.0168		4.9671			
		d-e		12000	2000	80	Approach	345.999		34.6822	0.0096		2.8516			
		e-f		14000	2000	80	Approach	295.365		47.3990	0.0132		3.8972			
		f-g		6000	300	80	Approach	248.951		24.1012	0.0067		1.9817			
		Taxi In					**Idle**	Idle			0.1883	55.7467				
		F1611LA2	146													
	Segment	a-b		15760	3000	88	Approach	430.389		36.6180	0.0102		1.4851			
		b-c		15000	2200	88	Approach	354.438		42.3205	0.0118		1.7163			
		c-d		12000	1500	85	Approach	329.121		36.4608	0.0101		1.4787			
		d-e		12000	1000	80	Approach	278.487		43.0900	0.0120		1.7475			
		e-f		6000	300	80	Approach	244.731		24.5167	0.0068		0.9943			
		Taxi In					**Idle**	Idle			0.1883	27.4967				
		F1611A4BF	14													
	Segment	b-c		26000	3000	88	Approach	421.950		61.6187	0.0171		0.2396			
		c-d		9000	2500	87	Approach	337.560		26.6619	0.0074		0.1037			
		d-e		9000	2500	87	Approach	295.365		30.4708	0.0085		0.1185			
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.0937			
		Taxi In					**Idle**	Idle			0.1883	2.6367				
		F1611LA4HF	15													
	Segment	3000-e		3375	3000	75	Approach	284.816		11.8497	0.0033		0.0494			
		e-f		6000	300	75	Approach	253.170		23.6995	0.0066		0.0987			
		Taxi In					**Idle**	Idle			0.1883	2.8250				
		F1611LA4LF	14													
	Segment	3000-e		6567.567568	3000	75	Approach	290.119		22.6375	0.0063		0.0880			
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.0937			
		Taxi In					**Idle**	Idle			0.1883	2.6367				
		F1629RA1BF	42													
	Segment	b-c		26000	3000	88	Approach	421.950		61.6187	0.0171		0.7189			
		c-d		9000	2500	87	Approach	337.560		26.6619	0.0074		0.3111			
		d-e		9000	2500	87	Approach	295.365		30.4708	0.0085		0.3555			
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.2812			
		Taxi In					**Idle**	Idle			0.1883	7.9100				
		F1629RA1HF	43													
	Segment	3000-e		3375	3000	75	Approach	284.816		11.8497	0.0033		0.1415			
		e-f		6000	300	75	Approach	248.951		24.1012	0.0067		0.2879			
		Taxi In					**Idle**	Idle			0.1883	8.0983				
		F1629RA1LF	42													
	Segment	3000-e		6567.567568	3000	75	Approach	290.119		22.6375	0.0063		0.2641			
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.2812			
		Taxi In					**Idle**	Idle			0.1883	7.9100				
		F1629RA2	326													
	Segment	3000-d		3612	3000	86	Approach	445.5792		8.1063	0.0023		0.7341			
		d-e		12180	2700	85	Approach	354.438		34.3643	0.0095		3.1119			
		e-f		6500	2100	85	Approach	354.438		18.3389	0.0051		1.6607			
		f-g		5620	1800	85	Approach	329.121		17.0758	0.0047		1.5463			
		g-h		12380	1500	85	Approach	303.804		40.7500	0.0113		3.6901			
		h-i		11924	900	80	Approach	278.487		42.8171	0.0119		3.8773			
		i-j		6076	300	80	Approach	244.731		24.8273	0.0069		2.2482			
		Taxi In					**Idle**	Idle			0.1883	61.3967				
		F1629RA5OH	1,260													
	Segment	e-f		6076	3000	85	Approach	506.34		11.9998	0.0033		4.1999			
		f-g		6076	2500	85	Approach	430.389		14.1175	0.0039		4.9411			
		g-h		23856	2000	80	Approach	354.438		67.3066	0.0187		23.5573			
		h-i		13512	2000	80	Approach	345.999		39.0521	0.0108		13.6682			
		i-j		12760	2000	80	Approach	295.365		43.2008	0.0120		15.1203			
		j-k		6100	500	80	Approach	248.9505		24.5029	0.0068		8.5760			
		Taxi In					**Idle**	Idle			0.1883	237.3000				
		Closed Pattern Ops =	**281**													
		F1611LCP1	70													
	Segment	a-b		3,000	50	83	Military	299.585		10.0139	0.0028				0.1947	
		b-c		6,000	100	94	Military	430.389		13.9409	0.0039				0.2711	
		c-d		11,000	1,100	94	Intermediate	464.145		23.6995	0.0066			0.4608		
		d-e		12,000	2,000	87	Approach	388.194		30.9124	0.0086		0.6011			
		e-f		10,850	2,000	87	Approach	303.804		35.7138	0.0099		0.6944			
		f-g		6,000	300	87	Approach	248.951		24.1012	0.0067		0.4686			
		F1629LCP1	211													
	Segment	a-b		3,000	50	83	Military	299.585		10.0139	0.0028				0.5869	
		b-c		6,000	100	94	Military	430.389		13.9409	0.0039				0.8171	
		c-d		11,000	1,100	94	Intermediate	464.145		23.6995	0.0066			1.3891		
		d-e		12,000	2,000	87	Approach	388.194		30.9124	0.0086		1.8118			
		e-f		10,850	2,000	87	Approach	303.804		35.7138	0.0099		2.0932			
		f-g		6,000	300	87	Approach	248.951		24.1012	0.0067		1.4126			
		Total F-16 =	**4,678**									**1091.9817 hrs in Idle**	**125.4798 hrs in Approach**	**22.4086 hrs in Intermediate**	**12.0307 hrs in Military**	**8.6859 hrs in AB-5**

Mode Variables: Mode	Totsl TIM (hr)	Fuel Flow Rate, lbs/hr	Emission Indices, lbs/1000 lbs fuel: CO	NOx	VOC	SOx	PM10	Total Emissions, lbs/year: CO	NOx	VOC	SOx	PM10
Idle	1092.0	1,084	35.30	4.61	7.94	1.20	2.06	41784.90	5456.89	9398.64	1420.45	2438.44
Approach	125.5	3,837	1.92	12.53	5.12	1.20	2.63	924.41	6032.77	2465.11	577.76	1266.26
Intermediate	22.4	5,770	0.86	22.18	2.89	1.20	2.06	111.20	2867.82	373.67	155.16	266.35
Military	12.0	9,679	0.86	29.32	1.79	1.20	1.33	100.14	3414.17	208.44	139.73	154.87
AB-5	8.7	41,682	11.99	8.37	1.53	1.20	1.15	4340.91	3030.31	553.93	434.45	416.35

Total Aircraft Emissions

	CO	NOx	VOC	SOx	PM10
Total Emissions (lbs/yr) =	**47261.56**	**20801.96**	**12999.78**	**2727.55**	**4542.27**
Total Emissions (tons/yr) =	**23.63**	**10.40**	**6.50**	**1.36**	**2.27**

Total fuel transferred, lbs	**2272960.62**
Total fuel transferred, gal	**336236.7781**
Refueling emissions, lbs/year	**13.81264009**

Table 2. Annual Flight Operations for 144th Fighter Wing - Baseline, March ARB

Aircraft Type	Engine Model	Type of Operation	Baseline Total Number of Operations	Segment Length, feet	Height above AGL, ft	Power Setting	Modeled Power Setting	Speed, kts	No. of Engines	Time in Mode, hours	Total Time In Mode (TIM) Total TIM = TIM x #of Operations: Idle (hr)	Approach (hr)	Intermediate (hr)	Military (hr)	AB-5 (hr)
F-16C/D	F100-PW-220														
		Departures =	**438**						**1**						
		F16DA	22												
		Taxi Out					**Idle**	Idle		0.3083	6.7833				
	Segment	a-b		3000	0	90	AB-5	135.024	22.2183	0.0062					0.1358
		b-c		7000	200	91	AB-5	388.194	18.0322	0.0050					0.1102
		c-d		18000	2900	90	Military	548.535	32.8147	0.0091				0.2005	
		d-3000		872.6708075	3000	90	Military	590.730	1.4773	0.0004				0.0090	
		F16DB	416												
		Taxi Out					**Idle**	Idle		0.3083	128.2667				
	Segment	a-b		3,000	0	90	AB-5	135.024	22.2183	0.0062					2.5674
		b-c		7,000	200	91	AB-5	388.194	18.0322	0.0050					2.0837
		c-d		18,000	2,900	90	Military	548.535	32.8147	0.0091				3.7919	
		d-3000		873	3,000	90	Military	590.730	1.4773	0.0004				0.1707	
		Arrivals =	448												
		F16AA	182												
	Segment	3000-c		16,473	3,000	76	Approach	506.340	32.5331	0.0090		1.6447			
		c-d		29,820	1,970	76	Approach	506.340	58.8932	0.0164		2.9774			
		d-e		8,372	1,965	76	Approach	455.706	18.3715	0.0051		0.9288			
		e-f		3,490	1,965	76	Approach	388.194	8.9904	0.0025		0.4545			
		f-g		3,429	1,965	85	Approach	354.438	9.6745	0.0027		0.4891			
		g-h		9,426	1,965	85	Approach	320.682	29.3936	0.0082		1.4860			
		h-i		6,000	300	82	Approach	286.926	20.9113	0.0058		1.0572			
		Taxi In					**Idle**	Idle		0.1883	34.2767				
		F16AB	257												
	Segment	3000-d		21,198	3,000	76	Approach	346.327	61.2080	0.0170		4.3696			
		d-e		14,414	2,065	80	Approach	303.804	47.4451	0.0132		3.3871			
		e-f		38,496	2,065	80	Approach	261.609	147.1509	0.0409		10.5049			
		Taxi In					**Idle**	Idle		0.1883	48.4017				
		F16AC	9												
	Segment	3000-c		32,268	3,000	76	Approach	348.090	92.6987	0.0257		0.2317			
		c-d		9,000	1,565	80	Approach	303.804	29.6244	0.0082		0.0741			
		d-e		33,000	1,565	80	Approach	261.609	126.1424	0.0350		0.3154			
		Taxi In					**Idle**	Idle		0.1883	1.6950				
		Closed Pattern Ops =	442												
		F16CA	89												
	Segment	a-b		1,000	50	75	Approach	248.951	4.0169	0.0011		0.0993			
		b-c		12,300	100	92	Military	299.585	41.0569	0.0114				1.0150	
		c-d		18,076	1,000	85	Military	379.755	47.5991	0.0132				1.1768	
		d-e		102,945	2,465	82	Intermediate	421.950	243.9744	0.0678			6.0316		
		e-f		36,179	2,465	85	Intermediate	379.755	95.2693	0.0265			2.3553		
		f-g		39,930	2,465	75	Approach	303.804	131.4334	0.0365		3.2493			
		g-h		38,442	2,065	75	Approach	253.170	151.8426	0.0422		3.7539			
		F16CB	353												
	Segment	a-b		1,000	50	75	Approach	253.170	3.9499	0.0011		0.3873			
		b-c		12,300	100	92	Military	303.804	40.4866	0.0112				3.9699	
		c-d		11,640	1,000	85	Military	379.755	30.6513	0.0085				3.0055	
		d-e		5,060	1,965	82	Intermediate	396.633	12.7574	0.0035			1.2509		
		e-f		13,000	1,965	85	Approach	337.560	38.5117	0.0107		3.7763			
		f-g		11,000	1,965	80	Approach	286.926	38.3374	0.0106		3.7592			
		g-h		6,591	300	80	Approach	253.170	26.0339	0.0072		2.5528			
Total Aircraft Emissions											**219.4233 hrs in Idle**	**45.4985 hrs in Approach**	**9.6378 hrs in Intermediate**	**13.3394 hrs in Military**	**4.8971 hrs in AB-5**

Mode	Totsl TIM (hr)	Fuel Flow Rate, lbs/hr	Emission Indices, lbs/1000 lbs fuel: CO	NOx	VOC	SOx	PM10	Total Emissions, lbs/year: CO	NOx	VOC	SOx	PM10
Idle	219.4	1,084	35.30	4.61	7.94	1.20	2.06	8396.28	1096.51	1888.57	285.43	489.98
Approach	45.5	3,837	1.92	12.53	5.12	1.20	2.63	335.19	2187.46	893.84	209.49	459.14
Intermediate	9.6	5,770	0.86	22.18	2.89	1.20	2.06	47.82	1233.43	160.71	66.73	114.56
Military	13.3	9,679	0.86	29.32	1.79	1.20	1.33	111.04	3785.57	231.11	154.93	171.72
AB-5	4.9	41,682	11.99	8.37	1.53	1.20	1.15	2447.43	1708.51	312.31	244.95	234.74

Total Aircraft Emissions

	CO	NOx	VOC	SOx	PM10
Total Emissions (lbs/yr) =	**11337.76**	**10011.48**	**3486.54**	**961.53**	**1470.14**
Total Emissions (tons/yr) =	**5.67**	**5.01**	**1.74**	**0.48**	**0.74**

Total fuel transferred, lbs	**801277.8**
Total fuel transferred, gal	**118532.2**
Refueling emissions, lbs/yea	**4.869315**

NOTES: Emission Indices from *Air Emissions Factor Guide to Air Force Mobile Sources*, Air Force Center for Engineering and the Environment, December 2003.
Flight Profiles from B. Wear, from noise analysis.
Refueling emissions from total fuel used, calculation from *Air Emissions Inventory Guidance Document for Stationary Sources at Air Force Installations*, December 2003.

Table 3. Annual Flight Operations for 144th Fighter Wing - 2012 Phase Out, F-16

Aircraft Type	Engine Model	Type of Operation (Flight Profile)	Baseline Total Number of Operations	Segment Length, feet	Height above AGL, ft	Power Setting	Modeled Power Setting	Average speed per segment, feet/sec	No. of Engines	Time in Mode, seconds	Time in Mode, hours	Total Time in Mode (TIM): Idle (hr)	Approach (hr)	Intermediate (hr)	Military (hr)	AB-5 (hr)
											Total TIM = TIM x #of Operations					
F-16C/D	F100-PW-220															
		Departures =	**1,477**						1							
		F1611LD6	309													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	95.2750				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					1.2205
		b-c		6000	1400	91	Military	464.145		12.9270	0.0036				1.1096	
		c-d		1500	1600	91	Military	506.340		2.9624	0.0008				0.2543	
		d-e		13500	2500	86	Intermediate	506.340		26.6619	0.0074			2.2885		
		e-f		5772	3000	86	Intermediate	506.340		11.3995	0.0032			0.9785		
		F1611LD8	54													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	16.6500				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.2133
		b-c		6000	1400	91	Military	464.145		12.9270	0.0036				0.1939	
		c-d		1500	1600	91	Military	506.340		2.9624	0.0008				0.0444	
		d-e		13500	2500	86	Intermediate	506.340		26.6619	0.0074			0.3999		
		e-3000		3428.571429	3000	86	Intermediate	506.340		6.7713	0.0019			0.1016		
		F1629LD1	12													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	3.7000				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.0474
		b-c		6240	1300	91	Military	464.145		13.4441	0.0037				0.0448	
		c-d		1760	1600	88	Military	506.340		3.4759	0.0010				0.0116	
		d-e		13000	2500	86	Intermediate	506.340		25.6744	0.0071			0.0856		
		e-3000		3428.571429	3000	86	Intermediate	506.340		6.7713	0.0019			0.0226		
		F1629LD2	5													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	1.5417				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.0197
		b-c		6240	1300	91	Military	464.145		13.4441	0.0037				0.0187	
		c-d		1760	1600	88	Military	506.34		3.4759	0.0010				0.0048	
		d-e		13000	2500	86	Intermediate	506.34		25.6744	0.0071			0.0357		
		e-3000		3428.571429	3000	86	Intermediate	506.34		6.7713	0.0019			0.0094		
		F1629RD8	911													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	280.8917				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					3.5984
		b-c		6000	1300	91	Military	464.145		12.9270	0.0036				3.2712	
		c-d		2000	1600	91	Military	506.34		3.9499	0.0011				0.9995	
		d-e		13000	2500	86	Intermediate	506.34		25.6744	0.0071			6.4971		
		e-3000		3428.571429	3000	86	Intermediate	506.34		6.7713	0.0019			1.7135		
		F1629RD9	186													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	57.3500				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.7347
		b-c		6000	1300	91	Military	464.145		12.9270	0.0036				0.6679	
		c-d		2000	1600	88	Military	506.34		3.9499	0.0011				0.2041	
		d-e		13000	2500	86	Intermediate	506.34		25.6744	0.0071			1.3265		
		e-3000		3428.571429	3000	86	Intermediate	506.34		6.7713	0.0019			0.3498		
		Arrivals =	**1,476**													
		F1611LA1OH	199													
	Segment	a-b		30000	3000	85	Approach	506.340		59.2487	0.0165		3.2751			
		b-c		12000	2000	85	Approach	506.340		23.6995	0.0066		1.3101			
		c-d		26000	2000	80	Approach	430.389		60.4105	0.0168		3.3394			
		d-e		12000	2000	80	Approach	345.999		34.6822	0.0096		1.9172			
		e-f		14000	2000	80	Approach	295.365		47.3990	0.0132		2.6201			
		f-g		6000	300	80	Approach	248.951		24.1012	0.0067		1.3323			
		Taxi In					**Idle**	Idle			0.1883	37.4783				
		F1611LA2	98													
	Segment	a-b		15760	3000	88	Approach	430.389		36.6180	0.0102		0.9968			
		b-c		15000	2200	88	Approach	354.438		42.3205	0.0118		1.1521			
		c-d		12000	1500	85	Approach	329.121		36.4608	0.0101		0.9925			
		d-e		12000	1000	80	Approach	278.487		43.0900	0.0120		1.1730			
		e-f		6000	300	80	Approach	244.731		24.5167	0.0068		0.6674			
		Taxi In					**Idle**	Idle			0.1883	18.4567				
		F1611A4BF	9													
	Segment	b-c		26000	3000	88	Approach	421.950		61.6187	0.0171		0.1540			
		c-d		9000	2500	87	Approach	337.560		26.6619	0.0074		0.0667			
		d-e		9000	2500	87	Approach	295.365		30.4708	0.0085		0.0762			
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.0603			
		Taxi In					**Idle**	Idle			0.1883	1.6950				
		F1611LA4HF	10													
	Segment	3000-e		3375	3000	75	Approach	284.816		11.8497	0.0033		0.0329			
		e-f		6000	300	75	Approach	253.170		23.6995	0.0066		0.0658			
		Taxi In					**Idle**	Idle			0.1883	1.8833				
		F1611LA4LF	9													
	Segment	3000-e		6567.567568	3000	75	Approach	290.119		22.6375	0.0063		0.0566			
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.0603			
		Taxi In					**Idle**	Idle			0.1883	1.6950				
		F1629RA1BF	28													
	Segment	b-c		26000	3000	88	Approach	421.950		61.6187	0.0171		0.4793			
		c-d		9000	2500	87	Approach	337.560		26.6619	0.0074		0.2074			
		d-e		9000	2500	87	Approach	295.365		30.4708	0.0085		0.2370			
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.1875			
		Taxi In					**Idle**	Idle			0.1883	5.2733				
		F1629RA1HF	29													
	Segment	3000-e		3375	3000	75	Approach	284.816		11.8497	0.0033		0.0955			
		e-f		6000	300	75	Approach	248.951		24.1012	0.0067		0.1941			
		Taxi In					**Idle**	Idle			0.1883	5.4617				
		F1629RA1LF	28													
	Segment	3000-e		6567.567568	3000	75	Approach	290.119		22.6375	0.0063		0.1761			
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.1875			
		Taxi In					**Idle**	Idle			0.1883	5.2733				
		F1629RA2	219													
	Segment	3000-d		3612	3000	86	Approach	445.5792		8.1063	0.0023		0.4931			
		d-e		12180	2700	85	Approach	354.438		34.3643	0.0095		2.0905			
		e-f		6500	2100	85	Approach	354.438		18.3389	0.0051		1.1156			
		f-g		5620	1800	85	Approach	329.121		17.0758	0.0047		1.0388			
		g-h		12380	1500	85	Approach	303.804		40.7500	0.0113		2.4790			
		h-i		11924	900	80	Approach	278.487		42.8171	0.0119		2.6047			
		i-j		6076	300	80	Approach	244.731		24.8273	0.0069		1.5103			
		Taxi In					**Idle**	Idle			0.1883	41.2450				
		F1629RA5OH	847													
	Segment	e-f		6076	3000	85	Approach	506.34		11.9998	0.0033		2.8233			
		f-g		6076	2500	85	Approach	430.389		14.1175	0.0039		3.3215			
		g-h		23856	2000	80	Approach	354.438		67.3066	0.0187		15.8357			
		h-i		13512	2000	80	Approach	345.999		39.0521	0.0108		9.1881			
		i-j		12760	2000	80	Approach	295.365		43.2008	0.0120		10.1642			
		j-k		6100	500	80	Approach	248.9505		24.5029	0.0068		5.7650			
		Taxi In					**Idle**	Idle			0.1883	159.5183				
		Closed Pattern Ops =	**189**													
		F1611LCP1	47													
	Segment	a-b		3,000	50	83	Military	299.585		10.0139	0.0028				0.1307	
		b-c		6,000	100	94	Military	430.389		13.9409	0.0039				0.1820	
		c-d		11,000	1,100	94	Intermediate	464.145		23.6995	0.0066			0.3094		
		d-e		12,000	2,000	87	Approach	388.194		30.9124	0.0086		0.4036			
		e-f		10,850	2,000	87	Approach	303.804		35.7138	0.0099		0.4663			
		f-g		6,000	300	87	Approach	248.951		24.1012	0.0067		0.3147			
		F1629LCP1	142													
	Segment	a-b		3,000	50	83	Military	299.585		10.0139	0.0028				0.3950	
		b-c		6,000	100	94	Military	430.389		13.9409	0.0039				0.5499	
		c-d		11,000	1,100	94	Intermediate	464.145		23.6995	0.0066			0.9348		
		d-e		12,000	2,000	87	Approach	388.194		30.9124	0.0086		1.2193			
		e-f		10,850	2,000	87	Approach	303.804		35.7138	0.0099		1.4087			
		f-g		6,000	300	87	Approach	248.951		24.1012	0.0067		0.9507			
		Total F-16 =	**3,142**									**733.3883 hrs in Idle**	**84.3058 hrs in Approach**	**15.0528 hrs in Intermediate**	**8.0825 hrs in Military**	**5.8340 hrs in AB-5**

Mode	Totsl TIM (hr)	Fuel Flow Rate, lbs/hr	Emission Indices, lbs/1000 lbs fuel: CO	NOx	VOC	SOx	PM10	Total Emissions, lbs/year: CO	NOx	VOC	SOx	PM10
Idle	733.4	1,084	35.30	4.61	7.94	1.20	2.06	28063.25	3664.92	6312.24	953.99	1637.69
Approach	84.3	3,837	1.92	12.53	5.12	1.20	2.63	621.08	4053.22	1656.23	388.18	850.76
Intermediate	15.1	5,770	0.86	22.18	2.89	1.20	2.06	74.70	1926.44	251.01	104.23	178.92
Military	8.1	9,679	0.86	29.32	1.79	1.20	1.33	67.28	2293.71	140.03	93.88	104.05
AB-5	5.8	41,682	11.99	8.37	1.53	1.20	1.15	2915.65	2035.36	372.06	291.91	279.65

Total Aircraft Emissions

	CO	NOx	VOC	SOx	PM10
Total Emissions (lbs/yr) =	**31741.96**	**13973.66**	**8731.57**	**1832.08**	**3051.06**
Total Emissions (tons/yr) =	**15.87**	**6.99**	**4.37**	**0.92**	**1.53**

Total fuel transferred, lbs	**1526733.3**
Total fuel transferred, gal	**226848.1212**
Refueling emissions, lbs/year	**9.277863148**

Table 4. Annual Flight Operations for 144th Fighter Wing - Preferred Alternative, Fresno

Aircraft Type	Engine Model	Type of Operation (Flight Profile)	Baseline Total Number of Operations	Segment Length, feet	Height above AGL, ft	Power Setting	Modeled Power Setting	Average speed per segment, feet/sec	No. of Engines	Time in Mode, seconds	Time in Mode, hours	Total Time in Mode (TIM): Idle (hr)	Approach (hr)	Intermediate (hr)	Military (hr)	AB-5 (hr)
									Total TIM = TIM x #of Operations							
F-15	F100-PW-220															
		Departures =	**2,198**						2							
		F1511LD6	460													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	141.8333				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					1.8170
		b-c		6000	1400	91	Military	464.145		12.9270	0.0036				1.6518	
		c-d		1500	1600	91	Military	506.340		2.9624	0.0008				0.3785	
		d-e		13500	2500	86	Intermediate	506.340		26.6619	0.0074			3.4068		
		e-f		5772	3000	86	Intermediate	506.340		11.3995	0.0032			1.4566		
		F1511LD8	81													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	24.9750				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.3199
		b-c		6000	1400	91	Military	464.145		12.9270	0.0036				0.2909	
		c-d		1500	1600	91	Military	506.340		2.9624	0.0008				0.0667	
		d-e		13500	2500	86	Intermediate	506.340		26.6619	0.0074			0.5999		
		e-3000		3428.571429	3000	86	Intermediate	506.340		6.7713	0.0019			0.1524		
		F1529LD1	18													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	5.5500				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.0711
		b-c		6240	1300	91	Military	464.145		13.4441	0.0037				0.0672	
		c-d		1760	1600	88	Military	506.340		3.4759	0.0010				0.0174	
		d-e		13000	2500	86	Intermediate	506.340		25.6744	0.0071			0.1284		
		e-3000		3428.571429	3000	86	Intermediate	506.340		6.7713	0.0019			0.0339		
		F1529LD2	7													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	2.1583				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.0276
		b-c		6240	1300	91	Military	464.145		13.4441	0.0037				0.0261	
		c-d		1760	1600	88	Military	506.34		3.4759	0.0010				0.0068	
		d-e		13000	2500	86	Intermediate	506.34		25.6744	0.0071			0.0499		
		e-3000		3428.571429	3000	86	Intermediate	506.34		6.7713	0.0019			0.0132		
		F1529RD8	1,355													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	417.7917				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					5.3521
		b-c		6000	1300	91	Military	464.145		12.9270	0.0036				4.8656	
		c-d		2000	1600	91	Military	506.34		3.9499	0.0011				1.4867	
		d-e		13000	2500	86	Intermediate	506.34		25.6744	0.0071			9.6636		
		e-3000		3428.571429	3000	86	Intermediate	506.34		6.7713	0.0019			2.5486		
		F1529RD9	277													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	85.4083				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					1.0941
		b-c		6000	1300	91	Military	464.145		12.9270	0.0036				0.9947	
		c-d		2000	1600	88	Military	506.34		3.9499	0.0011				0.3039	
		d-e		13000	2500	86	Intermediate	506.34		25.6744	0.0071			1.9755		
		e-3000		3428.571429	3000	86	Intermediate	506.34		6.7713	0.0019			0.5210		
		Arrivals =	**2,198**													
		F1511LA1OH	327													
	Segment	a-b		30000	3000	85	Approach	506.340		59.2487	0.0165		5.3818			
		b-c		12000	2000	85	Approach	506.340		23.6995	0.0066		2.1527			
		c-d		26000	2000	80	Approach	430.389		60.4105	0.0168		5.4873			
		d-e		12000	2000	80	Approach	345.999		34.6822	0.0096		3.1503			
		e-f		14000	2000	80	Approach	295.365		47.3990	0.0132		4.3054			
		f-g		6000	300	80	Approach	248.951		24.1012	0.0067		2.1892			
		Taxi In					**Idle**	Idle			0.1883	61.5850				
		F1511LA2	157													
	Segment	a-b		15760	3000	88	Approach	430.389		36.6180	0.0102		1.5970			
		b-c		15000	2200	88	Approach	354.438		42.3205	0.0118		1.8456			
		c-d		12000	1500	85	Approach	329.121		36.4608	0.0101		1.5901			
		d-e		12000	1000	80	Approach	278.487		43.0900	0.0120		1.8792			
		e-f		6000	300	80	Approach	244.731		24.5167	0.0068		1.0692			
		Taxi In					**Idle**	Idle			0.1883	29.5683				
		F1511LA4BF	0													
	Segment	b-c		26000	3000	88	Approach	421.950		61.6187	0.0171		0.0000			
		c-d		9000	2500	87	Approach	337.560		26.6619	0.0074		0.0000			
		d-e		9000	2500	87	Approach	295.365		30.4708	0.0085		0.0000			
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.0000			
		Taxi In					**Idle**	Idle			0.1883	0.0000				
		F1511LA4HF	0													
	Segment	3000-e		3375	3000	75	Approach	284.816		11.8497	0.0033		0.0000			
		e-f		6000	300	75	Approach	253.170		23.6995	0.0066		0.0000			
		Taxi In					**Idle**	Idle			0.1883	0.0000				
		F1511LA4LF	0													
	Segment	3000-e		6567.567568	3000	75	Approach	290.119		22.6375	0.0063		0.0000			
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.0000			
		Taxi In					**Idle**	Idle			0.1883	0.0000				
		F1529RA1BF	0													
	Segment	b-c		26000	3000	88	Approach	421.950		61.6187	0.0171		0.0000			
		c-d		9000	2500	87	Approach	337.560		26.6619	0.0074		0.0000			
		d-e		9000	2500	87	Approach	295.365		30.4708	0.0085		0.0000			
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.0000			
		Taxi In					**Idle**	Idle			0.1883	0.0000				
		F1529RA1HF	0													
	Segment	3000-e		3375	3000	75	Approach	284.816		11.8497	0.0033		0.0000			
		e-f		6000	300	75	Approach	248.951		24.1012	0.0067		0.0000			
		Taxi In					**Idle**	Idle			0.1883	0.0000				
		F1529RA1LF	0													
	Segment	3000-e		6567.567568	3000	75	Approach	290.119		22.6375	0.0063		0.0000			
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.0000			
		Taxi In					**Idle**	Idle			0.1883	0.0000				
		F1529RA2	352													
	Segment	3000-d		3612	3000	86	Approach	445.5792		8.1063	0.0023		0.7926			
		d-e		12180	2700	85	Approach	354.438		34.3643	0.0095		3.3601			
		e-f		6500	2100	85	Approach	354.438		18.3389	0.0051		1.7931			
		f-g		5620	1800	85	Approach	329.121		17.0758	0.0047		1.6696			
		g-h		12380	1500	85	Approach	303.804		40.7500	0.0113		3.9844			
		h-i		11924	900	80	Approach	278.487		42.8171	0.0119		4.1866			
		i-j		6076	300	80	Approach	244.731		24.8273	0.0069		2.4276			
		Taxi In					**Idle**	Idle			0.1883	66.2933				
		F1529RA5OH	1,362													
	Segment	e-f		6076	3000	85	Approach	506.34		11.9998	0.0033		4.5399			
		f-g		6076	2500	85	Approach	430.389		14.1175	0.0039		5.3411			
		g-h		24608	2000	80	Approach	354.438		69.4282	0.0193		26.2670			
		h-i		12760	2000	80	Approach	345.999		36.8787	0.0102		13.9524			
		i-j		12760	2000	80	Approach	295.365		43.2008	0.0120		16.3443			
		j-k		6100	500	80	Approach	248.9505		24.5029	0.0068		9.2702			
		Taxi In					**Idle**	Idle			0.1883	256.5100				
		Closed Pattern Ops =	**281**													
		F1511LCP1	70													
	Segment	a-b		3,000	50	83	Military	299.585		10.0139	0.0028				0.1947	
		b-c		6,000	100	94	Military	430.389		13.9409	0.0039				0.2711	
		c-d		11,000	1,100	94	Intermediate	464.145		23.6995	0.0066			0.4608		
		d-e		12,000	2,000	87	Approach	388.194		30.9124	0.0086		0.6011			
		e-f		10,850	2,000	87	Approach	303.804		35.7138	0.0099		0.6944			
		f-g		6,000	300	87	Approach	248.951		24.1012	0.0067		0.4686			
		F1529LCP1	211													
	Segment	a-b		3,000	50	83	Military	299.585		10.0139	0.0028				0.5869	
		b-c		6,000	100	94	Military	430.389		13.9409	0.0039				0.8171	
		c-d		11,000	1,100	94	Intermediate	464.145		23.6995	0.0066			1.3891		
		d-e		12,000	2,000	87	Approach	388.194		30.9124	0.0086		1.8118			
		e-f		10,850	2,000	87	Approach	303.804		35.7138	0.0099		2.0932			
		f-g		6,000	300	87	Approach	248.951		24.1012	0.0067		1.4126			
		Total F-16 =	**4,677**									**1091.6733 hrs in Idle**	**131.6586 hrs in Approach**	**22.3996 hrs in Intermediate**	**12.0260 hrs in Military**	**8.6819 hrs in AB-5**

Mode	Mode Variables: Totsl TIM (hr)	Fuel Flow Rate, lbs/hr	Emission Indices, lbs/1000 lbs fuel: CO	NOx	VOC	SOx	PM10	Total Emissions, lbs/year: CO	NOx	VOC	SOx	PM10
Idle	1091.7	1,084	35.30	4.61	7.94	1.20	2.06	83546.20	10910.71	18791.98	2840.10	4875.50
Approach	131.7	3,837	1.92	12.53	5.12	1.20	2.63	1939.87	12659.66	5172.98	1212.42	2657.21
Intermediate	22.4	5,770	0.86	22.18	2.89	1.20	2.06	222.30	5733.33	747.04	310.19	532.49
Military	12.0	9,679	0.86	29.32	1.79	1.20	1.33	200.21	6825.67	416.71	279.36	309.62
AB-5	8.7	41,682	11.99	8.37	1.53	1.20	1.15	8677.87	6057.86	1107.35	868.51	832.32

Total Aircraft Emissions

	CO	NOx	VOC	SOx	PM10
Total Emissions (lbs/yr) =	**94586.45**	**42187.23**	**26236.06**	**5510.57**	**9207.15**
Total Emissions (tons/yr) =	**47.29**	**21.09**	**13.12**	**2.76**	**4.60**

Total fuel transferred, lbs	**3479446.351**
Total fuel transferred, gal	**514710.9987**
Refueling emissions, lbs/year	**21.14437871**

Table 5. Annual Flight Operations for 144th Fighter Wing - Preferred Alternative, March ARB

Aircraft Type	Engine Model	Type of Operation	Baseline Total Number of Operations	Segment Length, feet	Height above AGL, ft	Power Setting	Modeled Power Setting	Speed, kts	No. of Engines	Time in Mode, hours	Total Time In Mode (TIM) Total TIM = TIM x #of Operations: Idle (hr)	Approach (hr)	Intermediate (hr)	Military (hr)	AB-5 (hr)
F-15	F100-PW-220														
		Departures =	**438**						**2**						
		F15DA	22												
		Taxi Out					**Idle**	Idle		0.3083	6.7833				
	Segment	a-b		3000	0	90	AB-5	135.024	22.2183	0.0062					0.1358
		b-c		7000	200	91	AB-5	388.194	18.0322	0.0050					0.1102
		c-d		18000	2900	90	Military	548.535	32.8147	0.0091				0.2005	
		d-3000		872.6708075	3000	90	Military	590.730	1.4773	0.0004				0.0090	
		F15DB	416												
		Taxi Out					**Idle**	Idle		0.3083	128.2667				
	Segment	a-b		3,000	0	90	AB-5	135.024	22.2183	0.0062					2.5674
		b-c		7,000	200	91	AB-5	388.194	18.0322	0.0050					2.0837
		c-d		18,000	2,900	90	Military	548.535	32.8147	0.0091				3.7919	
		d-3000		873	3,000	90	Military	590.730	1.4773	0.0004				0.1707	
		Arrivals =	448												
		F15AA	182												
	Segment	3000-c		16,473	3,000	76	Approach	506.340	32.5331	0.0090		1.6447			
		c-d		29,820	1,970	76	Approach	506.340	58.8932	0.0164		2.9774			
		d-e		8,372	1,965	76	Approach	455.706	18.3715	0.0051		0.9288			
		e-f		3,490	1,965	76	Approach	388.194	8.9904	0.0025		0.4545			
		f-g		3,429	1,965	85	Approach	354.438	9.6745	0.0027		0.4891			
		g-h		9,426	1,965	85	Approach	320.682	29.3936	0.0082		1.4860			
		h-i		6,000	300	82	Approach	286.926	20.9113	0.0058		1.0572			
		Taxi In					**Idle**	Idle		0.1883	34.2767				
		F15AB	257												
	Segment	3000-d		21,198	3,000	76	Approach	346.327	61.2080	0.0170		4.3696			
		d-e		14,414	2,065	80	Approach	303.804	47.4451	0.0132		3.3871			
		e-f		38,496	2,065	80	Approach	261.609	147.1509	0.0409		10.5049			
		Taxi In					**Idle**	Idle		0.1883	48.4017				
		F15AC	9												
	Segment	3000-c		32,268	3,000	76	Approach	348.090	92.6987	0.0257		0.2317			
		c-d		9,000	1,565	80	Approach	303.804	29.6244	0.0082		0.0741			
		d-e		33,000	1,565	80	Approach	261.609	126.1424	0.0350		0.3154			
		Taxi In					**Idle**	Idle		0.1883	1.6950				
		Closed Pattern Ops =	442												
		F15CA	89												
	Segment	a-b		1,000	50	75	Approach	248.951	4.0169	0.0011		0.0993			
		b-c		12,300	100	92	Military	299.585	41.0569	0.0114				1.0150	
		c-d		18,076	1,000	85	Military	379.755	47.5991	0.0132				1.1768	
		d-e		102,945	2,465	82	Intermediate	421.950	243.9744	0.0678			6.0316		
		e-f		36,179	2,465	85	Intermediate	379.755	95.2693	0.0265			2.3553		
		f-g		39,930	2,465	75	Approach	303.804	131.4334	0.0365		3.2493			
		g-h		38,442	2,065	75	Approach	253.170	151.8426	0.0422		3.7539			
		F15CB	353												
	Segment	a-b		1,000	50	75	Approach	253.170	3.9499	0.0011		0.3873			
		b-c		12,300	100	92	Military	303.804	40.4866	0.0112				3.9699	
		c-d		11,640	1,000	85	Military	379.755	30.6513	0.0085				3.0055	
		d-e		5,060	1,965	82	Intermediate	396.633	12.7574	0.0035			1.2509		
		e-f		13,000	1,965	85	Approach	337.560	38.5117	0.0107		3.7763			
		f-g		11,000	1,965	80	Approach	286.926	38.3374	0.0106		3.7592			
		g-h		6,591	300	80	Approach	253.170	26.0339	0.0072		2.5528			
											219.4233	**45.4985**	**9.6378**	**13.3394**	**4.8971**
											hrs in Idle	**hrs in Approac**	**hrs in Intermedia**	**hrs in Military**	**hrs in AB-5**
Total Aircraft Emissions															

Mode	Mode Variables: Totsl TIM (hr)	Fuel Flow Rate, lbs/hr	Emission Indices, lbs/1000 lbs fuel: CO	NOx	VOC	SOx	PM10	Total Emissions, lbs/year: CO	NOx	VOC	SOx	PM10
Idle	219.4	1,084	35.30	4.61	7.94	1.20	2.06	16792.56	2193.02	3777.14	570.85	979.96
Approach	45.5	3,837	1.92	12.53	5.12	1.20	2.63	670.38	4374.92	1787.68	418.99	918.28
Intermediate	9.6	5,770	0.86	22.18	2.89	1.20	2.06	95.65	2466.86	321.43	133.46	229.11
Military	13.3	9,679	0.86	29.32	1.79	1.20	1.33	222.07	7571.15	462.22	309.87	343.44
AB-5	4.9	41,682	11.99	8.37	1.53	1.20	1.15	4894.86	3417.01	624.62	489.89	469.48

Total Aircraft Emissions	**Total Emissions (lbs/yr) =**	**22675.52**	**20022.97**	**6973.08**	**1923.07**	**2940.28**
	Total Emissions (tons/yr) =	**11.34**	**10.01**	**3.49**	**0.96**	**1.47**

Total fuel transferred, l 1039133
Total fuel transferred, (153717.9
Refueling emissions, lt 6.314745

NOTES: Emission Indices from *Air Emissions Factor Guide to Air Force Mobile Sources* , Air Force Center for Engineering and the Environment, December 2003.
Flight Profiles from B. Wear, from noise analysis
Refueling emissions from total fuel used, calculation from *Air Emissions Inventory Guidance Document for Stationary Sources at Air Force Installations* , December 2003.

Table 6. Annual Flight Operations for 144th Fighter Wing - Preferred Alternative, Fresno, 2012 Phase In

Aircraft Type	Engine Model	Type of Operation (Flight Profile)	Baseline Total Number of Operations	Segment Length, feet	Height above AGL, ft	Power Setting	Modeled Power Setting	Average speed per segment, feet/sec	No. of Engines	Time in Mode, seconds	Time in Mode, hours	Total Time In Mode (TIM) Total TIM = TIM x #of Operations: Idle (hr)	Approach (hr)	Intermediate (hr)	Military (hr)	AB-5 (hr)
F-15	F100-PW-220															
		Departures =	**56**						**2**							
		F1511LD6	12													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	3.7000				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.0474
		b-c		6000	1400	91	Military	464.145		12.9270	0.0036				0.0431	
		c-d		1500	1600	91	Military	506.340		2.9624	0.0008				0.0099	
		d-e		13500	2500	86	Intermediate	506.340		26.6619	0.0074			0.0889		
		e-f		5772	3000	86	Intermediate	506.340		11.3995	0.0032			0.0380		
		F1511LD8	2													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	0.6167				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.0079
		b-c		6000	1400	91	Military	464.145		12.9270	0.0036				0.0072	
		c-d		1500	1600	91	Military	506.340		2.9624	0.0008				0.0016	
		d-e		13500	2500	86	Intermediate	506.340		26.6619	0.0074			0.0148		
		e-3000		3428.571429	3000	86	Intermediate	506.340		6.7713	0.0019			0.0038		
		F1529LD1	0													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	0.0000				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.0000
		b-c		6240	1300	91	Military	464.145		13.4441	0.0037				0.0000	
		c-d		1760	1600	88	Military	506.340		3.4759	0.0010				0.0000	
		d-e		13000	2500	86	Intermediate	506.340		25.6744	0.0071			0.0000		
		e-3000		3428.571429	3000	86	Intermediate	506.340		6.7713	0.0019			0.0000		
		F1529LD2	0													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	0.0000				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.0000
		b-c		6240	1300	91	Military	464.145		13.4441	0.0037				0.0000	
		c-d		1760	1600	88	Military	506.34		3.4759	0.0010				0.0000	
		d-e		13000	2500	86	Intermediate	506.34		25.6744	0.0071			0.0000		
		e-3000		3428.571429	3000	86	Intermediate	506.34		6.7713	0.0019			0.0000		
		F1529RD8	35													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	10.7917				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.1382
		b-c		6000	1300	91	Military	464.145		12.9270	0.0036				0.1257	
		c-d		2000	1600	91	Military	506.34		3.9499	0.0011				0.0384	
		d-e		13000	2500	86	Intermediate	506.34		25.6744	0.0071			0.2496		
		e-3000		3428.571429	3000	86	Intermediate	506.34		6.7713	0.0019			0.0658		
		F1529RD9	7													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	2.1583				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.0276
		b-c		6000	1300	91	Military	464.145		12.9270	0.0036				0.0251	
		c-d		2000	1600	88	Military	506.34		3.9499	0.0011				0.0077	
		d-e		13000	2500	86	Intermediate	506.34		25.6744	0.0071			0.0499		
		e-3000		3428.571429	3000	86	Intermediate	506.34		6.7713	0.0019			0.0132		
		Arrivals =	**56**													
		F1511LA1OH	8													
	Segment	a-b		30000	3000	85	Approach	506.340		59.2487	0.0165		0.1317			
		b-c		12000	2000	85	Approach	506.340		23.6995	0.0066		0.0527			
		c-d		26000	2000	80	Approach	430.389		60.4105	0.0168		0.1342			
		d-e		12000	2000	80	Approach	345.999		34.6822	0.0096		0.0771			
		e-f		14000	2000	80	Approach	295.365		47.3990	0.0132		0.1053			
		f-g		6000	300	80	Approach	248.951		24.1012	0.0067		0.0536			
		Taxi In					**Idle**	Idle			0.1883	1.5067				
		F1511LA2	4													
	Segment	a-b		15760	3000	88	Approach	430.389		36.6180	0.0102		0.0407			
		b-c		15000	2200	88	Approach	354.438		42.3205	0.0118		0.0470			
		c-d		12000	1500	85	Approach	329.121		36.4608	0.0101		0.0405			
		d-e		12000	1000	80	Approach	278.487		43.0900	0.0120		0.0479			
		e-f		6000	300	80	Approach	244.731		24.5167	0.0068		0.0272			
		Taxi In					**Idle**	Idle			0.1883	0.7533				
		F1511LA4BF	0													
	Segment	b-c		26000	3000	88	Approach	421.950		61.6187	0.0171		0.0000			
		c-d		9000	2500	87	Approach	337.560		26.6619	0.0074		0.0000			
		d-e		9000	2500	87	Approach	295.365		30.4708	0.0085		0.0000			
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.0000			
		Taxi In					**Idle**	Idle			0.1883	0.0000				
		F1511LA4HF	0													
	Segment	3000-e		3375	3000	75	Approach	284.816		11.8497	0.0033		0.0000			
		e-f		6000	300	75	Approach	253.170		23.6995	0.0066		0.0000			
		Taxi In					**Idle**	Idle			0.1883	0.0000				
		F1511LA4LF	0													
	Segment	3000-e		6567.567568	3000	75	Approach	290.119		22.6375	0.0063		0.0000			
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.0000			
		Taxi In					**Idle**	Idle			0.1883	0.0000				
		F1529RA1BF	0													
	Segment	b-c		26000	3000	88	Approach	421.950		61.6187	0.0171		0.0000			
		c-d		9000	2500	87	Approach	337.560		26.6619	0.0074		0.0000			
		d-e		9000	2500	87	Approach	295.365		30.4708	0.0085		0.0000			
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.0000			
		Taxi In					**Idle**	Idle			0.1883	0.0000				
		F1529RA1HF	0													
	Segment	3000-e		3375	3000	75	Approach	284.816		11.8497	0.0033		0.0000			
		e-f		6000	300	75	Approach	248.951		24.1012	0.0067		0.0000			
		Taxi In					**Idle**	Idle			0.1883	0.0000				
		F1529RA1LF	0													
	Segment	3000-e		6567.567568	3000	75	Approach	290.119		22.6375	0.0063		0.0000			
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.0000			
		Taxi In					**Idle**	Idle			0.1883	0.0000				
		F1529RA2	9													
	Segment	3000-d		3612	3000	86	Approach	445.5792		8.1063	0.0023		0.0203			
		d-e		12180	2700	85	Approach	354.438		34.3643	0.0095		0.0859			
		e-f		6500	2100	85	Approach	354.438		18.3389	0.0051		0.0458			
		f-g		5620	1800	85	Approach	329.121		17.0758	0.0047		0.0427			
		g-h		12380	1500	85	Approach	303.804		40.7500	0.0113		0.1019			
		h-i		11924	900	80	Approach	278.487		42.8171	0.0119		0.1070			
		i-j		6076	300	80	Approach	244.731		24.8273	0.0069		0.0621			
		Taxi In					**Idle**	Idle			0.1883	1.6950				
		F1529RA5OH	35													
	Segment	e-f		6076	3000	85	Approach	506.34		11.9998	0.0033		0.1167			
		f-g		6076	2500	85	Approach	430.389		14.1175	0.0039		0.1373			
		g-h		24608	2000	80	Approach	354.438		69.4282	0.0193		0.6750			
		h-i		12760	2000	80	Approach	345.999		36.8787	0.0102		0.3585			
		i-j		12760	2000	80	Approach	295.365		43.2008	0.0120		0.4200			
		j-k		6100	500	80	Approach	248.9505		24.5029	0.0068		0.2382			
		Taxi In					**Idle**	Idle			0.1883	6.5917				
		Closed Pattern Ops =	**7**													
		F1511LCP1	2													
	Segment	a-b		3,000	50	83	Military	299.585		10.0139	0.0028				0.0056	
		b-c		6,000	100	94	Military	430.389		13.9409	0.0039				0.0077	
		c-d		11,000	1,100	94	Intermediate	464.145		23.6995	0.0066			0.0132		
		d-e		12,000	2,000	87	Approach	388.194		30.9124	0.0086		0.0172			
		e-f		10,850	2,000	87	Approach	303.804		35.7138	0.0099		0.0198			
		f-g		6,000	300	87	Approach	248.951		24.1012	0.0067		0.0134			
		F1529LCP1	5													
	Segment	a-b		3,000	50	83	Military	299.585		10.0139	0.0028				0.0139	
		b-c		6,000	100	94	Military	430.389		13.9409	0.0039				0.0194	
		c-d		11,000	1,100	94	Intermediate	464.145		23.6995	0.0066			0.0329		
		d-e		12,000	2,000	87	Approach	388.194		30.9124	0.0086		0.0429			
		e-f		10,850	2,000	87	Approach	303.804		35.7138	0.0099		0.0496			
		f-g		6,000	300	87	Approach	248.951		24.1012	0.0067		0.0335			
		Total F-16 =	**119**									**27.8133 hrs in Idle**	**3.3457 hrs in Approach**	**0.5701 hrs in Intermediate**	**0.3053 hrs in Military**	**0.2212 hrs in AB-5**

Mode Variables			Emission Indices, lbs/1000 lbs fuel					Total Emissions, lbs/year				
Mode	Totsl TIM (hr)	Fuel Flow Rate, lbs/hr	CO	NOx	VOC	SOx	PM10	CO	NOx	VOC	SOx	PM10
Idle	27.8	1,084	35.30	4.61	7.94	1.20	2.06	2128.57	277.98	479.78	72.36	124.22
Approach	3.3	3,837	1.92	12.53	5.12	1.20	2.63	49.30	321.70	131.45	30.81	67.52
Intermediate	0.6	5,770	0.86	22.18	2.89	1.20	2.06	5.66	145.91	19.01	7.89	13.55
Military	0.3	9,679	0.86	29.32	1.79	1.20	1.33	5.08	173.26	10.58	7.09	7.86
AB-5	0.2	41,682	11.99	8.37	1.53	1.20	1.15	221.09	154.34	28.21	22.13	21.21

Total Aircraft Emissions

Total Emissions (lbs/yr) =	**2409.69**	**1073.20**	**668.03**	**140.28**	**234.36**
Total Emissions (tons/yr) =	**1.20**	**0.54**	**0.33**	**0.07**	**0.12**

Total fuel transferred, lbs	**88600.47168**
Total fuel transferred, gal	**13106.57865**
Refueling emissions, lbs/year	**0.538419547**

Table 7. Annual Flight Operations for 144th Fighter Wing - Preferred Alternative, Fresno, 2013 Phase In

Aircraft Type	Engine Model	Type of Operation (Flight Profile)	Baseline Total Number of Operations	Segment Length, feet	Height above AGL, ft	Power Setting	Modeled Power Setting	Average speed per segment, feet/sec	No. of Engines	Time in Mode, seconds	Time in Mode, hours	Total Time In Mode (TIM) Total TIM = TIM x #of Operations: Idle (hr)	Approach (hr)	Intermediate (hr)	Military (hr)	AB-5 (hr)
F-15	F100-PW-220															
		Departures =	**1,185**						2							
		F1511LD6	248													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	76.4667				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.9796
		b-c		6000	1400	91	Military	464.145		12.9270	0.0036				0.8905	
		c-d		1500	1600	91	Military	506.340		2.9624	0.0008				0.2041	
		d-e		13500	2500	86	Intermediate	506.340		26.6619	0.0074			1.8367		
		e-f		5772	3000	86	Intermediate	506.340		11.3995	0.0032			0.7853		
		F1511LD8	44													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	13.5667				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.1738
		b-c		6000	1400	91	Military	464.145		12.9270	0.0036				0.1580	
		c-d		1500	1600	91	Military	506.340		2.9624	0.0008				0.0362	
		d-e		13500	2500	86	Intermediate	506.340		26.6619	0.0074			0.3259		
		e-3000		3428.571429	3000	86	Intermediate	506.340		6.7713	0.0019			0.0828		
		F1529LD1	10													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	3.0833				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.0395
		b-c		6240	1300	91	Military	464.145		13.4441	0.0037				0.0373	
		c-d		1760	1600	88	Military	506.340		3.4759	0.0010				0.0097	
		d-e		13000	2500	86	Intermediate	506.340		25.6744	0.0071			0.0713		
		e-3000		3428.571429	3000	86	Intermediate	506.340		6.7713	0.0019			0.0188		
		F1529LD2	4													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	1.2333				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.0158
		b-c		6240	1300	91	Military	464.145		13.4441	0.0037				0.0149	
		c-d		1760	1600	88	Military	506.34		3.4759	0.0010				0.0039	
		d-e		13000	2500	86	Intermediate	506.34		25.6744	0.0071			0.0285		
		e-3000		3428.571429	3000	86	Intermediate	506.34		6.7713	0.0019			0.0075		
		F1529RD8	730													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	225.0833				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					2.8834
		b-c		6000	1300	91	Military	464.145		12.9270	0.0036				2.6213	
		c-d		2000	1600	91	Military	506.34		3.9499	0.0011				0.8010	
		d-e		13000	2500	86	Intermediate	506.34		25.6744	0.0071			5.2062		
		e-3000		3428.571429	3000	86	Intermediate	506.34		6.7713	0.0019			1.3731		
		F1529RD9	149													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	45.9417				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.5885
		b-c		6000	1300	91	Military	464.145		12.9270	0.0036				0.5350	
		c-d		2000	1600	88	Military	506.34		3.9499	0.0011				0.1635	
		d-e		13000	2500	86	Intermediate	506.34		25.6744	0.0071			1.0626		
		e-3000		3428.571429	3000	86	Intermediate	506.34		6.7713	0.0019			0.2803		
		Arrivals =	**1,185**													
		F1511LA1OH	176													
	Segment	a-b		30000	3000	85	Approach	506.340		59.2487	0.0165		2.8966			
		b-c		12000	2000	85	Approach	506.340		23.6995	0.0066		1.1586			
		c-d		26000	2000	80	Approach	430.389		60.4105	0.0168		2.9534			
		d-e		12000	2000	80	Approach	345.999		34.6822	0.0096		1.6956			
		e-f		14000	2000	80	Approach	295.365		47.3990	0.0132		2.3173			
		f-g		6000	300	80	Approach	248.951		24.1012	0.0067		1.1783			
		Taxi In					**Idle**	Idle			0.1883	33.1467				
		F1511LA2	85													
	Segment	a-b		15760	3000	88	Approach	430.389		36.6180	0.0102		0.8646			
		b-c		15000	2200	88	Approach	354.438		42.3205	0.0118		0.9992			
		c-d		12000	1500	85	Approach	329.121		36.4608	0.0101		0.8609			
		d-e		12000	1000	80	Approach	278.487		43.0900	0.0120		1.0174			
		e-f		6000	300	80	Approach	244.731		24.5167	0.0068		0.5789			
		Taxi In					**Idle**	Idle			0.1883	16.0083				
		F1511A4BF	0													
	Segment	b-c		26000	3000	88	Approach	421.950		61.6187	0.0171		0.0000			
		c-d		9000	2500	87	Approach	337.560		26.6619	0.0074		0.0000			
		d-e		9000	2500	87	Approach	295.365		30.4708	0.0085		0.0000			
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.0000			
		Taxi In					**Idle**	Idle			0.1883	0.0000				
		F1511LA4HF	0													
	Segment	3000-e		3375	3000	75	Approach	284.816		11.8497	0.0033		0.0000			
		e-f		6000	300	75	Approach	253.170		23.6995	0.0066		0.0000			
		Taxi In					**Idle**	Idle			0.1883	0.0000				
		F1511LA4LF	0													
	Segment	3000-e		6567.567568	3000	75	Approach	290.119		22.6375	0.0063		0.0000			
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.0000			
		Taxi In					**Idle**	Idle			0.1883	0.0000				
		F1529RA1BF	0													
	Segment	b-c		26000	3000	88	Approach	421.950		61.6187	0.0171		0.0000			
		c-d		9000	2500	87	Approach	337.560		26.6619	0.0074		0.0000			
		d-e		9000	2500	87	Approach	295.365		30.4708	0.0085		0.0000			
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.0000			
		Taxi In					**Idle**	Idle			0.1883	0.0000				
		F1529RA1HF	0													
	Segment	3000-e		3375	3000	75	Approach	284.816		11.8497	0.0033		0.0000			
		e-f		6000	300	75	Approach	248.951		24.1012	0.0067		0.0000			
		Taxi In					**Idle**	Idle			0.1883	0.0000				
		F1529RA1LF	0													
	Segment	3000-e		6567.567568	3000	75	Approach	290.119		22.6375	0.0063		0.0000			
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.0000			
		Taxi In					**Idle**	Idle			0.1883	0.0000				
		F1529RA2	190													
	Segment	3000-d		3612	3000	86	Approach	445.5792		8.1063	0.0023		0.4278			
		d-e		12180	2700	85	Approach	354.438		34.3643	0.0095		1.8137			
		e-f		6500	2100	85	Approach	354.438		18.3389	0.0051		0.9679			
		f-g		5620	1800	85	Approach	329.121		17.0758	0.0047		0.9012			
		g-h		12380	1500	85	Approach	303.804		40.7500	0.0113		2.1507			
		h-i		11924	900	80	Approach	278.487		42.8171	0.0119		2.2598			
		i-j		6076	300	80	Approach	244.731		24.8273	0.0069		1.3103			
		Taxi In					**Idle**	Idle			0.1883	35.7833				
		F1529RA5OH	734													
	Segment	e-f		6076	3000	85	Approach	506.34		11.9998	0.0033		2.4466			
		f-g		6076	2500	85	Approach	430.389		14.1175	0.0039		2.8784			
		g-h		24608	2000	80	Approach	354.438		69.4282	0.0193		14.1556			
		h-i		12760	2000	80	Approach	345.999		36.8787	0.0102		7.5192			
		i-j		12760	2000	80	Approach	295.365		43.2008	0.0120		8.8082			
		j-k		6100	500	80	Approach	248.9505		24.5029	0.0068		4.9959			
		Taxi In					**Idle**	Idle			0.1883	138.2367				
		Closed Pattern Ops =	**151**													
		F1511LCP1	38													
	Segment	a-b		3,000	50	83	Military	299.585		10.0139	0.0028				0.1057	
		b-c		6,000	100	94	Military	430.389		13.9409	0.0039				0.1472	
		c-d		11,000	1,100	94	Intermediate	464.145		23.6995	0.0066			0.2502		
		d-e		12,000	2,000	87	Approach	388.194		30.9124	0.0086		0.3263			
		e-f		10,850	2,000	87	Approach	303.804		35.7138	0.0099		0.3770			
		f-g		6,000	300	87	Approach	248.951		24.1012	0.0067		0.2544			
		F1529LCP1	113													
	Segment	a-b		3,000	50	83	Military	299.585		10.0139	0.0028				0.3143	
		b-c		6,000	100	94	Military	430.389		13.9409	0.0039				0.4376	
		c-d		11,000	1,100	94	Intermediate	464.145		23.6995	0.0066			0.7439		
		d-e		12,000	2,000	87	Approach	388.194		30.9124	0.0086		0.9703			
		e-f		10,850	2,000	87	Approach	303.804		35.7138	0.0099		1.1210			
		f-g		6,000	300	87	Approach	248.951		24.1012	0.0067		0.7565			
		Total F-16 =	**2,521**									**588.5500 hrs in Idle**	**70.9615 hrs in Approach**	**12.0730 hrs in Intermediate**	**6.4802 hrs in Military**	**4.6806 hrs in AB-5**

Mode Variables			Emission Indices, lbs/1000 lbs fuel					Total Emissions, lbs/year				
Mode	Totsl TIM (hr)	Fuel Flow Rate, lbs/hr	CO	NOx	VOC	SOx	PM10	CO	NOx	VOC	SOx	PM10
Idle	588.6	1,084	35.30	4.61	7.94	1.20	2.06	45041.97	5882.25	10131.25	1531.17	2628.51
Approach	71.0	3,837	1.92	12.53	5.12	1.20	2.63	1045.55	6823.32	2788.14	653.47	1432.19
Intermediate	12.1	5,770	0.86	22.18	2.89	1.20	2.06	119.82	3090.18	402.64	167.19	287.01
Military	6.5	9,679	0.86	29.32	1.79	1.20	1.33	107.88	3677.99	224.54	150.53	166.84
AB-5	4.7	41,682	11.99	8.37	1.53	1.20	1.15	4678.47	3265.95	597.00	468.24	448.73

Total Aircraft Emissions

Total Emissions (lbs/yr) =	**50993.69**	**22739.69**	**14143.58**	**2970.60**	**4963.27**
Total Emissions (tons/yr) =	**25.50**	**11.37**	**7.07**	**1.49**	**2.48**

Total fuel transferred, lbs	**1875737.54**
Total fuel transferred, gal	**277475.9675**
Refueling emissions, lbs/year	**11.39874017**

Table 8. Annual Flight Operations for 144th Fighter Wing - Alternative 2, Fresno

Aircraft Type	Engine Model	Type of Operation (Flight Profile)	Baseline Total Number of Operations	Segment Length, feet	Height above AGL, ft	Power Setting	Modeled Power Setting	Average speed per segment, feet/sec	No. of Engines	Time in Mode, seconds	Time in Mode, hours	Total Time in Mode (TIM) Total TIM = TIM x #of Operations: Idle (hr)	Approach (hr)	Intermediate (hr)	Military (hr)	AB-5 (hr)
F-15	F100-PW-220															
		Departures =	**2,856**						2							
		F1511LD6	598													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	184.3833				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					2.3620
		b-c		6000	1400	91	Military	464.145		12.9270	0.0036				2.1473	
		c-d		1500	1600	91	Military	506.340		2.9624	0.0008				0.4921	
		d-e		13500	2500	86	Intermediate	506.340		26.6619	0.0074			4.4288		
		e-f		5772	3000	86	Intermediate	506.340		11.3995	0.0032			1.8936		
		F1511LD8	105													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	32.3750				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.4147
		b-c		6000	1400	91	Military	464.145		12.9270	0.0036				0.3770	
		c-d		1500	1600	91	Military	506.340		2.9624	0.0008				0.0864	
		d-e		13500	2500	86	Intermediate	506.340		26.6619	0.0074			0.7776		
		e-3000		3428.571429	3000	86	Intermediate	506.340		6.7713	0.0019			0.1975		
		F1529LD1	23													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	7.0917				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.0908
		b-c		6240	1300	91	Military	464.145		13.4441	0.0037				0.0859	
		c-d		1760	1600	88	Military	506.340		3.4759	0.0010				0.0222	
		d-e		13000	2500	86	Intermediate	506.340		25.6744	0.0071			0.1640		
		e-3000		3428.571429	3000	86	Intermediate	506.340		6.7713	0.0019			0.0433		
		F1529LD2	9													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	2.7750				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.0355
		b-c		6240	1300	91	Military	464.145		13.4441	0.0037				0.0336	
		c-d		1760	1600	88	Military	506.34		3.4759	0.0010				0.0087	
		d-e		13000	2500	86	Intermediate	506.34		25.6744	0.0071			0.0642		
		e-3000		3428.571429	3000	86	Intermediate	506.34		6.7713	0.0019			0.0169		
		F1529RD8	1,761													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	542.9750				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					6.9558
		b-c		6000	1300	91	Military	464.145		12.9270	0.0036				6.3235	
		c-d		2000	1600	91	Military	506.34		3.9499	0.0011				1.9322	
		d-e		13000	2500	86	Intermediate	506.34		25.6744	0.0071			12.5591		
		e-3000		3428.571429	3000	86	Intermediate	506.34		6.7713	0.0019			3.3123		
		F1529RD9	360													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	111.0000				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					1.4220
		b-c		6000	1300	91	Military	464.145		12.9270	0.0036				1.2927	
		c-d		2000	1600	88	Military	506.34		3.9499	0.0011				0.3950	
		d-e		13000	2500	86	Intermediate	506.34		25.6744	0.0071			2.5674		
		e-3000		3428.571429	3000	86	Intermediate	506.34		6.7713	0.0019			0.6771		
		Arrivals =	**2,856**													
		F1511LA1OH	425													
	Segment	a-b		30000	3000	85	Approach	506.340		59.2487	0.0165		6.9946			
		b-c		12000	2000	85	Approach	506.340		23.6995	0.0066		2.7979			
		c-d		26000	2000	80	Approach	430.389		60.4105	0.0168		7.1318			
		d-e		12000	2000	80	Approach	345.999		34.6822	0.0096		4.0944			
		e-f		14000	2000	80	Approach	295.365		47.3990	0.0132		5.5957			
		f-g		6000	300	80	Approach	248.951		24.1012	0.0067		2.8453			
		Taxi In					**Idle**	Idle			0.1883	80.0417				
		F1511LA2	204													
	Segment	a-b		15760	3000	88	Approach	430.389		36.6180	0.0102		2.0750			
		b-c		15000	2200	88	Approach	354.438		42.3205	0.0118		2.3982			
		c-d		12000	1500	85	Approach	329.121		36.4608	0.0101		2.0661			
		d-e		12000	1000	80	Approach	278.487		43.0900	0.0120		2.4418			
		e-f		6000	300	80	Approach	244.731		24.5167	0.0068		1.3893			
		Taxi In					**Idle**	Idle			0.1883	38.4200				
		F1511LA4BF	0													
	Segment	b-c		26000	3000	88	Approach	421.950		61.6187	0.0171		0.0000			
		c-d		9000	2500	87	Approach	337.560		26.6619	0.0074		0.0000			
		d-e		9000	2500	87	Approach	295.365		30.4708	0.0085		0.0000			
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.0000			
		Taxi In					**Idle**	Idle			0.1883	0.0000				
		F1511LA4HF	0													
	Segment	3000-e		3375	3000	75	Approach	284.816		11.8497	0.0033		0.0000			
		e-f		6000	300	75	Approach	253.170		23.6995	0.0066		0.0000			
		Taxi In					**Idle**	Idle			0.1883	0.0000				
		F1511LA4LF	0													
	Segment	3000-e		6567.567568	3000	75	Approach	290.119		22.6375	0.0063		0.0000			
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.0000			
		Taxi In					**Idle**	Idle			0.1883	0.0000				
		F1529RA1BF	0													
	Segment	b-c		26000	3000	88	Approach	421.950		61.6187	0.0171		0.0000			
		c-d		9000	2500	87	Approach	337.560		26.6619	0.0074		0.0000			
		d-e		9000	2500	87	Approach	295.365		30.4708	0.0085		0.0000			
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.0000			
		Taxi In					**Idle**	Idle			0.1883	0.0000				
		F1529RA1HF	0													
	Segment	3000-e		3375	3000	75	Approach	284.816		11.8497	0.0033		0.0000			
		e-f		6000	300	75	Approach	248.951		24.1012	0.0067		0.0000			
		Taxi In					**Idle**	Idle			0.1883	0.0000				
		F1529RA1LF	0													
	Segment	3000-e		6567.567568	3000	75	Approach	290.119		22.6375	0.0063		0.0000			
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.0000			
		Taxi In					**Idle**	Idle			0.1883	0.0000				
		F1529RA2	457													
	Segment	3000-d		3612	3000	86	Approach	445.5792		8.1063	0.0023		1.0291			
		d-e		12180	2700	85	Approach	354.438		34.3643	0.0095		4.3624			
		e-f		6500	2100	85	Approach	354.438		18.3389	0.0051		2.3280			
		f-g		5620	1800	85	Approach	329.121		17.0758	0.0047		2.1677			
		g-h		12380	1500	85	Approach	303.804		40.7500	0.0113		5.1730			
		h-i		11924	900	80	Approach	278.487		42.8171	0.0119		5.4354			
		i-j		6076	300	80	Approach	244.731		24.8273	0.0069		3.1517			
		Taxi In					**Idle**	Idle			0.1883	86.0683				
		F1529RA5OH	1,770													
	Segment	e-f		6076	3000	85	Approach	506.34		11.9998	0.0033		5.8999			
		f-g		6076	2500	85	Approach	430.389		14.1175	0.0039		6.9411			
		g-h		24608	2000	80	Approach	354.438		69.4282	0.0193		34.1355			
		h-i		12760	2000	80	Approach	345.999		36.8787	0.0102		18.1320			
		i-j		12760	2000	80	Approach	295.365		43.2008	0.0120		21.2404			
		j-k		6100	500	80	Approach	248.9505		24.5029	0.0068		12.0472			
		Taxi In					**Idle**	Idle			0.1883	333.3500				
		Closed Pattern Ops =	**365**													
		F1511LCP1	91													
	Segment	a-b		3,000	50	83	Military	299.585		10.0139	0.0028				0.2531	
		b-c		6,000	100	94	Military	430.389		13.9409	0.0039				0.3524	
		c-d		11,000	1,100	94	Intermediate	464.145		23.6995	0.0066			0.5991		
		d-e		12,000	2,000	87	Approach	388.194		30.9124	0.0086		0.7814			
		e-f		10,850	2,000	87	Approach	303.804		35.7138	0.0099		0.9028			
		f-g		6,000	300	87	Approach	248.951		24.1012	0.0067		0.6092			
		F1529LCP1	274													
	Segment	a-b		3,000	50	83	Military	299.585		10.0139	0.0028				0.7622	
		b-c		6,000	100	94	Military	430.389		13.9409	0.0039				1.0611	
		c-d		11,000	1,100	94	Intermediate	464.145		23.6995	0.0066			1.8038		
		d-e		12,000	2,000	87	Approach	388.194		30.9124	0.0086		2.3528			
		e-f		10,850	2,000	87	Approach	303.804		35.7138	0.0099		2.7182			
		f-g		6,000	300	87	Approach	248.951		24.1012	0.0067		1.8344			
		Total F-16 =	**6,077**									**1418.4800 hrs in Idle**	**171.0722 hrs in Approach**	**29.1048 hrs in Intermediate**	**15.6253 hrs in Military**	**11.2810 hrs in AB-5**

Mode	Totsl TIM (hr)	Fuel Flow Rate, lbs/hr	Emission Indices, lbs/1000 lbs fuel: CO	NOx	VOC	SOx	PM10	Total Emissions, lbs/year: CO	NOx	VOC	SOx	PM10
Idle	1418.5	1,084	35.30	4.61	7.94	1.20	2.06	108556.84	14176.97	24417.60	3690.32	6335.05
Approach	171.1	3,837	1.92	12.53	5.12	1.20	2.63	2520.59	16449.48	6721.58	1575.37	3452.68
Intermediate	29.1	5,770	0.86	22.18	2.89	1.20	2.06	288.85	7449.58	970.66	403.04	691.89
Military	15.6	9,679	0.86	29.32	1.79	1.20	1.33	260.13	8868.56	541.43	362.97	402.29
AB-5	11.3	41,682	11.99	8.37	1.53	1.20	1.15	11275.70	7871.36	1438.85	1128.51	1081.49

Total Aircraft Emissions

Total Emissions (lbs/yr) =	**122902.11**	**54815.95**	**34090.12**	**7160.21**	**11963.40**
Total Emissions (tons/yr) =	**61.45**	**27.41**	**17.05**	**3.58**	**5.98**

Total fuel transferred, lbs **4521053.274**
Total fuel transferred, gal **666794.863**
Refueling emissions, lbs/year **27.47415909**

Table 9. Annual Flight Operations for 144th Fighter Wing - Alternative 2, March ARB

Aircraft Type	Engine Model	Type of Operation	Baseline Total Number of Operations	Segment Length, feet	Height above AGL, ft	Power Setting	Modeled Power Setting	Speed, kts	No. of Engines	Time in Mode, hours	Total Time In Mode (TIM) Total TIM = TIM x #of Operations: Idle (hr)	Approach (hr)	Intermediate (hr)	Military (hr)	AB-5 (hr)
F-15	F100-PW-220														
		Departures =	**438**						**2**						
		F15DA	22												
		Taxi Out					**Idle**	Idle		0.3083	6.7833				
	Segment	a-b		3000	0	90	AB-5	135.024	22.2183	0.0062					0.1358
		b-c		7000	200	91	AB-5	388.194	18.0322	0.0050					0.1102
		c-d		18000	2900	90	Military	548.535	32.8147	0.0091				0.2005	
		d-3000		872.6708075	3000	90	Military	590.730	1.4773	0.0004				0.0090	
		F15DB	416												
		Taxi Out					**Idle**	Idle		0.3083	128.2667				
	Segment	a-b		3,000	0	90	AB-5	135.024	22.2183	0.0062					2.5674
		b-c		7,000	200	91	AB-5	388.194	18.0322	0.0050					2.0837
		c-d		18,000	2,900	90	Military	548.535	32.8147	0.0091				3.7919	
		d-3000		873	3,000	90	Military	590.730	1.4773	0.0004				0.1707	
		Arrivals =	448												
		F15AA	182												
	Segment	3000-c		16,473	3,000	76	Approach	506.340	32.5331	0.0090		1.6447			
		c-d		29,820	1,970	76	Approach	506.340	58.8932	0.0164		2.9774			
		d-e		8,372	1,965	76	Approach	455.706	18.3715	0.0051		0.9288			
		e-f		3,490	1,965	76	Approach	388.194	8.9904	0.0025		0.4545			
		f-g		3,429	1,965	85	Approach	354.438	9.6745	0.0027		0.4891			
		g-h		9,426	1,965	85	Approach	320.682	29.3936	0.0082		1.4860			
		h-i		6,000	300	82	Approach	286.926	20.9113	0.0058		1.0572			
		Taxi In					**Idle**	Idle		0.1883	34.2767				
		F15AB	257												
	Segment	3000-d		21,198	3,000	76	Approach	346.327	61.2080	0.0170		4.3696			
		d-e		14,414	2,065	80	Approach	303.804	47.4451	0.0132		3.3871			
		e-f		38,496	2,065	80	Approach	261.609	147.1509	0.0409		10.5049			
		Taxi In					**Idle**	Idle		0.1883	48.4017				
		F15AC	9												
	Segment	3000-c		32,268	3,000	76	Approach	348.090	92.6987	0.0257		0.2317			
		c-d		9,000	1,565	80	Approach	303.804	29.6244	0.0082		0.0741			
		d-e		33,000	1,565	80	Approach	261.609	126.1424	0.0350		0.3154			
		Taxi In					**Idle**	Idle		0.1883	1.6950				
		Closed Pattern Ops =	442												
		F15CA	89												
	Segment	a-b		1,000	50	75	Approach	248.951	4.0169	0.0011		0.0993			
		b-c		12,300	100	92	Military	299.585	41.0569	0.0114				1.0150	
		c-d		18,076	1,000	85	Military	379.755	47.5991	0.0132				1.1768	
		d-e		102,945	2,465	82	Intermediate	421.950	243.9744	0.0678			6.0316		
		e-f		36,179	2,465	85	Intermediate	379.755	95.2693	0.0265			2.3553		
		f-g		39,930	2,465	75	Approach	303.804	131.4334	0.0365		3.2493			
		g-h		38,442	2,065	75	Approach	253.170	151.8426	0.0422		3.7539			
		F15CB	353												
	Segment	a-b		1,000	50	75	Approach	253.170	3.9499	0.0011		0.3873			
		b-c		12,300	100	92	Military	303.804	40.4866	0.0112				3.9699	
		c-d		11,640	1,000	85	Military	379.755	30.6513	0.0085				3.0055	
		d-e		5,060	1,965	82	Intermediate	396.633	12.7574	0.0035			1.2509		
		e-f		13,000	1,965	85	Approach	337.560	38.5117	0.0107		3.7763			
		f-g		11,000	1,965	80	Approach	286.926	38.3374	0.0106		3.7592			
		g-h		6,591	300	80	Approach	253.170	26.0339	0.0072		2.5528			
											219.4233	**45.4985**	**9.6378**	**13.3394**	**4.8971**
											hrs in Idle	**hrs in Approac**	**hrs in Intermedia**	**hrs in Military**	**hrs in AB-5**
Total Aircraft Emissions															

Mode	Mode Variables: Totsl TIM (hr)	Fuel Flow Rate, lbs/hr	Emission Indices, lbs/1000 lbs fuel: CO	NOx	VOC	SOx	PM10	Total Emissions, lbs/year: CO	NOx	VOC	SOx	PM10
Idle	219.4	1,084	35.30	4.61	7.94	1.20	2.06	16792.56	2193.02	3777.14	570.85	979.96
Approach	45.5	3,837	1.92	12.53	5.12	1.20	2.63	670.38	4374.92	1787.68	418.99	918.28
Intermediate	9.6	5,770	0.86	22.18	2.89	1.20	2.06	95.65	2466.86	321.43	133.46	229.11
Military	13.3	9,679	0.86	29.32	1.79	1.20	1.33	222.07	7571.15	462.22	309.87	343.44
AB-5	4.9	41,682	11.99	8.37	1.53	1.20	1.15	4894.86	3417.01	624.62	489.89	469.48

Total Aircraft Emissions

Total Emissions (lbs/yr) =	**22675.52**	**20022.97**	**6973.08**	**1923.07**	**2940.28**
Total Emissions (tons/yr) =	**11.34**	**10.01**	**3.49**	**0.96**	**1.47**

Total fuel transferred, l 1039133
Total fuel transferred, (153717.9
Refueling emissions, lb 6.314745

NOTES: Emission Indices from *Air Emissions Factor Guide to Air Force Mobile Sources* , Air Force Center for Engineering and the Environment, December 2003.
Flight Profiles from B. Wear, from noise analysis
Refueling emissions from total fuel used, calculation from *Air Emissions Inventory Guidance Document for Stationary Sources at Air Force Installations* , December 2003.

Table 10. Annual Baseline Emissions from Engine Runups

Baseline Runup Emissions - F100-PW-220				Emission Indices, lbs/1000 lbs fuel					Emissions, lbs/year				
Total Minutes of Testing	Power Setting	Total TIM per setting, hours	Fuel Flow, lbs/hr	CO	NOx	VOC	SOx	PM	CO	NOx	VOC	SOx	PM
5280	Idle	88	1,084	35.30	4.61	7.94	1.20	2.06	3367.34	439.76	757.41	114.47	196.51
Total Aircraft Emissions								**Total Emissions (lbs/yr) =**	**3367.34**	**439.76**	**757.41**	**114.47**	**196.51**
								Total Emissions (tons/yr) =	**1.68**	**0.22**	**0.38**	**0.06**	**0.10**

Table 11. Annual Preferred Alternative (1) and Alternative 2 Emissions from Engine Runups

Runup Emissions - F100-PW-220				Emission Indices, lbs/1000 lbs fuel					Emissions, lbs/year				
Number of Engines Tested	Power Setting	Total TIM per setting, hours	Fuel Flow, lbs/hr	CO	NOx	VOC	SOx	PM	CO	NOx	VOC	SOx	PM
10560	Idle	176	1,084	35.30	4.61	7.94	1.20	2.06	6734.68	879.51	1514.82	228.94	393.02
Total Aircraft Emissions								**Total Emissions (lbs/yr) =**	**6734.68**	**879.51**	**1514.82**	**228.94**	**393.02**
								Total Emissions (tons/yr) =	**3.37**	**0.44**	**0.76**	**0.11**	**0.20**

NOTES: Emission Indices from *Air Emissions Factor Guide to Air Force Mobile Sources*, Air Force Center for Engineering and the Environment, December 2003
Number of engine tests assumed to be the same for baseline and proposed action. 34 uninstalled engine tests and 4 installed engine tests total.

Table 12. Annual Aerospace Ground Equipment Emissions - 144th Fighter Wing, Fresno-Yosemite International Airport

NOTE: Assumed that during combustion, all sulfur in the fuel reacts to form SOx or sulfates. Therefore, for JP-8 at 0.06wt%:

EF(SOx) = wt% x (1/100) x Fuel FLow x 7 lb/gal x 2 mol SOx/1mol S

Fuel Flow = hp x 7000 Btu/hp-hr x 1 gal/124000 Btu

Baseline AGE

							Emission Factors, lbs/hr						Total Annual Emissions (lbs/yr)					
AGE Type	Model	Operating Time/LTO, hrs	LTOs	Fuel Flow, gal/hr	hp	lbs/hp-hr	VOC	NOx	CO	SOx	PM10	PM2.5	CO	NOx	VOC	SOx	PM10	PM2.5
Generator	A/M32A-86D	0.33	2,198	6.47	N/A		0.2	7.97	1.52	0.05	0.091	0.088	1102.52	5780.96	145.07	39.42	66.01	63.83
Start Cart	A/M32A-60A	0.33	2,198	10.161	180		0.27	1.82	5.48	0.09	0.211	0.205	3974.86	1320.12	195.84	61.91	153.05	148.69
Heater/AC	H1	0.5	2,198	0.39	6.5		0.1	0.16	0.18	0.00	0.006	0.0058	197.82	175.84	109.90	3.60	6.59	6.37
Hydraulic Test Stand	MJ-2A	0.5	2,198	11.008	195		0.19	3.85	2.46	0.09	0.083	0.076	2703.54	4231.15	208.81	101.62	91.22	83.52
Light Cart	NF-2	1	2,198	1.016	18		0.01	0.11	0.08	0.01	0.01	0.0097	175.84	241.78	21.98	18.76	21.98	21.32
Air Compressor	MC-7	0.25	2,198	3.3	52		0.06	1.29	0.64	0.03	0.145	0.141	351.68	708.86	32.97	15.23	79.68	77.48
Bomb Lift	MJ-1B	1	2,198	1.637	29		3.04	4.78	3.04	0.01	0.8	0.776	6681.92	10506.44	6681.92	30.23	1758.40	1705.65
Total											**Total**		**15188.18**	**22965.14**	**7396.49**	**270.77**	**2176.92**	**2106.87**
Total, tpy											Total tpy		7.59	11.48	3.70	0.14	1.09	1.05

Preferred Alternative AGE

			Total Fuel Used				Emission Factors, lbs/hr						Total Annual Emissions (lbs/yr)					
AGE Type	Model	Operating Time/LTO, hrs	LTOs	Fuel Flow, gal/hr	hp	lbs/hp-hr	VOC	NOx	CO	SOx	PM10	PM2.5	CO	NOx	VOC	SOx	PM10	PM2.5
Generator	A/M32A-86D	0.33	2,198	6.47	N/A		0.2	7.97	1.52	0.05	0.091	0.088	1102.52	5780.96	145.07	39.42	66.01	63.83
Start Cart	A/M32A-60A	0.33	2,198	10.161	180		0.27	1.82	5.48	0.09	0.211	0.205	3974.86	1320.12	195.84	61.91	153.05	148.69
Heater/AC	H1	0.5	2,198	0.39	6.5		0.1	0.16	0.18	0.00	0.006	0.0058	197.82	175.84	109.90	3.60	6.59	6.37
Hydraulic Test Stand	MJ-2A	0.5	2,198	11.008	195		0.19	3.85	2.46	0.09	0.083	0.076	2703.54	4231.15	208.81	101.62	91.22	83.52
Light Cart	NF-2	1	2,198	1.016	18		0.01	0.11	0.08	0.01	0.01	0.0097	175.84	241.78	21.98	18.76	21.98	21.32
Air Compressor	MC-7	0.25	2,198	3.3	52		0.06	1.29	0.64	0.03	0.145	0.141	351.68	708.86	32.97	15.23	79.68	77.48
Bomb Lift	MJ-1B	1	2,198	1.637	29		3.04	4.78	3.04	0.01	0.8	0.776	6681.92	10506.44	6681.92	30.23	1758.40	1705.65
Total											**Total**		**15188.18**	**22965.14**	**7396.49**	**270.77**	**2176.92**	**2106.87**
Total, tpy											Total tpy		7.59	11.48	3.70	0.14	1.09	1.05

Assume AGE for Preferred Alternative is proportional to the number of flight operations

Alternative 2 AGE

			Total Fuel Used				Emission Factors, lbs/hr						Total Annual Emissions (lbs/yr)					
AGE Type	Model	Operating Time/LTO, hrs	LTOs	Fuel Flow, gal/hr	hp	lbs/hp-hr	VOC	NOx	CO	SOx	PM10	PM2.5	CO	NOx	VOC	SOx	PM10	PM2.5
Generator	A/M32A-86D	0.33	2,856	6.47	N/A		0.2	7.97	1.52	0.05	0.091	0.088	1432.57	7511.57	188.50	51.22	85.77	82.94
Start Cart	A/M32A-60A	0.33	2,856	10.161	180		0.27	1.82	5.48	0.09	0.211	0.205	5164.79	1715.31	254.47	80.45	198.86	193.21
Heater/AC	H1	0.5	2,856	0.39	6.5		0.1	0.16	0.18	0.00	0.006	0.0058	257.04	228.48	142.80	4.68	8.57	8.28
Hydraulic Test Stand	MJ-2A	0.5	2,856	11.008	195		0.19	3.85	2.46	0.09	0.083	0.076	3512.88	5497.80	271.32	132.04	118.52	108.53
Light Cart	NF-2	1	2,856	1.016	18		0.01	0.11	0.08	0.01	0.01	0.0097	228.48	314.16	28.56	24.38	28.56	27.70
Air Compressor	MC-7	0.25	2,856	3.3	52		0.06	1.29	0.64	0.03	0.145	0.141	456.96	921.06	42.84	19.79	103.53	100.67
Bomb Lift	MJ-1B	1	2,856	1.637	29		3.04	4.78	3.04	0.01	0.8	0.776	8682.24	13651.68	8682.24	39.27	2284.80	2216.26
Total											**Total**		**19734.96**	**29840.06**	**9610.73**	**351.83**	**2828.61**	**2737.59**
Total, tpy											Total tpy		9.87	14.92	4.81	0.18	1.41	1.37

Assume AGE for Alternative 2 is proportional to the number of flight operations

Table 13. Annual Aerospace Ground Equipment Emissions - 144th Fighter Wing, March Air Reserve Base

Baseline AGE

			Total Fuel Used				Emission Factors, lbs/hr						Total Annual Emissions (lbs/yr)					
AGE Type	Model	Operating Time/LTO, hrs	LTOs	Fuel Flow, gal/hr	hp	lbs/hp-hr	VOC	NOx	CO	SOx	PM10	PM2.5	CO	NOx	VOC	SOx	PM10	PM2.5
Generator	A/M32A-86D	0.33	437	6.47	N/A		0.2	7.97	1.52	0.05	0.091	0.088	219.20	1149.35	28.84	7.84	13.12	12.69
Start Cart	A/M32A-60A	0.33	437	10.161	180		0.27	1.82	5.48	0.09	0.211	0.205	790.27	262.46	38.94	12.31	30.43	29.56
Heater/AC	H1	0.5	437	0.39	6.5		0.1	0.16	0.18	0.00	0.006	0.0058	39.33	34.96	21.85	0.72	1.31	1.27
Hydraulic Test Stand	MJ-2A	0.5	437	11.008	195		0.19	3.85	2.46	0.09	0.083	0.076	537.51	841.23	41.52	20.20	18.14	16.61
Light Cart	NF-2	1	437	1.016	18		0.01	0.11	0.08	0.01	0.01	0.0097	34.96	48.07	4.37	3.73	4.37	4.24
Air Compressor	MC-7	0.25	437	3.3	52		0.06	1.29	0.64	0.03	0.145	0.141	69.92	140.93	6.56	3.03	15.84	15.40
Bomb Lift	MJ-1B	1	437	1.637	29		3.04	4.78	3.04	0.01	0.8	0.776	1328.48	2088.86	1328.48	6.01	349.60	339.11
Total											**Total**		**1048.80**	**1446.78**	**89.63**	**20.86**	**44.86**	**43.52**
Total, tpy											Total tpy		0.52	0.72	0.04	0.01	0.02	0.02

Preferred Alternative AGE

			Total Fuel Used				Emission Factors, lbs/hr						Total Annual Emissions (lbs/yr)					
AGE Type	Model	Operating Time/LTO, hrs	LTOs	Fuel Flow, gal/hr	hp	lbs/hp-hr	VOC	NOx	CO	SOx	PM10	PM2.5	CO	NOx	VOC	SOx	PM10	PM2.5
Generator	A/M32A-86D	0.33	437	6.47	N/A		0.2	7.97	1.52	0.05	0.091	0.088	219.20	1149.35	28.84	7.84	13.12	12.69
Start Cart	A/M32A-60A	0.33	437	10.161	180		0.27	1.82	5.48	0.09	0.211	0.205	790.27	262.46	38.94	12.31	30.43	29.56
Heater/AC	H1	0.5	437	0.39	6.5		0.1	0.16	0.18	0.00	0.006	0.0058	39.33	34.96	21.85	0.72	1.31	1.27
Hydraulic Test Stand	MJ-2A	0.5	437	11.008	195		0.19	3.85	2.46	0.09	0.083	0.076	537.51	841.23	41.52	20.20	18.14	16.61
Light Cart	NF-2	1	437	1.016	18		0.01	0.11	0.08	0.01	0.01	0.0097	34.96	48.07	4.37	3.73	4.37	4.24
Air Compressor	MC-7	0.25	437	3.3	52		0.06	1.29	0.64	0.03	0.145	0.141	69.92	140.93	6.56	3.03	15.84	15.40
Bomb Lift	MJ-1B	1	437	1.637	29		3.04	4.78	3.04	0.01	0.8	0.776	1328.48	2088.86	1328.48	6.01	349.60	339.11
Total											**Total**		**1048.80**	**1446.78**	**89.63**	**20.86**	**44.86**	**43.52**
Total, tpy											Total tpy		0.52	0.72	0.04	0.01	0.02	0.02

Alternative 2 AGE

			Total Fuel Used				Emission Factors, lbs/hr						Total Annual Emissions (lbs/yr)					
AGE Type	Model	Operating Time/LTO, hrs	LTOs	Fuel Flow, gal/hr	hp	lbs/hp-hr	VOC	NOx	CO	SOx	PM10	PM2.5	CO	NOx	VOC	SOx	PM10	PM2.5
Generator	A/M32A-86D	0.33	437	6.47	N/A		0.2	7.97	1.52	0.05	0.091	0.088	219.20	1149.35	28.84	7.84	13.12	12.69
Start Cart	A/M32A-60A	0.33	437	10.161	180		0.27	1.82	5.48	0.09	0.211	0.205	790.27	262.46	38.94	12.31	30.43	29.56
Heater/AC	H1	0.5	437	0.39	6.5		0.1	0.16	0.18	0.00	0.006	0.0058	39.33	34.96	21.85	0.72	1.31	1.27
Hydraulic Test Stand	MJ-2A	0.5	437	11.008	195		0.19	3.85	2.46	0.09	0.083	0.076	537.51	841.23	41.52	20.20	18.14	16.61
Light Cart	NF-2	1	437	1.016	18		0.01	0.11	0.08	0.01	0.01	0.0097	34.96	48.07	4.37	3.73	4.37	4.24
Air Compressor	MC-7	0.25	437	3.3	52		0.06	1.29	0.64	0.03	0.145	0.141	69.92	140.93	6.56	3.03	15.84	15.40
Bomb Lift	MJ-1B	1	437	1.637	29		3.04	4.78	3.04	0.01	0.8	0.776	1328.48	2088.86	1328.48	6.01	349.60	339.11
Total											**Total**		**1048.80**	**1446.78**	**89.63**	**20.86**	**44.86**	**43.52**
Total, tpy											Total tpy		0.52	0.72	0.04	0.01	0.02	0.02

Assume AGE for Alternative 2 is proportional to the number of flight operations

Table 14. Annual Ground Vehicle Baseline Emissions - 144th Fighter Wing, Fresno

Vehicle Category	Fraction of Trips	Personnel	VMT	CO		NO_x		VOCs						SO_2		PM10				PM2.5				CO2		CH4		N2O	
			(mi/year)	Running Exhaust (g/mi)	Start-Up (g/start)*	Running Exhaust (g/mi)	Start-Up (g/start)*	Running Exhaust (g/mi)	Start-Up (g/start)*	Hot-Soak (g/trip)	Resting Loss (g/hr)	Running Evaporative (g/mi)	Diurnal Evaporative (g/hr)	Running Exhaust (g/mi)	Start-Up (g/start)*	Running Exhaust (g/mi)	Start-Up (g/start)*	Tire Wear (g/mi)	Brake Wear (g/mi)	Running Exhaust (g/mi)	Start-Up (g/start)*	Tire Wear (g/mi)	Brake Wear (g/mi)	Running Exhaust (g/mi)	Start-Up (g/start)*	Running Exhaust (g/mi)	Start-Up (g/start)*	Running Exhaust (g/mi)	Start-Up (g/start)*
POVs (Daily Employees)		**327**	**Per trip: 0.2 on-base; 9.57 off base**																										
LDGV	0.8083	264	2582	2.072	8.006	0.184	0.414	0.058	0.694	0.232	0.035	0.039	0.084	0.003	0.002	0.011	0.015	0.008	0.013	0.011	0.014	0.002	0.005	338.923	163.505	0.021	0.04	0.01748	0.03933
LDGT12	0.1917	63	612	2.924	9.266	0.292	0.398	0.109	0.702	0.25	0.04	0.054	0.089	0.004	0.002	0.014	0.015	0.008	0.013	0.013	0.014	0.002	0.005	420.633	194.855	0.025	0.041	0.02774	0.03781
POVs (Weekend Employees)		**718**																						319.478	162.144	0.016	0.034	0	0
LDGV	0.8083	580	5670	2.072	8.006	0.184	0.414	0.058	0.694	0.232	0.035	0.039	0.084	0.003	0.002	0.011	0.015	0.008	0.013	0.011	0.014	0.002	0.005	338.923	163.505	0.021	0.04	0.01748	0.03933
LDGT12	0.1917	138	1345	2.924	9.266	0.292	0.398	0.109	0.702	0.25	0.04	0.054	0.089	0.004	0.002	0.014	0.015	0.008	0.013	0.013	0.014	0.002	0.005	420.633	194.855	0.025	0.041	0.02774	0.03781

Vehicle Category	Emissions, lbs/day									Emissions, tons/year								
	CO	NOx	VOCs	SOx	PM10	PM2.5	CO2	CH4	N2O	CO	NOx	VOCs	SOx	PM10	PM2.5	CO2	CH4	N2O
POVs (Daily Employees)																		
LDGV	11.83	1.05	0.34	0.02	0.18	0.10	1930.26	0.12	0.10	1.54	0.14	0.04	0.00	0.02	0.01	250.93	0.02	0.01
LDGT12	3.99	0.40	0.16	0.01	0.05	0.03	568.80	0.03	0.04	0.52	0.05	0.02	0.00	0.01	0.00	73.94	0.00	0.00
POVs (Weekend Employees)																		
LDGV	25.94	2.30	0.73	0.04	0.40	0.23	4237.44	0.26	0.22	1.35	0.12	0.04	0.00	0.02	0.01	220.35	0.01	0.01
LDGT12	8.71	0.87	0.33	0.01	0.10	0.06	1247.90	0.07	0.08	0.45	0.05	0.02	0.00	0.01	0.00	64.89	0.00	0.00
										3.86	**0.35**	**0.12**	**0.01**	**0.06**	**0.03**	**610.11**	**0.04**	**0.03**

NOTES: Emission factors from EMFAC2007 Model, Fresno County, 2012, average speed 30 mph from CalEEMod default.
Trip length assume 0.2 miles on base (from Inventory); 9.57 miles off base (from CalEEMod default, home-work commute).
Assume personal vehicles would include light-duty auto and light-duty truck trips only. Assume 80.83% LDA and 19.17% LDT based on EMFAC2007 Model, Fresno County, 2012
Assume startup after 8 hours, running time 45 minutes.

Table 15. Annual Ground Vehicle Baseline Emissions - 144th Fighter Wing, March ARB

Vehicle Category	Fraction of Trips	Personnel	VMT	CO		NO_x		VOCs						SO_2		PM10				PM2.5				CO2		CH4		N2O	
			(mi/year)	Running Exhaust (g/mi)	Start-Up (g/start)*	Running Exhaust (g/mi)	Start-Up (g/start)*	Running Exhaust (g/mi)	Start-Up (g/start)*	Hot-Soak (g/trip)	Resting Loss (g/hr)	Running Evaporative (g/mi)	Diurnal Evaporative (g/hr)	Running Exhaust (g/mi)	Start-Up (g/start)*	Running Exhaust (g/mi)	Start-Up (g/start)*	Tire Wear (g/mi)	Brake Wear (g/mi)	Running Exhaust (g/mi)	Start-Up (g/start)*	Tire Wear (g/mi)	Brake Wear (g/mi)	Running Exhaust (g/mi)	Start-Up (g/start)*	Running Exhaust (g/mi)	Start-Up (g/start)*	Running Exhaust (g/mi)	Start-Up (g/start)*
POVs (Daily Employees)		**1400**	**Per trip: 2 on-base; 9.57 off base**																										
LDGV	0.8267	1157	11308	1.891	7.358	0.167	0.374	0.047	0.591	0.179	0.029	0.029	0.066	0.003	0.002	0.012	0.016	0.008	0.013	0.011	0.015	0.002	0.005	337.885	162.08	0.019	0.034	0.015865	0.03553
LDGT12	0.1733	243	2370	2.574	8.407	0.27	0.376	0.086	0.596	0.192	0.031	0.038	0.066	0.004	0.002	0.015	0.017	0.008	0.013	0.014	0.016	0.002	0.005	420.302	192.959	0.023	0.034	0.02565	0.03572

Vehicle Category	Emissions, lbs/day									Emissions, tons/year								
	CO	NOx	VOCs	SOx	PM10	PM2.5	CO2	CH4	N2O	CO	NOx	VOCs	SOx	PM10		CO2	CH4	N2O
POVs (Daily Employees)																		
LDGV	47.17	4.16	1.18	0.07	0.82	0.45	8423.89	0.47	0.40	6.13	0.54	0.15	0.01	0.11	0.06	1095.11	0.06	0.05
LDGT12	13.49	1.41	0.46	0.02	0.19	0.11	2197.29	0.12	0.13	1.75	0.18	0.06	0.00	0.02	0.01	285.65	0.02	0.02
										7.89	**0.73**	**0.21**	**0.01**	**0.13**	**0.07**	**1380.75**	**0.08**	**0.07**

NOTES: Emission factors from EMFAC2007 Model, SCAB-Riverside County, 2012, average speed 30 mph from CalEEMod default.
Trip length assume 0.2 miles on base (from Inventory); 9.57 miles off base (from CalEEMod default, home-work commute).
Assume personal vehicles would include light-duty auto and light-duty truck trips only. Assume 82.67% LDA and 17.33% LDT based on EMFAC2007 Model, SCAB-Riverside County, 2012
Assume startup after 8 hours, running time 45 minutes.

Table 16. Annual Ground Vehicle Emissions - 144th Fighter Wing, Preferred Alternative, Fresno

Vehicle Category	Fraction of Trips	Personnel	VMT	CO		NO_x		VOCs						SO_2		PM10				PM2.5				CO2		CH4		N2O	
			(mi/year)	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Hot-Soak (g/trip)	Resting Loss (g/hr)	Running Evaporative (g/mi)	Diurnal Evaporative (g/hr)	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Tire Wear (g/mi)	Brake Wear (g/mi)	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Tire Wear (g/mi)	Brake Wear (g/mi)	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]
POVs (Daily Employees)		**350**	**Per trip: 0.2 on-base; 9.57 off base**																										
LDGV	0.8083	283	2764	2.072	8.006	0.184	0.414	0.058	0.694	0.232	0.035	0.039	0.084	0.003	0.002	0.011	0.015	0.008	0.013	0.011	0.014	0.002	0.005	338.923	163.505	0.021	0.04	0.01748	0.03933
LDGT12	0.1917	67	656	2.924	9.266	0.292	0.398	0.109	0.702	0.25	0.04	0.054	0.089	0.004	0.002	0.014	0.015	0.008	0.013	0.013	0.014	0.002	0.005	420.633	194.855	0.025	0.041	0.02774	0.03781
POVs (Weekend Employees)		**717**																						319.478	162.144	0.016	0.034	0	0
LDGV	0.8083	580	5662	2.072	8.006	0.184	0.414	0.058	0.694	0.232	0.035	0.039	0.084	0.003	0.002	0.011	0.015	0.008	0.013	0.011	0.014	0.002	0.005	338.923	163.505	0.021	0.04	0.01748	0.03933
LDGT12	0.1917	137	1343	2.924	9.266	0.292	0.398	0.109	0.702	0.25	0.04	0.054	0.089	0.004	0.002	0.014	0.015	0.008	0.013	0.013	0.014	0.002	0.005	420.633	194.855	0.025	0.041	0.02774	0.03781

Vehicle Category	Emissions, lbs/day									Emissions, tons/year								
	CO	NOx	VOCs	SOx	PM10	PM2.5	CO2	CH4	N2O	CO	NOx	VOCs	SOx	PM10	PM2.5	CO2	CH4	N2O
POVs (Daily Employees)																		
LDGV	12.66	1.12	0.36	0.02	0.20	0.11	2065.97	0.13	0.11	1.65	0.15	0.05	0.00	0.03	0.01	268.58	0.02	0.01
LDGT12	4.27	0.42	0.17	0.01	0.05	0.03	608.75	0.04	0.04	0.55	0.06	0.02	0.00	0.01	0.00	79.14	0.00	0.01
POVs (Weekend Employees)																		
LDGV	25.90	2.30	0.73	0.04	0.40	0.22	4231.53	0.26	0.22	1.35	0.12	0.04	0.00	0.02	0.01	220.04	0.01	0.01
LDGT12	8.70	0.87	0.33	0.01	0.10	0.06	1246.16	0.07	0.08	0.45	0.05	0.02	0.00	0.01	0.00	64.80	0.00	0.00
										4.00	**0.37**	**0.12**	**0.01**	**0.06**	**0.03**	**632.55**	**0.04**	**0.03**

NOTES: Emission factors from EMFAC2007 Model, Fresno County, 2012, average speed 30 mph from CalEEMod default.
Trip length assume 0.2 miles on base (from Inventory); 9.57 miles off base (from CalEEMod default, home-work commute).
Assume personal vehicles would include light-duty auto and light-duty truck trips only. Assume 80.83% LDA and 19.17% LDT based on EMFAC2007 Model, Fresno County, 2012
Assume startup after 8 hours, running time 45 minutes.

Table 17. Annual Ground Vehicle Emissions - 144th Fighter Wing, Preferred Alternative, March ARB

Vehicle Category	Fraction of Trips	Personnel	VMT	CO		NO_x		VOCs						SO_2		PM10				PM2.5				CO2		CH4		N2O	
			(mi/year)	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Hot-Soak (g/trip)	Resting Loss (g/hr)	Running Evaporative (g/mi)	Diurnal Evaporative (g/hr)	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Tire Wear (g/mi)	Brake Wear (g/mi)	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Tire Wear (g/mi)	Brake Wear (g/mi)	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]
POVs (Daily Employees)		**1400**	**Per trip: 2 on-base; 9.57 off base**																										
LDGV	0.8267	1157	11308	1.891	7.358	0.167	0.374	0.047	0.591	0.179	0.029	0.029	0.066	0.003	0.002	0.012	0.016	0.008	0.013	0.011	0.015	0.002	0.005	337.885	162.08	0.019	0.034	0.015865	0.03553
LDGT12	0.1733	243	2370	2.574	8.407	0.27	0.376	0.086	0.596	0.192	0.031	0.038	0.066	0.004	0.002	0.015	0.017	0.008	0.013	0.014	0.016	0.002	0.005	420.302	192.959	0.023	0.034	0.02565	0.03572

Vehicle Category	Emissions, lbs/day									Emissions, tons/year								
	CO	NOx	VOCs	SOx	PM10	PM2.5	CO2	CH4	N2O	CO	NOx	VOCs	SOx	PM10		CO2	CH4	N2O
POVs (Daily Employees)																		
LDGV	47.17	4.16	1.18	0.07	0.82	0.45	8423.89	0.47	0.40	6.13	0.54	0.15	0.01	0.11	0.06	1095.11	0.06	0.05
LDGT12	13.49	1.41	0.46	0.02	0.19	0.11	2197.29	0.12	0.13	1.75	0.18	0.06	0.00	0.02	0.01	285.65	0.02	0.02
										7.89	**0.73**	**0.21**	**0.01**	**0.13**	**0.07**	**1380.75**	**0.08**	**0.07**

NOTES: Emission factors from EMFAC2007 Model, SCAB-Riverside County, 2012, average speed 30 mph from CalEEMod default.
Trip length assume 0.2 miles on base (from Inventory); 9.57 miles off base (from CalEEMod default, home-work commute).
Assume personal vehicles would include light-duty auto and light-duty truck trips only. Assume 82.67% LDA and 17.33% LDT based on EMFAC2007 Model, SCAB-Riverside County, 2012
Assume startup after 8 hours, running time 45 minutes.

Table 18. Annual Ground Vehicle Emissions - 144th Fighter Wing, Alternative 2, Fresno

Vehicle Category	Fraction of Trips	Personnel	VMT	CO		NO_x		VOCs						SO_2		PM10				PM2.5				CO2		CH4		N2O	
			(mi/year)	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Hot-Soak (g/trip)	Resting Loss (g/hr)	Running Evaporative (g/mi)	Diurnal Evaporative (g/hr)	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Tire Wear (g/mi)	Brake Wear (g/mi)	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Tire Wear (g/mi)	Brake Wear (g/mi)	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]
POVs (Daily Employees)		**350**	**Per trip: 0.2 on-base; 9.57 off base**																										
LDGV	0.8083	283	2764	2.072	8.006	0.184	0.414	0.058	0.694	0.232	0.035	0.039	0.084	0.003	0.002	0.011	0.015	0.008	0.013	0.011	0.014	0.002	0.005	338.923	163.505	0.021	0.04	0.01748	0.03933
LDGT12	0.1917	67	656	2.924	9.266	0.292	0.398	0.109	0.702	0.25	0.04	0.054	0.089	0.004	0.002	0.014	0.015	0.008	0.013	0.013	0.014	0.002	0.005	420.633	194.855	0.025	0.041	0.02774	0.03781
POVs (Weekend Employees)		**717**																						319.478	162.144	0.016	0.034	0	0
LDGV	0.8083	580	5662	2.072	8.006	0.184	0.414	0.058	0.694	0.232	0.035	0.039	0.084	0.003	0.002	0.011	0.015	0.008	0.013	0.011	0.014	0.002	0.005	338.923	163.505	0.021	0.04	0.01748	0.03933
LDGT12	0.1917	137	1343	2.924	9.266	0.292	0.398	0.109	0.702	0.25	0.04	0.054	0.089	0.004	0.002	0.014	0.015	0.008	0.013	0.013	0.014	0.002	0.005	420.633	194.855	0.025	0.041	0.02774	0.03781

Vehicle Category	Emissions, lbs/day									Emissions, tons/year								
	CO	NOx	VOCs	SOx	PM10	PM2.5	CO2	CH4	N2O	CO	NOx	VOCs	SOx	PM10	PM2.5	CO2	CH4	N2O
POVs (Daily Employees)																		
LDGV	12.66	1.12	0.36	0.02	0.20	0.11	2065.97	0.13	0.11	1.65	0.15	0.05	0.00	0.03	0.01	268.58	0.02	0.01
LDGT12	4.27	0.42	0.17	0.01	0.05	0.03	608.75	0.04	0.04	0.55	0.06	0.02	0.00	0.01	0.00	79.14	0.00	0.01
POVs (Weekend Employees)																		
LDGV	25.90	2.30	0.73	0.04	0.40	0.22	4231.53	0.26	0.22	1.35	0.12	0.04	0.00	0.02	0.01	220.04	0.01	0.01
LDGT12	8.70	0.87	0.33	0.01	0.10	0.06	1246.16	0.07	0.08	0.45	0.05	0.02	0.00	0.01	0.00	64.80	0.00	0.00
										4.00	**0.37**	**0.12**	**0.01**	**0.06**	**0.03**	**632.55**	**0.04**	**0.03**

NOTES: Emission factors from EMFAC2007 Model, Fresno County, 2012, average speed 30 mph from CalEEMod default.
Trip length assume 0.2 miles on base (from Inventory); 9.57 miles off base (from CalEEMod default, home-work commute).
Assume personal vehicles would include light-duty auto and light-duty truck trips only. Assume 80.83% LDA and 19.17% LDT based on EMFAC2007 Model, Fresno County, 2012
Assume startup after 8 hours, running time 45 minutes.

Table 19. Annual Ground Vehicle Emissions - 144th Fighter Wing, Alternative 2, March ARB

Vehicle Category	Fraction of Trips	Personnel	VMT	CO		NO_x		VOCs						SO_2		PM10				PM2.5				CO2		CH4		N2O	
			(mi/year)	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Hot-Soak (g/trip)	Resting Loss (g/hr)	Running Evaporative (g/mi)	Diurnal Evaporative (g/hr)	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Tire Wear (g/mi)	Brake Wear (g/mi)	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Tire Wear (g/mi)	Brake Wear (g/mi)	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]
POVs (Daily Employees)		**1400**	**Per trip: 2 on-base; 9.57 off base**																										
LDGV	0.8267	1157	11308	1.891	7.358	0.167	0.374	0.047	0.591	0.179	0.029	0.029	0.066	0.003	0.002	0.012	0.016	0.008	0.013	0.011	0.015	0.002	0.005	337.885	162.08	0.019	0.034	0.015865	0.03553
LDGT12	0.1733	243	2370	2.574	8.407	0.27	0.376	0.086	0.596	0.192	0.031	0.038	0.066	0.004	0.002	0.015	0.017	0.008	0.013	0.014	0.016	0.002	0.005	420.302	192.959	0.023	0.034	0.02565	0.03572

Vehicle Category	Emissions, lbs/day									Emissions, tons/year								
	CO	NOx	VOCs	SOx	PM10	PM2.5	CO2	CH4	N2O	CO	NOx	VOCs	SOx	PM10		CO2	CH4	N2O
POVs (Daily Employees)																		
LDGV	47.17	4.16	1.18	0.07	0.82	0.45	8423.89	0.47	0.40	6.13	0.54	0.15	0.01	0.11	0.06	1095.11	0.06	0.05
LDGT12	13.49	1.41	0.46	0.02	0.19	0.11	2197.29	0.12	0.13	1.75	0.18	0.06	0.00	0.02	0.01	285.65	0.02	0.02
										7.89	**0.73**	**0.21**	**0.01**	**0.13**	**0.07**	**1380.75**	**0.08**	**0.07**

NOTES: Emission factors from EMFAC2007 Model, SCAB-Riverside County, 2012, average speed 30 mph from CalEEMod default.
Trip length assume 0.2 miles on base (from Inventory); 9.57 miles off base (from CalEEMod default, home-work commute).
Assume personal vehicles would include light-duty auto and light-duty truck trips only. Assume 82.67% LDA and 17.33% LDT based on EMFAC2007 Model, SCAB-Riverside County, 2012
Assume startup after 8 hours, running time 45 minutes.

Table 20. Annual Baseline Emissions - 144th Fighter Wing, Fresno-Yosemite Airport

	Emissions, tons/year					
Source Type	*CO*	*NOx*	*VOC*	*SOx*	*PM10*	*PM2.5*
Aircraft	23.631	10.401	6.500	1.364	2.271	2.248
Refueling			0.007			
Engine Runups	1.684	0.220	0.379	0.057	0.098	0.097
Aerospace Ground Equipment	7.594	11.483	3.698	0.135	1.088	1.078
Personal-Owned Vehicles	3.858	0.353	0.120	0.005	0.056	0.032
Total Emissions Baseline	**36.77**	**22.46**	**10.704**	**1.56**	**3.514**	**3.45**

Table 21. Annual Preferred Alternative Emissions - 144th Fighter Wing, Preferred Alternative, Fresno-Yosemite Airport

	Emissions, tons/year					
Source Type	*CO*	*NOx*	*VOC*	*SOx*	*PM10*	*PM2.5*
Aircraft	47.293	21.094	13.118	2.755	4.604	4.558
Refueling			0.011			
Engine Runups	3.367	0.440	0.757	0.114	0.197	0.195
Aerospace Ground Equipment	7.594	11.483	3.698	0.135	1.088	1.078
Personal-Owned Vehicles	4.000	0.366	0.125	0.006	0.058	0.033
Total Emissions Preferred Alternative	**62.25**	**33.38**	**17.709**	**3.01**	**5.947**	**5.86**
Net Increase	**25.49**	**10.93**	**7.005**	**1.45**	**2.433**	**2.41**

Table 22. Annual Alternative 2 Emissions - 144th Fighter Wing, Alternative 2, Fresno-Yosemite Airport

	Emissions, tons/year					
Source Type	*CO*	*NOx*	*VOC*	*SOx*	*PM10*	*PM2.5*
Aircraft	61.451	27.408	17.045	3.580	5.982	5.922
Refueling			0.014			
Engine Runups	3.367	0.440	0.757	0.114	0.197	0.195
Aerospace Ground Equipment	9.867	14.920	4.805	0.176	1.414	1.400
Personal-Owned Vehicles	4.000	0.366	0.125	0.006	0.058	0.033
Total Emissions Alternative 2	**78.69**	**43.13**	**22.75**	**3.88**	**7.65**	**7.55**
Net Increase	**41.92**	**20.68**	**12.04**	**2.31**	**4.14**	**4.09**

Table 23. Annual Baseline Emissions - 144th Fighter Wing, March ARB

	Emissions, tons/year					
Source Type	*CO*	*NOx*	*VOC*	*SOx*	*PM10*	*PM2.5*
Aircraft	5.669	5.006	1.743	0.481	0.735	0.728
Refueling			0.002			
Aerospace Ground Equipment	0.524	0.723	0.045	0.010	0.022	0.022
Personal-Owned Vehicles	7.886	0.725	0.213	0.012	0.131	0.073
Total Emissions Baseline	**14.08**	**6.45**	**2.003**	**0.50**	**0.889**	**0.82**

Table 24. Annual Preferred Alternative Emissions - 144th Fighter Wing, Preferred Alternative, March ARB

	Emissions, tons/year					
Source Type	*CO*	*NOx*	*VOC*	*SOx*	*PM10*	*PM2.5*
Aircraft	11.338	10.011	3.487	0.962	1.470	1.455
Refueling			0.003			
Aerospace Ground Equipment	0.524	0.723	0.045	0.010	0.022	0.022
Personal-Owned Vehicles	7.886	0.725	0.213	0.012	0.131	0.073
Total Emissions Preferred Alternative	**19.75**	**11.46**	**3.747**	**0.98**	**1.624**	**1.55**
Net Increase	**5.67**	**5.01**	**1.744**	**0.48**	**0.735**	**0.73**

Table 25. Annual Alternative 2 Emissions - 144th Fighter Wing, Alternative 2, March ARB

	Emissions, tons/year					
Source Type	*CO*	*NOx*	*VOC*	*SOx*	*PM10*	*PM2.5*
Aircraft	11.338	10.011	3.487	0.962	1.470	1.455
Refueling			0.003			
Aerospace Ground Equipment	0.524	0.723	0.045	0.010	0.022	0.022
Personal-Owned Vehicles	7.886	0.725	0.213	0.012	0.131	0.073
Total Emissions Alternative 2	**19.75**	**11.46**	**3.75**	**0.98**	**1.62**	**1.55**
Net Increase	**5.67**	**5.01**	**1.74**	**0.48**	**0.74**	**0.73**

Table 26. Annual Baseline Emissions - 144th Fighter Wing, Fresno-Yosemite Airport

	Emissions, tons/year					
Source Type	*CO*	*NOx*	*VOC*	*SOx*	*PM10*	*PM2.5*
Aircraft	23.631	10.401	6.500	1.364	2.271	2.248
Refueling			0.007			
Engine Runups	1.684	0.220	0.379	0.057	0.098	0.097
Aerospace Ground Equipment	7.594	11.483	3.698	0.135	1.088	1.078
Personal-Owned Vehicles	3.858	0.353	0.120	0.005	0.056	0.032
Total Emissions Baseline	**36.77**	**22.46**	**10.70**	**1.56**	**3.51**	**3.45**

Table 27. Annual Preferred Alternative Emissions - 144th Fighter Wing, Preferred Alternative, Fresno-Yosemite Airport, 2012

	Emissions, tons/year					
Source Type	*CO*	*NOx*	*VOC*	*SOx*	*PM10*	*PM2.5*
F-16 Aircraft Operations	15.871	6.987	4.366	0.916	1.526	1.510
F-15 Aircraft Operations	1.205	0.537	0.334	0.070	0.117	0.116
Refueling			0.005			
Engine Runups	3.367	0.440	0.757	0.114	0.197	0.195
Aerospace Ground Equipment	7.594	11.483	3.698	0.135	1.088	1.078
Personal-Owned Vehicles	4.000	0.366	0.125	0.006	0.058	0.033
Total Operations Emissions Preferred Alternative	**32.04**	**19.81**	**9.29**	**1.24**	**2.99**	**2.93**
Construction Emissions	0.64	1.11	0.14	0	0.09	0.05
Total Emissions Preferred Alternative	**32.68**	**20.92**	**9.43**	**1.24**	**3.08**	**2.98**
Net Increase	**-4.09**	**-1.53**	**-1.28**	**-0.32**	**-0.44**	**-0.47**

Table 28. Annual Preferred Alternative Emissions - 144th Fighter Wing, Preferred Alternative, Fresno-Yosemite Airport, 2013

	Emissions, tons/year					
Source Type	*CO*	*NOx*	*VOC*	*SOx*	*PM10*	*PM2.5*
Aircraft	25.497	11.370	7.072	1.485	2.482	2.457
Refueling			0.006			
Engine Runups	3.367	0.440	0.757	0.114	0.197	0.195
Aerospace Ground Equipment	7.594	11.483	3.698	0.135	1.088	1.078
Personal-Owned Vehicles	4.000	0.366	0.125	0.006	0.058	0.033
Total Operations Emissions Preferred Alternative	**40.46**	**23.66**	**11.66**	**1.74**	**3.82**	**3.76**
Construction Emissions	2.34	4.75	1.65	0	0.39	0.28
Total Emissions Preferred Alternative	**42.80**	**28.41**	**13.31**	**1.74**	**4.21**	**4.04**
Net Increase	**6.03**	**5.95**	**2.60**	**0.18**	**0.70**	**0.59**

Table 29. Annual Flight Operations for 144th Fighter Wing - Baseline GHG Emissions, Fresno

Aircraft Type	Engine Model	Type of Operation (Flight Profile)	Baseline Total Number of Operations	Segment Length, feet	Height above AGL, ft	Power Setting	Modeled Power Setting	Average speed per segment, feet/sec	No. of Engines	Time in Mode, seconds	Time in Mode, hours	Total Time In Mode (TIM) Total TIM = TIM x #of Operations: Idle (hr)	Approach (hr)	Intermediate (hr)	Military (hr)	AB-5 (hr)	Cruise (hr)
F-16C/D	F100-PW-220																
		Departures =	**2,199**						1								
		F1611LD6	460														
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	141.8333					
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					1.8170	
		b-c		6000	1400	91	Military	464.145		12.9270	0.0036				1.6518		
		c-d		1500	1600	91	Military	506.340		2.9624	0.0008				0.3785		
		d-e		13500	2500	86	Intermediate	506.340		26.6619	0.0074			3.4068			
		e-f		5772	3000	86	Intermediate	506.340		11.3995	0.0032			1.4566			
		Cruise					Cruise				1.5000						690.0000
		F1611LD8	81														
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	24.9750					
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.3199	
		b-c		6000	1400	91	Military	464.145		12.9270	0.0036				0.2909		
		c-d		1500	1600	91	Military	506.340		2.9624	0.0008				0.0667		
		d-e		13500	2500	86	Intermediate	506.340		26.6619	0.0074			0.5999			
		e-3000		3428.571429	3000	86	Intermediate	506.340		6.7713	0.0019			0.1524			
		Cruise					Cruise				1.5000						121.5000
		F1629LD1	18														
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	5.5500					
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.0711	
		b-c		6240	1300	91	Military	464.145		13.4441	0.0037				0.0672		
		c-d		1760	1600	88	Military	506.340		3.4759	0.0010				0.0174		
		d-e		13000	2500	86	Intermediate	506.340		25.6744	0.0071			0.1284			
		e-3000		3428.571429	3000	86	Intermediate	506.340		6.7713	0.0019			0.0339			
		Cruise					Cruise				1.5000						27.0000
		F1629LD2	7														
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	2.1583					
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.0276	
		b-c		6240	1300	91	Military	464.145		13.4441	0.0037				0.0261		
		c-d		1760	1600	88	Military	506.34		3.4759	0.0010				0.0068		
		d-e		13000	2500	86	Intermediate	506.34		25.6744	0.0071			0.0499			
		e-3000		3428.571429	3000	86	Intermediate	506.34		6.7713	0.0019			0.0132			
		Cruise					Cruise				1.5000						10.5000
		F1629RD8	1,356														
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	418.1000					
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					5.3561	
		b-c		6000	1300	91	Military	464.145		12.9270	0.0036				4.8692		
		c-d		2000	1600	91	Military	506.34		3.9499	0.0011				1.4878		
		d-e		13000	2500	86	Intermediate	506.34		25.6744	0.0071			9.6707			
		e-3000		3428.571429	3000	86	Intermediate	506.34		6.7713	0.0019			2.5505			
		Cruise					Cruise				1.5000						2034.0000
		F1629RD9	277														
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	85.4083					
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					1.0941	
		b-c		6000	1300	91	Military	464.145		12.9270	0.0036				0.9947		
		c-d		2000	1600	88	Military	506.34		3.9499	0.0011				0.3039		
		d-e		13000	2500	86	Intermediate	506.34		25.6744	0.0071			1.9755			
		e-3000		3428.571429	3000	86	Intermediate	506.34		6.7713	0.0019			0.5210			
		Cruise					Cruise				1.5000						415.5000
		Arrivals =	**2,198**														
		F1611LA1OH	296														
	Segment	a-b		30000	3000	85	Approach	506.340		59.2487	0.0165		4.8716				
		b-c		12000	2000	85	Approach	506.340		23.6995	0.0066		1.9486				
		c-d		26000	2000	80	Approach	430.389		60.4105	0.0168		4.9671				
		d-e		12000	2000	80	Approach	345.999		34.6822	0.0096		2.8516				
		e-f		14000	2000	80	Approach	295.365		47.3990	0.0132		3.8972				
		f-g		6000	300	80	Approach	248.951		24.1012	0.0067		1.9817				
		Taxi In					**Idle**	Idle			0.1883	55.7467					
		F1611LA2	146														
	Segment	a-b		15760	3000	88	Approach	430.389		36.6180	0.0102		1.4851				
		b-c		15000	2200	88	Approach	354.438		42.3205	0.0118		1.7163				
		c-d		12000	1500	85	Approach	329.121		36.4608	0.0101		1.4787				
		d-e		12000	1000	80	Approach	278.487		43.0900	0.0120		1.7475				
		e-f		6000	300	80	Approach	244.731		24.5167	0.0068		0.9943				
		Taxi In					**Idle**	Idle			0.1883	27.4967					
		F1611A4BF	14														
	Segment	b-c		26000	3000	88	Approach	421.950		61.6187	0.0171		0.2396				
		c-d		9000	2500	87	Approach	337.560		26.6619	0.0074		0.1037				
		d-e		9000	2500	87	Approach	295.365		30.4708	0.0085		0.1185				
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.0937				
		Taxi In					**Idle**	Idle			0.1883	2.6367					
		F1611LA4HF	15														
	Segment	3000-e		3375	3000	75	Approach	284.816		11.8497	0.0033		0.0494				
		e-f		6000	300	75	Approach	253.170		23.6995	0.0066		0.0987				
		Taxi In					**Idle**	Idle			0.1883	2.8250					
		F1611LA4LF	14														
	Segment	3000-e		6567.567568	3000	75	Approach	290.119		22.6375	0.0063		0.0880				
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.0937				
		Taxi In					**Idle**	Idle			0.1883	2.6367					
		F1629RA1BF	42														
	Segment	b-c		26000	3000	88	Approach	421.950		61.6187	0.0171		0.7189				
		c-d		9000	2500	87	Approach	337.560		26.6619	0.0074		0.3111				
		d-e		9000	2500	87	Approach	295.365		30.4708	0.0085		0.3555				
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.2812				
		Taxi In					**Idle**	Idle			0.1883	7.9100					
		F1629RA1HF	43														
	Segment	3000-e		3375	3000	75	Approach	284.816		11.8497	0.0033		0.1415				
		e-f		6000	300	75	Approach	248.951		24.1012	0.0067		0.2879				
		Taxi In					**Idle**	Idle			0.1883	8.0983					
		F1629RA1LF	42														
	Segment	3000-e		6567.567568	3000	75	Approach	290.119		22.6375	0.0063		0.2641				
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.2812				
		Taxi In					**Idle**	Idle			0.1883	7.9100					
		F1629RA2	326														
	Segment	3000-d		3612	3000	86	Approach	445.5792		8.1063	0.0023		0.7341				
		d-e		12180	2700	85	Approach	354.438		34.3643	0.0095		3.1119				
		e-f		6500	2100	85	Approach	354.438		18.3389	0.0051		1.6607				
		f-g		5620	1800	85	Approach	329.121		17.0758	0.0047		1.5463				
		g-h		12380	1500	85	Approach	303.804		40.7500	0.0113		3.6901				
		h-i		11924	900	80	Approach	278.487		42.8171	0.0119		3.8773				
		i-j		6076	300	80	Approach	244.731		24.8273	0.0069		2.2482				
		Taxi In					**Idle**	Idle			0.1883	61.3967					
		F1629RA5OH	1,260														
	Segment	e-f		6076	3000	85	Approach	506.34		11.9998	0.0033		4.1999				
		f-g		6076	2500	85	Approach	430.389		14.1175	0.0039		4.9411				
		g-h		23856	2000	80	Approach	354.438		67.3066	0.0187		23.5573				
		h-i		13512	2000	80	Approach	345.999		39.0521	0.0108		13.6682				
		i-j		12760	2000	80	Approach	295.365		43.2008	0.0120		15.1203				
		j-k		6100	500	80	Approach	248.9505		24.5029	0.0068		8.5760				
		Taxi In					**Idle**	Idle			0.1883	237.3000					
		Closed Pattern Ops =	**281**														
		F1611LCP1	70														
	Segment	a-b		3,000	50	83	Military	299.585		10.0139	0.0028				0.1947		
		b-c		6,000	100	94	Military	430.389		13.9409	0.0039				0.2711		
		c-d		11,000	1,100	94	Intermediate	464.145		23.6995	0.0066			0.4608			
		d-e		12,000	2,000	87	Approach	388.194		30.9124	0.0086		0.6011				
		e-f		10,850	2,000	87	Approach	303.804		35.7138	0.0099		0.6944				
		f-g		6,000	300	87	Approach	248.951		24.1012	0.0067		0.4686				
		F1629LCP1	211														
	Segment	a-b		3,000	50	83	Military	299.585		10.0139	0.0028				0.5869		
		b-c		6,000	100	94	Military	430.389		13.9409	0.0039				0.8171		
		c-d		11,000	1,100	94	Intermediate	464.145		23.6995	0.0066			1.3891			
		d-e		12,000	2,000	87	Approach	388.194		30.9124	0.0086		1.8118				
		e-f		10,850	2,000	87	Approach	303.804		35.7138	0.0099		2.0932				
		f-g		6,000	300	87	Approach	248.951		24.1012	0.0067		1.4126				
		Total F-16 =	**4,678**									**1091.9817 hrs in Idle**	**125.4798 hrs in Approach**	**22.4086 hrs in Intermediate**	**12.0307 hrs in Military**	**8.6859 hrs in AB-5**	**3298.5000 hrs in Cruise**

Mode Variables			Emission Indices, lbs/1000 lbs fuel			Total Emissions, lbs/year		
Mode	Totsl TIM (hr)	Fuel Flow Rate, lbs/hr	CO2	CH4	N2O	CO2	CH4	N2O
Idle	1092.0	1,084	3100.00	0.09	0.10	3669495.19	102.98	118.37
Approach	125.5	3,837	3100.00	0.09	0.10	1492544.06	41.89	48.15
Intermediate	22.4	5,770	3100.00	0.09	0.10	409822.35	11.25	12.93
Military	12.0	9,679	3100.00	0.09	0.10	360979.45	10.13	11.64
AB-5	8.7	41,682	3100.00	0.09	0.10	1122336.87	31.50	36.20
Cruise	3298.5	3,837	3100.00	0.09	0.10	39234667.95	1101.10	1265.63
Total Aircraft Emissions						**46280845.87**	**1298.85**	**1492.93**
						23140.42	**0.65**	**0.75**

Table 30. Annual Flight Operations for 144th Fighter Wing - Baseline GHG Emissions, March ARB

Aircraft Type	Engine Model	Type of Operation	Baseline Total Number of Operations	Segment Length, feet	Height above AGL, ft	Power Setting	Modeled Power Setting	Speed, kts	No. of Engines	Time in Mode, hours	Total Time In Mode (TIM) Total TIM = TIM x #of Operations: Idle (hr)	Approach (hr)	Intermediate (hr)	Military (hr)	AB-5 (hr)	Cruise (hr)
F-16C/D	F100-PW-220															
		Departures =	**438**						**1**							
		F16DA	22													
		Taxi Out					**Idle**	Idle		0.3083	6.7833					
	Segment	a-b		3000	0	90	AB-5	135.024		22.2183	0.0062				0.1358	
		b-c		7000	200	91	AB-5	388.194		18.0322	0.0050				0.1102	
		c-d		18000	2900	90	Military	548.535		32.8147	0.0091			0.2005		
		d-3000		872.6708075	3000	90	Military	590.730		1.4773	0.0004			0.0090		
		Cruise					Cruise				1.5000					33.0000
		F16DB	416													
		Taxi Out					**Idle**	Idle		0.3083	128.2667					
	Segment	a-b		3,000	0	90	AB-5	135.024		22.2183	0.0062				2.5674	
		b-c		7,000	200	91	AB-5	388.194		18.0322	0.0050				2.0837	
		c-d		18,000	2,900	90	Military	548.535		32.8147	0.0091			3.7919		
		d-3000		873	3,000	90	Military	590.730		1.4773	0.0004			0.1707		
		Cruise					Cruise				1.5000					624.0000
		Arrivals =	448													
		F16AA	182													
	Segment	3000-c		16,473	3,000	76	Approach	506.340		32.5331	0.0090		1.6447			
		c-d		29,820	1,970	76	Approach	506.340		58.8932	0.0164		2.9774			
		d-e		8,372	1,965	76	Approach	455.706		18.3715	0.0051		0.9288			
		e-f		3,490	1,965	76	Approach	388.194		8.9904	0.0025		0.4545			
		f-g		3,429	1,965	85	Approach	354.438		9.6745	0.0027		0.4891			
		g-h		9,426	1,965	85	Approach	320.682		29.3936	0.0082		1.4860			
		h-i		6,000	300	82	Approach	286.926		20.9113	0.0058		1.0572			
		Taxi In					**Idle**	Idle			0.1883	34.2767				
		F16AB	257													
	Segment	3000-d		21,198	3,000	76	Approach	346.327		61.2080	0.0170		4.3696			
		d-e		14,414	2,065	80	Approach	303.804		47.4451	0.0132		3.3871			
		e-f		38,496	2,065	80	Approach	261.609		147.1509	0.0409		10.5049			
		Taxi In					**Idle**	Idle			0.1883	48.4017				
		F16AC	9													
	Segment	3000-c		32,268	3,000	76	Approach	348.090		92.6987	0.0257		0.2317			
		c-d		9,000	1,565	80	Approach	303.804		29.6244	0.0082		0.0741			
		d-e		33,000	1,565	80	Approach	261.609		126.1424	0.0350		0.3154			
		Taxi In					**Idle**	Idle			0.1883	1.6950				
		Closed Pattern Ops =	442													
		F16CA	89													
	Segment	a-b		1,000	50	75	Approach	248.951		4.0169	0.0011		0.0993			
		b-c		12,300	100	92	Military	299.585		41.0569	0.0114			1.0150		
		c-d		18,076	1,000	85	Military	379.755		47.5991	0.0132			1.1768		
		d-e		102,945	2,465	82	Intermediate	421.950		243.9744	0.0678				6.0316	
		e-f		36,179	2,465	85	Intermediate	379.755		95.2693	0.0265				2.3553	
		f-g		39,930	2,465	75	Approach	303.804		131.4334	0.0365		3.2493			
		g-h		38,442	2,065	75	Approach	253.170		151.8426	0.0422		3.7539			
		F16CB	353													
	Segment	a-b		1,000	50	75	Approach	253.170		3.9499	0.0011		0.3873			
		b-c		12,300	100	92	Military	303.804		40.4866	0.0112			3.9699		
		c-d		11,640	1,000	85	Military	379.755		30.6513	0.0085			3.0055		
		d-e		5,060	1,965	82	Intermediate	396.633		12.7574	0.0035				1.2509	
		e-f		13,000	1,965	85	Approach	337.560		38.5117	0.0107		3.7763			
		f-g		11,000	1,965	80	Approach	286.926		38.3374	0.0106		3.7592			
		g-h		6,591	300	80	Approach	253.170		26.0339	0.0072		2.5528			
Total Aircraft Emissions												**219.4233 hrs in Idle**	**45.4985 hrs in Approach**	**9.6378 hrs in Intermedia**	**13.3394 hrs in Military**	**4.8971 hrs in AB-5**	**657.0000 hrs in Cruise**

Mode Variables: Mode	Totsl TIM (hr)	Fuel Flow Rate, lbs/hr	Emission Indices, lbs/1000 lbs fuel: CO2	CH4	N2O	Total Emissions, lbs/year: CO2	CH4	N2O
Idle	219.4	1,084	3100.00	0.09	0.10	737350.17	20.69	23.79
Approach	45.5	3,837	3100.00	0.09	0.10	541190.97	15.19	17.46
Intermediate	9.6	5,770	3100.00	0.09	0.10	172391.17	4.84	5.56
Military	13.3	9,679	3100.00	0.09	0.10	400248.37	11.23	12.91
AB-5	4.9	41,682	3100.00	0.09	0.10	632780.46	17.76	20.41
Cruise	657.0	3,837	3100.00	0.09	0.10	7814817.90	219.32	252.09
Total Aircraft Emissions						**10298779.05**	**289.03**	**332.22**
						5149.39	**0.14**	**0.17**

NOTES: Emission Indices from *Air Emissions Factor Guide to Air Force Mobile Sources* , Air Force Center for Engineering and the Environment, December 2003.
Flight Profiles from B. Wear, from noise analysis
Refueling emissions from total fuel used, calculation from *Air Emissions Inventory Guidance Document for Stationary Sources at Air Force Installations* , December 2003.

Table 31. Annual Flight Operations for 144th Fighter Wing - 2012 Phase Out GHG Emissions, F-16

Aircraft Type	Engine Model	Type of Operation (Flight Profile)	Baseline Total Number of Operations	Segment Length, feet	Height above AGL, ft	Power Setting	Modeled Power Setting	Average speed per segment, feet/sec	No. of Engines	Time in Mode, seconds	Time in Mode, hours	Total Time In Mode (TIM) Total TIM = TIM x #of Operations: Idle (hr)	Approach (hr)	Intermediate (hr)	Military (hr)	AB-5 (hr)	Cruise (hr)
F-16C/D	F100-PW-220																
		Departures =	**1,477**						1								
		F1611LD6	309														
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	95.2750					
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					1.2205	
		b-c		6000	1400	91	Military	464.145		12.9270	0.0036				1.1096		
		c-d		1500	1600	91	Military	506.340		2.9624	0.0008				0.2543		
		d-e		13500	2500	86	Intermediate	506.340		26.6619	0.0074			2.2885			
		e-f		5772	3000	86	Intermediate	506.340		11.3995	0.0032			0.9785			
		Cruise					Cruise				1.5000						463.5000
		F1611LD8	54														
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	16.6500					
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.2133	
		b-c		6000	1400	91	Military	464.145		12.9270	0.0036				0.1939		
		c-d		1500	1600	91	Military	506.340		2.9624	0.0008				0.0444		
		d-e		13500	2500	86	Intermediate	506.340		26.6619	0.0074			0.3999			
		e-3000		3428.571429	3000	86	Intermediate	506.340		6.7713	0.0019			0.1016			
		Cruise					Cruise				1.5000						81.0000
		F1629LD1	12														
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	3.7000					
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.0474	
		b-c		6240	1300	91	Military	464.145		13.4441	0.0037				0.0448		
		c-d		1760	1600	88	Military	506.340		3.4759	0.0010				0.0116		
		d-e		13000	2500	86	Intermediate	506.340		25.6744	0.0071			0.0856			
		e-3000		3428.571429	3000	86	Intermediate	506.340		6.7713	0.0019			0.0226			
		Cruise					Cruise				1.5000						18.0000
		F1629LD2	5														
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	1.5417					
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.0197	
		b-c		6240	1300	91	Military	464.145		13.4441	0.0037				0.0187		
		c-d		1760	1600	88	Military	506.34		3.4759	0.0010				0.0048		
		d-e		13000	2500	86	Intermediate	506.34		25.6744	0.0071			0.0357			
		e-3000		3428.571429	3000	86	Intermediate	506.34		6.7713	0.0019			0.0094			
		Cruise					Cruise				1.5000						7.5000
		F1629RD8	911														
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	280.8917					
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					3.5984	
		b-c		6000	1300	91	Military	464.145		12.9270	0.0036				3.2712		
		c-d		2000	1600	91	Military	506.34		3.9499	0.0011				0.9995		
		d-e		13000	2500	86	Intermediate	506.34		25.6744	0.0071			6.4971			
		e-3000		3428.571429	3000	86	Intermediate	506.34		6.7713	0.0019			1.7135			
		Cruise					Cruise				1.5000						1366.5000
		F1629RD9	186														
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	57.3500					
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.7347	
		b-c		6000	1300	91	Military	464.145		12.9270	0.0036				0.6679		
		c-d		2000	1600	88	Military	506.34		3.9499	0.0011				0.2041		
		d-e		13000	2500	86	Intermediate	506.34		25.6744	0.0071			1.3265			
		e-3000		3428.571429	3000	86	Intermediate	506.34		6.7713	0.0019			0.3498			
		Cruise					Cruise				1.5000						279.0000
		Arrivals =	**1,476**														
		F1611LA1OH	199														
	Segment	a-b		30000	3000	85	Approach	506.340		59.2487	0.0165		3.2751				
		b-c		12000	2000	85	Approach	506.340		23.6995	0.0066		1.3101				
		c-d		26000	2000	80	Approach	430.389		60.4105	0.0168		3.3394				
		d-e		12000	2000	80	Approach	345.999		34.6822	0.0096		1.9172				
		e-f		14000	2000	80	Approach	295.365		47.3990	0.0132		2.6201				
		f-g		6000	300	80	Approach	248.951		24.1012	0.0067		1.3323				
		Taxi In					**Idle**	Idle			0.1883	37.4783					
		F1611LA2	98														
	Segment	a-b		15760	3000	88	Approach	430.389		36.6180	0.0102		0.9968				
		b-c		15000	2200	88	Approach	354.438		42.3205	0.0118		1.1521				
		c-d		12000	1500	85	Approach	329.121		36.4608	0.0101		0.9925				
		d-e		12000	1000	80	Approach	278.487		43.0900	0.0120		1.1730				
		e-f		6000	300	80	Approach	244.731		24.5167	0.0068		0.6674				
		Taxi In					**Idle**	Idle			0.1883	18.4567					
		F1611A4BF	9														
	Segment	b-c		26000	3000	88	Approach	421.950		61.6187	0.0171		0.1540				
		c-d		9000	2500	87	Approach	337.560		26.6619	0.0074		0.0667				
		d-e		9000	2500	87	Approach	295.365		30.4708	0.0085		0.0762				
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.0603				
		Taxi In					**Idle**	Idle			0.1883	1.6950					
		F1611LA4HF	10														
	Segment	3000-e		3375	3000	75	Approach	284.816		11.8497	0.0033		0.0329				
		e-f		6000	300	75	Approach	253.170		23.6995	0.0066		0.0658				
		Taxi In					**Idle**	Idle			0.1883	1.8833					
		F1611LA4LF	9														
	Segment	3000-e		6567.567568	3000	75	Approach	290.119		22.6375	0.0063		0.0566				
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.0603				
		Taxi In					**Idle**	Idle			0.1883	1.6950					
		F1629RA1BF	28														
	Segment	b-c		26000	3000	88	Approach	421.950		61.6187	0.0171		0.4793				
		c-d		9000	2500	87	Approach	337.560		26.6619	0.0074		0.2074				
		d-e		9000	2500	87	Approach	295.365		30.4708	0.0085		0.2370				
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.1875				
		Taxi In					**Idle**	Idle			0.1883	5.2733					
		F1629RA1HF	29														
	Segment	3000-e		3375	3000	75	Approach	284.816		11.8497	0.0033		0.0955				
		e-f		6000	300	75	Approach	248.951		24.1012	0.0067		0.1941				
		Taxi In					**Idle**	Idle			0.1883	5.4617					
		F1629RA1LF	28														
	Segment	3000-e		6567.567568	3000	75	Approach	290.119		22.6375	0.0063		0.1761				
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.1875				
		Taxi In					**Idle**	Idle			0.1883	5.2733					
		F1629RA2	219														
	Segment	3000-d		3612	3000	86	Approach	445.5792		8.1063	0.0023		0.4931				
		d-e		12180	2700	85	Approach	354.438		34.3643	0.0095		2.0905				
		e-f		6500	2100	85	Approach	354.438		18.3389	0.0051		1.1156				
		f-g		5620	1800	85	Approach	329.121		17.0758	0.0047		1.0388				
		g-h		12380	1500	85	Approach	303.804		40.7500	0.0113		2.4790				
		h-i		11924	900	80	Approach	278.487		42.8171	0.0119		2.6047				
		i-j		6076	300	80	Approach	244.731		24.8273	0.0069		1.5103				
		Taxi In					**Idle**	Idle			0.1883	41.2450					
		F1629RA5OH	847														
	Segment	e-f		6076	3000	85	Approach	506.34		11.9998	0.0033		2.8233				
		f-g		6076	2500	85	Approach	430.389		14.1175	0.0039		3.3215				
		g-h		23856	2000	80	Approach	354.438		67.3066	0.0187		15.8357				
		h-i		13512	2000	80	Approach	345.999		39.0521	0.0108		9.1881				
		i-j		12760	2000	80	Approach	295.365		43.2008	0.0120		10.1642				
		j-k		6100	500	80	Approach	248.9505		24.5029	0.0068		5.7650				
		Taxi In					**Idle**	Idle			0.1883	159.5183					
		Closed Pattern Ops =	**189**														
		F1611LCP1	47														
	Segment	a-b		3,000	50	83	Military	299.585		10.0139	0.0028				0.1307		
		b-c		6,000	100	94	Military	430.389		13.9409	0.0039				0.1820		
		c-d		11,000	1,100	94	Intermediate	464.145		23.6995	0.0066			0.3094			
		d-e		12,000	2,000	87	Approach	388.194		30.9124	0.0086		0.4036				
		e-f		10,850	2,000	87	Approach	303.804		35.7138	0.0099		0.4663				
		f-g		6,000	300	87	Approach	248.951		24.1012	0.0067		0.3147				
		F1629LCP1	142														
	Segment	a-b		3,000	50	83	Military	299.585		10.0139	0.0028				0.3950		
		b-c		6,000	100	94	Military	430.389		13.9409	0.0039				0.5499		
		c-d		11,000	1,100	94	Intermediate	464.145		23.6995	0.0066			0.9348			
		d-e		12,000	2,000	87	Approach	388.194		30.9124	0.0086		1.2193				
		e-f		10,850	2,000	87	Approach	303.804		35.7138	0.0099		1.4087				
		f-g		6,000	300	87	Approach	248.951		24.1012	0.0067		0.9507				
		Total F-16 =	**3,142**									**733.3883 hrs in Idle**	**84.3058 hrs in Approach**	**15.0528 hrs in Intermediate**	**8.0825 hrs in Military**	**5.8340 hrs in AB-5**	**2215.5000 hrs in Cruise**

Mode	Mode Variables: Totsl TIM (hr)	Mode Variables: Fuel Flow Rate, lbs/hr	Emission Indices, lbs/1000 lbs fuel: CO2	CH4	N2O	Total Emissions, lbs/year: CO2	CH4	N2O
Idle	733.4	1,084	3100.00	0.09	0.10	2464478.16	69.16	79.50
Approach	84.3	3,837	3100.00	0.09	0.10	1002792.74	28.14	32.35
Intermediate	15.1	5,770	3100.00	0.09	0.10	269249.57	7.56	8.69
Military	8.1	9,679	3100.00	0.09	0.10	242513.94	6.81	7.82
AB-5	5.8	41,682	3100.00	0.09	0.10	753838.82	21.16	24.32
Cruise	2215.5	3,837	3100.00	0.09	0.10	26352707.85	739.58	850.09
Total Aircraft Emissions						**31085581.08**	**872.40**	**1002.76**
						15542.79	**0.44**	**0.50**

Table 32. Annual Flight Operations for 144th Fighter Wing - Preferred Alternative GHG Emissions, Fresno

Aircraft Type	Engine Model	Type of Operation (Flight Profile)	Baseline Total Number of Operations	Segment Length, feet	Height above AGL, ft	Power Setting	Modeled Power Setting	Average speed per segment, feet/sec	No. of Engines	Time in Mode, seconds	Time in Mode, hours	Total Time In Mode (TIM) Total TIM = TIM x #of Operations: Idle (hr)	Approach (hr)	Intermediate (hr)	Military (hr)	AB-5 (hr)	Cruise (hr)
F-15	F100-PW-220																
		Departures =	**2,198**						2								
		F1511LD6	460														
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	141.8333					
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					1.8170	
		b-c		6000	1400	91	Military	464.145		12.9270	0.0036				1.6518		
		c-d		1500	1600	91	Military	506.340		2.9624	0.0008				0.3785		
		d-e		13500	2500	86	Intermediate	506.340		26.6619	0.0074			3.4068			
		e-f		5772	3000	86	Intermediate	506.340		11.3995	0.0032			1.4566			
		Cruise					Cruise				1.5000						690.0000
		F1511LD8	81														
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	24.9750					
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.3199	
		b-c		6000	1400	91	Military	464.145		12.9270	0.0036				0.2909		
		c-d		1500	1600	91	Military	506.340		2.9624	0.0008				0.0667		
		d-e		13500	2500	86	Intermediate	506.340		26.6619	0.0074			0.5999			
		e-3000		3428.571429	3000	86	Intermediate	506.340		6.7713	0.0019			0.1524			
		Cruise					Cruise				1.5000						121.5000
		F1529LD1	18														
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	5.5500					
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.0711	
		b-c		6240	1300	91	Military	464.145		13.4441	0.0037				0.0672		
		c-d		1760	1600	88	Military	506.340		3.4759	0.0010				0.0174		
		d-e		13000	2500	86	Intermediate	506.340		25.6744	0.0071			0.1284			
		e-3000		3428.571429	3000	86	Intermediate	506.340		6.7713	0.0019			0.0339			
		Cruise					Cruise				1.5000						27.0000
		F1529LD2	7														
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	2.1583					
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.0276	
		b-c		6240	1300	91	Military	464.145		13.4441	0.0037				0.0261		
		c-d		1760	1600	88	Military	506.34		3.4759	0.0010				0.0068		
		d-e		13000	2500	86	Intermediate	506.34		25.6744	0.0071			0.0499			
		e-3000		3428.571429	3000	86	Intermediate	506.34		6.7713	0.0019			0.0132			
		Cruise					Cruise				1.5000						10.5000
		F1529RD8	1,355														
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	417.7917					
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					5.3521	
		b-c		6000	1300	91	Military	464.145		12.9270	0.0036				4.8656		
		c-d		2000	1600	91	Military	506.34		3.9499	0.0011				1.4867		
		d-e		13000	2500	86	Intermediate	506.34		25.6744	0.0071			9.6636			
		e-3000		3428.571429	3000	86	Intermediate	506.34		6.7713	0.0019			2.5486			
		Cruise					Cruise				1.5000						2032.5000
		F1529RD9	277														
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	85.4083					
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					1.0941	
		b-c		6000	1300	91	Military	464.145		12.9270	0.0036				0.9947		
		c-d		2000	1600	88	Military	506.34		3.9499	0.0011				0.3039		
		d-e		13000	2500	86	Intermediate	506.34		25.6744	0.0071			1.9755			
		e-3000		3428.571429	3000	86	Intermediate	506.34		6.7713	0.0019			0.5210			
		Cruise					Cruise				1.5000						415.5000
		Arrivals =	**2,198**														
		F1511LA1OH	327														
	Segment	a-b		30000	3000	85	Approach	506.340		59.2487	0.0165		5.3818				
		b-c		12000	2000	85	Approach	506.340		23.6995	0.0066		2.1527				
		c-d		26000	2000	80	Approach	430.389		60.4105	0.0168		5.4873				
		d-e		12000	2000	80	Approach	345.999		34.6822	0.0096		3.1503				
		e-f		14000	2000	80	Approach	295.365		47.3990	0.0132		4.3054				
		f-g		6000	300	80	Approach	248.951		24.1012	0.0067		2.1892				
		Taxi In					**Idle**	Idle			0.1883	61.5850					
		F1511LA2	157														
	Segment	a-b		15760	3000	88	Approach	430.389		36.6180	0.0102		1.5970				
		b-c		15000	2200	88	Approach	354.438		42.3205	0.0118		1.8456				
		c-d		12000	1500	85	Approach	329.121		36.4608	0.0101		1.5901				
		d-e		12000	1000	80	Approach	278.487		43.0900	0.0120		1.8792				
		e-f		6000	300	80	Approach	244.731		24.5167	0.0068		1.0692				
		Taxi In					**Idle**	Idle			0.1883	29.5683					
		F1511A4BF	0														
	Segment	b-c		26000	3000	88	Approach	421.950		61.6187	0.0171		0.0000				
		c-d		9000	2500	87	Approach	337.560		26.6619	0.0074		0.0000				
		d-e		9000	2500	87	Approach	295.365		30.4708	0.0085		0.0000				
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.0000				
		Taxi In					**Idle**	Idle			0.1883	0.0000					
		F1511LA4HF	0														
	Segment	3000-e		3375	3000	75	Approach	284.816		11.8497	0.0033		0.0000				
		e-f		6000	300	75	Approach	253.170		23.6995	0.0066		0.0000				
		Taxi In					**Idle**	Idle			0.1883	0.0000					
		F1511LA4LF	0														
	Segment	3000-e		6567.567568	3000	75	Approach	290.119		22.6375	0.0063		0.0000				
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.0000				
		Taxi In					**Idle**	Idle			0.1883	0.0000					
		F1529RA1BF	0														
	Segment	b-c		26000	3000	88	Approach	421.950		61.6187	0.0171		0.0000				
		c-d		9000	2500	87	Approach	337.560		26.6619	0.0074		0.0000				
		d-e		9000	2500	87	Approach	295.365		30.4708	0.0085		0.0000				
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.0000				
		Taxi In					**Idle**	Idle			0.1883	0.0000					
		F1529RA1HF	0														
	Segment	3000-e		3375	3000	75	Approach	284.816		11.8497	0.0033		0.0000				
		e-f		6000	300	75	Approach	248.951		24.1012	0.0067		0.0000				
		Taxi In					**Idle**	Idle			0.1883	0.0000					
		F1529RA1LF	0														
	Segment	3000-e		6567.567568	3000	75	Approach	290.119		22.6375	0.0063		0.0000				
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.0000				
		Taxi In					**Idle**	Idle			0.1883	0.0000					
		F1529RA2	352														
	Segment	3000-d		3612	3000	86	Approach	445.5792		8.1063	0.0023		0.7926				
		d-e		12180	2700	85	Approach	354.438		34.3643	0.0095		3.3601				
		e-f		6500	2100	85	Approach	354.438		18.3389	0.0051		1.7931				
		f-g		5620	1800	85	Approach	329.121		17.0758	0.0047		1.6696				
		g-h		12380	1500	85	Approach	303.804		40.7500	0.0113		3.9844				
		h-i		11924	900	80	Approach	278.487		42.8171	0.0119		4.1866				
		i-j		6076	300	80	Approach	244.731		24.8273	0.0069		2.4276				
		Taxi In					**Idle**	Idle			0.1883	66.2933					
		F1529RA5OH	1,362														
	Segment	e-f		6076	3000	85	Approach	506.34		11.9998	0.0033		4.5399				
		f-g		6076	2500	85	Approach	430.389		14.1175	0.0039		5.3411				
		g-h		24608	2000	80	Approach	354.438		69.4282	0.0193		26.2670				
		h-i		12760	2000	80	Approach	345.999		36.8797	0.0102		13.9524				
		i-j		12760	2000	80	Approach	295.365		43.2008	0.0120		16.3443				
		j-k		6100	500	80	Approach	248.9505		24.5029	0.0068		9.2702				
		Taxi In					**Idle**	Idle			0.1883	256.5100					
		Closed Pattern Ops =	**281**														
		F1511LCP1	70														
	Segment	a-b		3,000	50	83	Military	299.585		10.0139	0.0028				0.1947		
		b-c		6,000	100	94	Military	430.389		13.9409	0.0039				0.2711		
		c-d		11,000	1,100	94	Intermediate	464.145		23.6995	0.0066			0.4608			
		d-e		12,000	2,000	87	Approach	388.194		30.9124	0.0086		0.6011				
		e-f		10,850	2,000	87	Approach	303.804		35.7138	0.0099		0.6944				
		f-g		6,000	300	87	Approach	248.951		24.1012	0.0067		0.4686				
		F1529LCP1	211														
	Segment	a-b		3,000	50	83	Military	299.585		10.0139	0.0028				0.5869		
		b-c		6,000	100	94	Military	430.389		13.9409	0.0039				0.8171		
		c-d		11,000	1,100	94	Intermediate	464.145		23.6995	0.0066			1.3891			
		d-e		12,000	2,000	87	Approach	388.194		30.9124	0.0086		1.8118				
		e-f		10,850	2,000	87	Approach	303.804		35.7138	0.0099		2.0932				
		f-g		6,000	300	87	Approach	248.951		24.1012	0.0067		1.4126				
		Total F-16 =	**4,677**									**1091.6733 hrs in Idle**	**131.6686 hrs in Approach**	**22.3996 hrs in Intermediate**	**12.0260 hrs in Military**	**8.6819 hrs in AB-5**	**3297.0000 hrs in Cruise**

Mode	Mode Variables: Totsl TIM (hr)	Mode Variables: Fuel Flow Rate, lbs/hr	Emission Indices, lbs/1000 lbs fuel: CO2	CH4	N2O	Total Emissions, lbs/year: CO2	CH4	N2O
Idle	1091.7	1,084	3100.00	0.09	0.10	7336918.14	205.91	236.67
Approach	131.7	3,837	3100.00	0.09	0.10	3132078.28	87.90	101.03
Intermediate	22.4	5,770	3100.00	0.09	0.10	801322.28	22.49	25.85
Military	12.0	9,679	3100.00	0.09	0.10	721677.57	20.25	23.28
AB-5	8.7	41,682	3100.00	0.09	0.10	2243652.97	62.97	72.38
Cruise	3297.0	3,837	3100.00	0.09	0.10	78433651.80	2201.20	2530.12
Total Aircraft Emissions						**92669301.04**	**2600.72**	**2989.33**
						46334.65	**1.30**	**1.49**

Table 33. Annual Flight Operations for 144th Fighter Wing - Preferred Alternative GHG Emissions, March ARB

Aircraft Type	Engine Model	Type of Operation	Baseline Total Number of Operations	Segment Length, feet	Height above AGL, ft	Power Setting	Modeled Power Setting	Speed, kts	No. of Engines	Time in Mode, hours	Total Time In Mode (TIM) Total TIM = TIM x #of Operations: Idle (hr)	Approach (hr)	Intermediate (hr)	Military (hr)	AB-5 (hr)	Cruise (hr)
F-15	F100-PW-220															
		Departures =	**438**						**2**							
		F15DA	22													
		Taxi Out					**Idle**	Idle		0.3083	6.7833					
	Segment	a-b		3000	0	90	AB-5	135.024	22.2183	0.0062					0.1358	
		b-c		7000	200	91	AB-5	388.194	18.0322	0.0050					0.1102	
		c-d		18000	2900	90	Military	548.535	32.8147	0.0091				0.2005		
		d-3000		872.6708075	3000	90	Military	590.730	1.4773	0.0004				0.0090		
		Cruise					Cruise			1.5000						33.0000
		F15DB	416													
		Taxi Out					**Idle**	Idle		0.3083	128.2667					
	Segment	a-b		3,000	0	90	AB-5	135.024	22.2183	0.0062					2.5674	
		b-c		7,000	200	91	AB-5	388.194	18.0322	0.0050					2.0837	
		c-d		18,000	2,900	90	Military	548.535	32.8147	0.0091				3.7919		
		d-3000		873	3,000	90	Military	590.730	1.4773	0.0004				0.1707		
		Cruise					Cruise			1.5000						624.0000
		Arrivals =	448													
		F15AA	182													
	Segment	3000-c		16,473	3,000	76	Approach	506.340	32.5331	0.0090		1.6447				
		c-d		29,820	1,970	76	Approach	506.340	58.8932	0.0164		2.9774				
		d-e		8,372	1,965	76	Approach	455.706	18.3715	0.0051		0.9288				
		e-f		3,490	1,965	76	Approach	388.194	8.9904	0.0025		0.4545				
		f-g		3,429	1,965	85	Approach	354.438	9.6745	0.0027		0.4891				
		g-h		9,426	1,965	85	Approach	320.682	29.3936	0.0082		1.4860				
		h-i		6,000	300	82	Approach	286.926	20.9113	0.0058		1.0572				
		Taxi In					**Idle**	Idle		0.1883	34.2767					
		F15AB	257													
	Segment	3000-d		21,198	3,000	76	Approach	346.327	61.2080	0.0170		4.3696				
		d-e		14,414	2,065	80	Approach	303.804	47.4451	0.0132		3.3871				
		e-f		38,496	2,065	80	Approach	261.609	147.1509	0.0409		10.5049				
		Taxi In					**Idle**	Idle		0.1883	48.4017					
		F15AC	9													
	Segment	3000-c		32,268	3,000	76	Approach	348.090	92.6987	0.0257		0.2317				
		c-d		9,000	1,565	80	Approach	303.804	29.6244	0.0082		0.0741				
		d-e		33,000	1,565	80	Approach	261.609	126.1424	0.0350		0.3154				
		Taxi In					**Idle**	Idle		0.1883	1.6950					
		Closed Pattern Ops =	442													
		F15CA	89													
	Segment	a-b		1,000	50	75	Approach	248.951	4.0169	0.0011		0.0993				
		b-c		12,300	100	92	Military	299.585	41.0569	0.0114				1.0150		
		c-d		18,076	1,000	85	Military	379.755	47.5991	0.0132				1.1768		
		d-e		102,945	2,465	82	Intermediate	421.950	243.9744	0.0678			6.0316			
		e-f		36,179	2,465	85	Intermediate	379.755	95.2693	0.0265			2.3553			
		f-g		39,930	2,465	75	Approach	303.804	131.4334	0.0365		3.2493				
		g-h		38,442	2,065	75	Approach	253.170	151.8426	0.0422		3.7539				
		F15CB	353													
	Segment	a-b		1,000	50	75	Approach	253.170	3.9499	0.0011		0.3873				
		b-c		12,300	100	92	Military	303.804	40.4866	0.0112				3.9699		
		c-d		11,640	1,000	85	Military	379.755	30.6513	0.0085				3.0055		
		d-e		5,060	1,965	82	Intermediate	396.633	12.7574	0.0035			1.2509			
		e-f		13,000	1,965	85	Approach	337.560	38.5117	0.0107		3.7763				
		f-g		11,000	1,965	80	Approach	286.926	38.3374	0.0106		3.7592				
		g-h		6,591	300	80	Approach	253.170	26.0339	0.0072		2.5528				
											219.4233	**45.4985**	**9.6378**	**13.3394**	**4.8971**	**657.0000**
											hrs in Idle	**hrs in Approac**	**hrs in Intermediat**	**hrs in Military**	**hrs in AB-5**	**hrs in Cruise**
Total Aircraft Emissions																

Mode Variables: Mode	Totsl TIM (hr)	Fuel Flow Rate, lbs/hr	Emission Indices, lbs/1000 lbs fuel: CO2	CH4	N2O	Total Emissions, lbs/year: CO2	CH4	N2O
Idle	219.4	1,084	3100.00	0.09	0.10	1474700.34	41.39	47.57
Approach	45.5	3,837	3100.00	0.09	0.10	1082381.94	30.38	34.92
Intermediate	9.6	5,770	3100.00	0.09	0.10	344782.34	9.68	11.12
Military	13.3	9,679	3100.00	0.09	0.10	800496.75	22.47	25.82
AB-5	4.9	41,682	3100.00	0.09	0.10	1265560.92	35.52	40.82
Cruise	657.0	3,837	3100.00	0.09	0.10	15629635.80	438.64	504.18
Total Aircraft Emissions						**20597558.09**	**578.06**	**664.44**
						10298.78	**0.29**	**0.33**

NOTES: Emission Indices from *Air Emissions Factor Guide to Air Force Mobile Sources*, Air Force Center for Engineering and the Environment, December 2003
Flight Profiles from B. Wear, from noise analysis.
Refueling emissions from total fuel used, calculation from *Air Emissions Inventory Guidance Document for Stationary Sources at Air Force Installation*:, December 2003.

Table 34. Annual Flight Operations for 144th Fighter Wing - Preferred Alternative GHG Emissions, Fresno, 2012 Phase In

Aircraft Type	Engine Model	Type of Operation (Flight Profile)	Baseline Total Number of Operations	Segment Length, feet	Height above AGL, ft	Power Setting	Modeled Power Setting	Average speed per segment, feet/sec	No. of Engines	Time in Mode, seconds	Time in Mode, hours	Total Time In Mode (TIM) Total TIM = TIM x #of Operations: Idle (hr)	Approach (hr)	Intermediate (hr)	Military (hr)	AB-5 (hr)	Cruise (hr)
F-15	F100-PW-220																
		Departures =	**56**						**2**								
		F1511LD6	12														
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	3.7000					
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.0474	
		b-c		6000	1400	91	Military	464.145		12.9270	0.0036				0.0431		
		c-d		1500	1600	91	Military	506.340		2.9624	0.0008				0.0099		
		d-e		13500	2500	86	Intermediate	506.340		26.6619	0.0074			0.0889			
		e-f		5772	3000	86	Intermediate	506.340		11.3995	0.0032			0.0380			
		Cruise					Cruise				1.5000						18.0000
		F1511LD8	2														
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	0.6167					
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.0079	
		b-c		6000	1400	91	Military	464.145		12.9270	0.0036				0.0072		
		c-d		1500	1600	91	Military	506.340		2.9624	0.0008				0.0016		
		d-e		13500	2500	86	Intermediate	506.340		26.6619	0.0074			0.0148			
		e-3000		3428.571429	3000	86	Intermediate	506.340		6.7713	0.0019			0.0038			
		Cruise					Cruise				1.5000						3.0000
		F1529LD1	0														
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	0.0000					
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.0000	
		b-c		6240	1300	91	Military	464.145		13.4441	0.0037				0.0000		
		c-d		1760	1600	88	Military	506.340		3.4759	0.0010				0.0000		
		d-e		13000	2500	86	Intermediate	506.340		25.6744	0.0071			0.0000			
		e-3000		3428.571429	3000	86	Intermediate	506.340		6.7713	0.0019			0.0000			
		Cruise					Cruise				1.5000						0.0000
		F1529LD2	0														
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	0.0000					
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.0000	
		b-c		6240	1300	91	Military	464.145		13.4441	0.0037				0.0000		
		c-d		1760	1600	88	Military	506.34		3.4759	0.0010				0.0000		
		d-e		13000	2500	86	Intermediate	506.34		25.6744	0.0071			0.0000			
		e-3000		3428.571429	3000	86	Intermediate	506.34		6.7713	0.0019			0.0000			
		Cruise					Cruise				1.5000						0.0000
		F1529RD8	35														
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	10.7917					
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.1382	
		b-c		6000	1300	91	Military	464.145		12.9270	0.0036				0.1257		
		c-d		2000	1600	91	Military	506.34		3.9499	0.0011				0.0384		
		d-e		13000	2500	86	Intermediate	506.34		25.6744	0.0071			0.2496			
		e-3000		3428.571429	3000	86	Intermediate	506.34		6.7713	0.0019			0.0658			
		Cruise					Cruise				1.5000						52.5000
		F1529RD9	7														
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	2.1583					
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.0276	
		b-c		6000	1300	91	Military	464.145		12.9270	0.0036				0.0251		
		c-d		2000	1600	88	Military	506.34		3.9499	0.0011				0.0077		
		d-e		13000	2500	86	Intermediate	506.34		25.6744	0.0071			0.0499			
		e-3000		3428.571429	3000	86	Intermediate	506.34		6.7713	0.0019			0.0132			
		Cruise					Cruise				1.5000						10.5000
		Arrivals =	**56**														
		F1511LA1OH	8														
	Segment	a-b		30000	3000	85	Approach	506.340		59.2487	0.0165		0.1317				
		b-c		12000	2000	85	Approach	506.340		23.6995	0.0066		0.0527				
		c-d		26000	2000	80	Approach	430.389		60.4105	0.0168		0.1342				
		d-e		12000	2000	80	Approach	345.999		34.6822	0.0096		0.0771				
		e-f		14000	2000	80	Approach	295.365		47.3990	0.0132		0.1053				
		f-g		6000	300	80	Approach	248.951		24.1012	0.0067		0.0536				
		Taxi In					**Idle**	Idle			0.1883	1.5067					
		F1511LA2	4														
	Segment	a-b		15760	3000	88	Approach	430.389		36.6180	0.0102		0.0407				
		b-c		15000	2200	88	Approach	354.438		42.3205	0.0118		0.0470				
		c-d		12000	1500	85	Approach	329.121		36.4608	0.0101		0.0405				
		d-e		12000	1000	80	Approach	278.487		43.0900	0.0120		0.0479				
		e-f		6000	300	80	Approach	244.731		24.5167	0.0068		0.0272				
		Taxi In					**Idle**	Idle			0.1883	0.7533					
		F1511A4BF	0														
	Segment	b-c		26000	3000	88	Approach	421.950		61.6187	0.0171		0.0000				
		c-d		9000	2500	87	Approach	337.560		26.6619	0.0074		0.0000				
		d-e		9000	2500	87	Approach	295.365		30.4708	0.0085		0.0000				
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.0000				
		Taxi In					**Idle**	Idle			0.1883	0.0000					
		F1511LA4HF	0														
	Segment	3000-e		3375	3000	75	Approach	284.816		11.8497	0.0033		0.0000				
		e-f		6000	300	75	Approach	253.170		23.6995	0.0066		0.0000				
		Taxi In					**Idle**	Idle			0.1883	0.0000					
		F1511LA4LF	0														
	Segment	3000-e		6567.567568	3000	75	Approach	290.119		22.6375	0.0063		0.0000				
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.0000				
		Taxi In					**Idle**	Idle			0.1883	0.0000					
		F1529RA1BF	0														
	Segment	b-c		26000	3000	88	Approach	421.950		61.6187	0.0171		0.0000				
		c-d		9000	2500	87	Approach	337.560		26.6619	0.0074		0.0000				
		d-e		9000	2500	87	Approach	295.365		30.4708	0.0085		0.0000				
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.0000				
		Taxi In					**Idle**	Idle			0.1883	0.0000					
		F1529RA1HF	0														
	Segment	3000-e		3375	3000	75	Approach	284.816		11.8497	0.0033		0.0000				
		e-f		6000	300	75	Approach	248.951		24.1012	0.0067		0.0000				
		Taxi In					**Idle**	Idle			0.1883	0.0000					
		F1529RA1LF	0														
	Segment	3000-e		6567.567568	3000	75	Approach	290.119		22.6375	0.0063		0.0000				
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.0000				
		Taxi In					**Idle**	Idle			0.1883	0.0000					
		F1529RA2	9														
	Segment	3000-d		3612	3000	86	Approach	445.5792		8.1063	0.0023		0.0203				
		d-e		12180	2700	85	Approach	354.438		34.3643	0.0095		0.0859				
		e-f		6500	2100	85	Approach	354.438		18.3389	0.0051		0.0458				
		f-g		5620	1800	85	Approach	329.121		17.0758	0.0047		0.0427				
		g-h		12380	1500	85	Approach	303.804		40.7500	0.0113		0.1019				
		h-i		11924	900	80	Approach	278.487		42.8171	0.0119		0.1070				
		i-j		6076	300	80	Approach	244.731		24.8273	0.0069		0.0621				
		Taxi In					**Idle**	Idle			0.1883	1.6950					
		F1529RA5OH	35														
	Segment	e-f		6076	3000	85	Approach	506.34		11.9998	0.0033		0.1167				
		f-g		6076	2500	85	Approach	430.389		14.1175	0.0039		0.1373				
		g-h		24608	2000	80	Approach	354.438		69.4282	0.0193		0.6750				
		h-i		12760	2000	80	Approach	345.999		36.8787	0.0102		0.3585				
		i-j		12760	2000	80	Approach	295.365		43.2008	0.0120		0.4200				
		j-k		6100	500	80	Approach	248.9505		24.5029	0.0068		0.2382				
		Taxi In					**Idle**	Idle			0.1883	6.5917					
		Closed Pattern Ops =	**7**														
		F1511LCP1	2														
	Segment	a-b		3,000	50	83	Military	299.585		10.0139	0.0028				0.0056		
		b-c		6,000	100	94	Military	430.389		13.9409	0.0039				0.0077		
		c-d		11,000	1,100	94	Intermediate	464.145		23.6995	0.0066			0.0132			
		d-e		12,000	2,000	87	Approach	388.194		30.9124	0.0086		0.0172				
		e-f		10,850	2,000	87	Approach	303.804		35.7138	0.0099		0.0198				
		f-g		6,000	300	87	Approach	248.951		24.1012	0.0067		0.0134				
		F1529LCP1	5														
	Segment	a-b		3,000	50	83	Military	299.585		10.0139	0.0028				0.0139		
		b-c		6,000	100	94	Military	430.389		13.9409	0.0039				0.0194		
		c-d		11,000	1,100	94	Intermediate	464.145		23.6995	0.0066			0.0329			
		d-e		12,000	2,000	87	Approach	388.194		30.9124	0.0086		0.0429				
		e-f		10,850	2,000	87	Approach	303.804		35.7138	0.0099		0.0496				
		f-g		6,000	300	87	Approach	248.951		24.1012	0.0067		0.0335				
		Total F-16 =	**119**									**27.8133 hrs in Idle**	**3.3467 hrs in Approach**	**0.5701 hrs in Intermediate**	**0.3053 hrs in Military**	**0.2212 hrs in AB-5**	**84.0000 hrs in Cruise**

Mode	Mode Variables: Totsl TIM (hr)	Mode Variables: Fuel Flow Rate, lbs/hr	Emission Indices, lbs/1000 lbs fuel: CO2	CH4	N2O	Total Emissions, lbs/year: CO2	CH4	N2O
Idle	27.8	1,084	3100.00	0.09	0.10	186927.85	5.25	6.03
Approach	3.3	3,837	3100.00	0.09	0.10	79591.64	2.23	2.57
Intermediate	0.6	5,770	3100.00	0.09	0.10	20393.37	0.57	0.66
Military	0.3	9,679	3100.00	0.09	0.10	18319.08	0.51	0.59
AB-5	0.2	41,682	3100.00	0.09	0.10	57163.13	1.60	1.84
Cruise	84.0	3,837	3100.00	0.09	0.10	1998309.60	56.08	64.46
Total Aircraft Emissions						**2360704.67**	**66.25**	**76.15**
						1180.35	**0.03**	**0.04**

Table 35. Annual Flight Operations for 144th Fighter Wing - Preferred Alternative GHG Emissions, Fresno, 2013 Phase In

Aircraft Type	Engine Model	Type of Operation (Flight Profile)	Baseline Total Number of Operations	Segment Length, feet	Height above AGL, ft	Power Setting	Modeled Power Setting	Average speed per segment, feet/sec	No. of Engines	Time in Mode, seconds	Time in Mode, hours	Total Time In Mode (TIM) Total TIM = TIM x #of Operations: Idle (hr)	Approach (hr)	Intermediate (hr)	Military (hr)	AB-5 (hr)	Cruise (hr)
F-15	F100-PW-220																
		Departures =	**1,185**						**2**								
		F1511LD6	248														
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	76.4667					
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.9796	
		b-c		6000	1400	91	Military	464.145		12.9270	0.0036				0.8905		
		c-d		1500	1600	91	Military	506.340		2.9624	0.0008				0.2041		
		d-e		13500	2500	86	Intermediate	506.340		26.6619	0.0074			1.8367			
		e-f		5772	3000	86	Intermediate	506.340		11.3995	0.0032			0.7853			
		Cruise					Cruise				1.5000						372.0000
		F1511LD8	44														
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	13.5667					
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.1738	
		b-c		6000	1400	91	Military	464.145		12.9270	0.0036				0.1580		
		c-d		1500	1600	91	Military	506.340		2.9624	0.0008				0.0362		
		d-e		13500	2500	86	Intermediate	506.340		26.6619	0.0074			0.3259			
		e-3000		3428.571429	3000	86	Intermediate	506.340		6.7713	0.0019			0.0828			
		Cruise					Cruise				1.5000						66.0000
		F1529LD1	10														
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	3.0833					
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.0395	
		b-c		6240	1300	91	Military	464.145		13.4441	0.0037				0.0373		
		c-d		1760	1600	88	Military	506.340		3.4759	0.0010				0.0097		
		d-e		13000	2500	86	Intermediate	506.340		25.6744	0.0071			0.0713			
		e-3000		3428.571429	3000	86	Intermediate	506.340		6.7713	0.0019			0.0188			
		Cruise					Cruise				1.5000						15.0000
		F1529LD2	4														
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	1.2333					
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.0158	
		b-c		6240	1300	91	Military	464.145		13.4441	0.0037				0.0149		
		c-d		1760	1600	88	Military	506.34		3.4759	0.0010				0.0039		
		d-e		13000	2500	86	Intermediate	506.34		25.6744	0.0071			0.0285			
		e-3000		3428.571429	3000	86	Intermediate	506.34		6.7713	0.0019			0.0075			
		Cruise					Cruise				1.5000						6.0000
		F1529RD8	730														
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	225.0833					
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					2.8834	
		b-c		6000	1300	91	Military	464.145		12.9270	0.0036				2.6213		
		c-d		2000	1600	91	Military	506.34		3.9499	0.0011				0.8010		
		d-e		13000	2500	86	Intermediate	506.34		25.6744	0.0071			5.2062			
		e-3000		3428.571429	3000	86	Intermediate	506.34		6.7713	0.0019			1.3731			
		Cruise					Cruise				1.5000						1095.0000
		F1529RD9	149														
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	45.9417					
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.5885	
		b-c		6000	1300	91	Military	464.145		12.9270	0.0036				0.5350		
		c-d		2000	1600	88	Military	506.34		3.9499	0.0011				0.1635		
		d-e		13000	2500	86	Intermediate	506.34		25.6744	0.0071			1.0626			
		e-3000		3428.571429	3000	86	Intermediate	506.34		6.7713	0.0019			0.2803			
		Cruise					Cruise				1.5000						223.5000
		Arrivals =	**1,185**														
		F1511LA1OH	176														
	Segment	a-b		30000	3000	85	Approach	506.340		59.2487	0.0165		2.8966				
		b-c		12000	2000	85	Approach	506.340		23.6995	0.0066		1.1586				
		c-d		26000	2000	80	Approach	430.389		60.4105	0.0168		2.9534				
		d-e		12000	2000	80	Approach	345.999		34.6822	0.0096		1.6956				
		e-f		14000	2000	80	Approach	295.365		47.3990	0.0132		2.3173				
		f-g		6000	300	80	Approach	248.951		24.1012	0.0067		1.1783				
		Taxi In					**Idle**	Idle			0.1883	33.1467					
		F1511LA2	85														
	Segment	a-b		15760	3000	88	Approach	430.389		36.6180	0.0102		0.8646				
		b-c		15000	2200	88	Approach	354.438		42.3205	0.0118		0.9992				
		c-d		12000	1500	85	Approach	329.121		36.4608	0.0101		0.8609				
		d-e		12000	1000	80	Approach	278.487		43.0900	0.0120		1.0174				
		e-f		6000	300	80	Approach	244.731		24.5167	0.0068		0.5789				
		Taxi In					**Idle**	Idle			0.1883	16.0083					
		F1511A4BF	0														
	Segment	b-c		26000	3000	88	Approach	421.950		61.6187	0.0171		0.0000				
		c-d		9000	2500	87	Approach	337.560		26.6619	0.0074		0.0000				
		d-e		9000	2500	87	Approach	295.365		30.4708	0.0085		0.0000				
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.0000				
		Taxi In					**Idle**	Idle			0.1883	0.0000					
		F1511LA4HF	0														
	Segment	3000-e		3375	3000	75	Approach	284.816		11.8497	0.0033		0.0000				
		e-f		6000	300	75	Approach	253.170		23.6995	0.0066		0.0000				
		Taxi In					**Idle**	Idle			0.1883	0.0000					
		F1511LA4LF	0														
	Segment	3000-e		6567.567568	3000	75	Approach	290.119		22.6375	0.0063		0.0000				
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.0000				
		Taxi In					**Idle**	Idle			0.1883	0.0000					
		F1529RA1BF	0														
	Segment	b-c		26000	3000	88	Approach	421.950		61.6187	0.0171		0.0000				
		c-d		9000	2500	87	Approach	337.560		26.6619	0.0074		0.0000				
		d-e		9000	2500	87	Approach	295.365		30.4708	0.0085		0.0000				
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.0000				
		Taxi In					**Idle**	Idle			0.1883	0.0000					
		F1529RA1HF	0														
	Segment	3000-e		3375	3000	75	Approach	284.816		11.8497	0.0033		0.0000				
		e-f		6000	300	75	Approach	248.951		24.1012	0.0067		0.0000				
		Taxi In					**Idle**	Idle			0.1883	0.0000					
		F1529RA1LF	0														
	Segment	3000-e		6567.567568	3000	75	Approach	290.119		22.6375	0.0063		0.0000				
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.0000				
		Taxi In					**Idle**	Idle			0.1883	0.0000					
		F1529RA2	190														
	Segment	3000-d		3612	3000	86	Approach	445.5792		8.1063	0.0023		0.4278				
		d-e		12180	2700	85	Approach	354.438		34.3643	0.0095		1.8137				
		e-f		6500	2100	85	Approach	354.438		18.3389	0.0051		0.9679				
		f-g		5620	1800	85	Approach	329.121		17.0758	0.0047		0.9012				
		g-h		12380	1500	85	Approach	303.804		40.7500	0.0113		2.1507				
		h-i		11924	900	80	Approach	278.487		42.8171	0.0119		2.2598				
		i-j		6076	300	80	Approach	244.731		24.8273	0.0069		1.3103				
		Taxi In					**Idle**	Idle			0.1883	35.7833					
		F1529RA5OH	734														
	Segment	e-f		6076	3000	85	Approach	506.34		11.9998	0.0033		2.4466				
		f-g		6076	2500	85	Approach	430.389		14.1175	0.0039		2.8784				
		g-h		24608	2000	80	Approach	354.438		69.4282	0.0193		14.1556				
		h-i		12760	2000	80	Approach	345.999		36.8787	0.0102		7.5192				
		i-j		12760	2000	80	Approach	295.365		43.2008	0.0120		8.8082				
		j-k		6100	500	80	Approach	248.9505		24.5029	0.0068		4.9959				
		Taxi In					**Idle**	Idle			0.1883	138.2367					
		Closed Pattern Ops =	**151**														
		F1511LCP1	38														
	Segment	a-b		3,000	50	83	Military	299.585		10.0139	0.0028				0.1057		
		b-c		6,000	100	94	Military	430.389		13.9409	0.0039				0.1472		
		c-d		11,000	1,100	94	Intermediate	464.145		23.6995	0.0066			0.2502			
		d-e		12,000	2,000	87	Approach	388.194		30.9124	0.0086		0.3263				
		e-f		10,850	2,000	87	Approach	303.804		35.7138	0.0099		0.3770				
		f-g		6,000	300	87	Approach	248.951		24.1012	0.0067		0.2544				
		F1529LCP1	113														
	Segment	a-b		3,000	50	83	Military	299.585		10.0139	0.0028				0.3143		
		b-c		6,000	100	94	Military	430.389		13.9409	0.0039				0.4376		
		c-d		11,000	1,100	94	Intermediate	464.145		23.6995	0.0066			0.7439			
		d-e		12,000	2,000	87	Approach	388.194		30.9124	0.0086		0.9703				
		e-f		10,850	2,000	87	Approach	303.804		35.7138	0.0099		1.1210				
		f-g		6,000	300	87	Approach	248.951		24.1012	0.0067		0.7565				
		Total F-16 =	**2,521**									**588.5500 hrs in Idle**	**70.9615 hrs in Approach**	**12.0730 hrs in Intermediate**	**6.4802 hrs in Military**	**4.6806 hrs in AB-5**	**1777.5000 hrs in Cruise**

Mode	Mode Variables: Totsl TIM (hr)	Fuel Flow Rate, lbs/hr	Emission Indices, lbs/1000 lbs fuel: CO2	CH4	N2O	Total Emissions, lbs/year: CO2	CH4	N2O
Idle	588.6	1,084	3100.00	0.09	0.10	3955526.84	111.01	127.60
Approach	71.0	3,837	3100.00	0.09	0.10	1688132.49	47.38	54.46
Intermediate	12.1	5,770	3100.00	0.09	0.10	431900.94	12.12	13.93
Military	6.5	9,679	3100.00	0.09	0.10	388872.91	10.91	12.54
AB-5	4.7	41,682	3100.00	0.09	0.10	1209612.73	33.95	39.02
Cruise	1777.5	3,837	3100.00	0.09	0.10	42285658.50	1186.73	1364.05
Total Aircraft Emissions						**49959704.41**	**1402.09**	**1611.60**
						24979.85	**0.70**	**0.81**

Table 36. Annual Flight Operations for 144th Fighter Wing - Alternative 2 GHG Emissions, Fresno

Aircraft Type	Engine Model	Type of Operation (Flight Profile)	Baseline Total Number of Operations	Segment Length, feet	Height above AGL, ft	Power Setting	Modeled Power Setting	Average speed per segment, feet/sec	No. of Engines	Time in Mode, seconds	Time in Mode, hours	Total Time In Mode (TIM) Total TIM = TIM x #of Operations: Idle (hr)	Approach (hr)	Intermediate (hr)	Military (hr)	AB-5 (hr)	Cruise (hr)
F-15	F100-PW-220																
		Departures =	**2,856**						2								
		F1511LD6	598														
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	184.3833					
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					2.3620	
		b-c		6000	1400	91	Military	464.145		12.9270	0.0036				2.1473		
		c-d		1500	1600	91	Military	506.340		2.9624	0.0008				0.4921		
		d-e		13500	2500	86	Intermediate	506.340		26.6619	0.0074			4.4288			
		e-f		5772	3000	86	Intermediate	506.340		11.3995	0.0032			1.8936			
		Cruise					Cruise				1.5000						897.0000
		F1511LD8	105														
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	32.3750					
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.4147	
		b-c		6000	1400	91	Military	464.145		12.9270	0.0036				0.3770		
		c-d		1500	1600	91	Military	506.340		2.9624	0.0008				0.0864		
		d-e		13500	2500	86	Intermediate	506.340		26.6619	0.0074			0.7776			
		e-3000		3428.571429	3000	86	Intermediate	506.340		6.7713	0.0019			1.1248			
		Cruise					Cruise				1.5000						897.0000
		F1529LD1	23														
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	7.0917					
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.0908	
		b-c		6240	1300	91	Military	464.145		13.4441	0.0037				0.0859		
		c-d		1760	1600	88	Military	506.340		3.4759	0.0010				0.0222		
		d-e		13000	2500	86	Intermediate	506.340		25.6744	0.0071			0.1640			
		e-3000		3428.571429	3000	86	Intermediate	506.340		6.7713	0.0019			1.1248			
		Cruise					Cruise				1.5000						897.0000
		F1529LD2	9														
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	2.7750					
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.0355	
		b-c		6240	1300	91	Military	464.145		13.4441	0.0037				0.0336		
		c-d		1760	1600	88	Military	506.34		3.4759	0.0010				0.0087		
		d-e		13000	2500	86	Intermediate	506.34		25.6744	0.0071			0.0642			
		e-3000		3428.571429	3000	86	Intermediate	506.34		6.7713	0.0019			1.1248			
		Cruise					Cruise				1.5000						897.0000
		F1529RD8	1,761														
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	542.9750					
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					6.9558	
		b-c		6000	1300	91	Military	464.145		12.9270	0.0036				6.3235		
		c-d		2000	1600	91	Military	506.34		3.9499	0.0011				1.9322		
		d-e		13000	2500	86	Intermediate	506.34		25.6744	0.0071			12.5591			
		e-3000		3428.571429	3000	86	Intermediate	506.34		6.7713	0.0019			1.1248			
		Cruise					Cruise				1.5000						897.0000
		F1529RD9	360														
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	111.0000					
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					1.4220	
		b-c		6000	1300	91	Military	464.145		12.9270	0.0036				1.2927		
		c-d		2000	1600	88	Military	506.34		3.9499	0.0011				0.3950		
		d-e		13000	2500	86	Intermediate	506.34		25.6744	0.0071			2.5674			
		e-3000		3428.571429	3000	86	Intermediate	506.34		6.7713	0.0019			1.1248			
		Cruise					Cruise				1.5000						897.0000
		Arrivals =	**2,856**														
		F1511LA1OH	425														
	Segment	a-b		30000	3000	85	Approach	506.340		59.2487	0.0165		6.9946				
		b-c		12000	2000	85	Approach	506.340		23.6995	0.0066		2.7979				
		c-d		26000	2000	80	Approach	430.389		60.4105	0.0168		7.1318				
		d-e		12000	2000	80	Approach	345.999		34.6822	0.0096		4.0944				
		e-f		14000	2000	80	Approach	295.365		47.3990	0.0132		5.5957				
		f-g		6000	300	80	Approach	248.951		24.1012	0.0067		2.8453				
		Taxi In					**Idle**	Idle			0.1883	80.0417					
		F1511LA2	204														
	Segment	a-b		15760	3000	88	Approach	430.389		36.6180	0.0102		2.0750				
		b-c		15000	2200	88	Approach	354.438		42.3205	0.0118		2.3982				
		c-d		12000	1500	85	Approach	329.121		36.4608	0.0101		2.0661				
		d-e		12000	1000	80	Approach	278.487		43.0900	0.0120		2.4418				
		e-f		6000	300	80	Approach	244.731		24.5167	0.0068		1.3893				
		Taxi In					**Idle**	Idle			0.1883	38.4200					
		F1511A4BF	0														
	Segment	b-c		26000	3000	88	Approach	421.950		61.6187	0.0171		0.0000				
		c-d		9000	2500	87	Approach	337.560		26.6619	0.0074		0.0000				
		d-e		9000	2500	87	Approach	295.365		30.4708	0.0085		0.0000				
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.0000				
		Taxi In					**Idle**	Idle			0.1883	0.0000					
		F1511LA4HF	0														
	Segment	3000-e		3375	3000	75	Approach	284.816		11.8497	0.0033		0.0000				
		e-f		6000	300	75	Approach	253.170		23.6995	0.0066		0.0000				
		Taxi In					**Idle**	Idle			0.1883	0.0000					
		F1511LA4LF	0														
	Segment	3000-e		6567.567568	3000	75	Approach	290.119		22.6375	0.0063		0.0000				
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.0000				
		Taxi In					**Idle**	Idle			0.1883	0.0000					
		F1529RA1BF	0														
	Segment	b-c		26000	3000	88	Approach	421.950		61.6187	0.0171		0.0000				
		c-d		9000	2500	87	Approach	337.560		26.6619	0.0074		0.0000				
		d-e		9000	2500	87	Approach	295.365		30.4708	0.0085		0.0000				
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.0000				
		Taxi In					**Idle**	Idle			0.1883	0.0000					
		F1529RA1HF	0														
	Segment	3000-e		3375	3000	75	Approach	284.816		11.8497	0.0033		0.0000				
		e-f		6000	300	75	Approach	248.951		24.1012	0.0067		0.0000				
		Taxi In					**Idle**	Idle			0.1883	0.0000					
		F1529RA1LF	0														
	Segment	3000-e		6567.567568	3000	75	Approach	290.119		22.6375	0.0063		0.0000				
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.0000				
		Taxi In					**Idle**	Idle			0.1883	0.0000					
		F1529RA2	457														
	Segment	3000-d		3612	3000	86	Approach	445.5792		8.1063	0.0023		1.0291				
		d-e		12180	2700	85	Approach	354.438		34.3643	0.0095		4.3624				
		e-f		6500	2100	85	Approach	354.438		18.3389	0.0051		2.3280				
		f-g		5620	1800	85	Approach	329.121		17.0758	0.0047		2.1677				
		g-h		12380	1500	85	Approach	303.804		40.7500	0.0113		5.1730				
		h-i		11924	900	80	Approach	278.487		42.8171	0.0119		5.4354				
		i-j		6076	300	80	Approach	244.731		24.8273	0.0069		3.1517				
		Taxi In					**Idle**	Idle			0.1883	86.0683					
		F1529RA5OH	1,770														
	Segment	e-f		6076	3000	85	Approach	506.34		11.9998	0.0033		5.8999				
		f-g		6076	2500	85	Approach	430.389		14.1175	0.0039		6.9411				
		g-h		24608	2000	80	Approach	354.438		69.4282	0.0193		34.1355				
		h-i		12760	2000	80	Approach	345.999		36.8787	0.0102		18.1320				
		i-j		12760	2000	80	Approach	295.365		43.2008	0.0120		21.2404				
		j-k		6100	500	80	Approach	248.9505		24.5029	0.0068		12.0472				
		Taxi In					**Idle**	Idle			0.1883	333.3500					
		Closed Pattern Ops =	**365**														
		F1511LCP1	91														
	Segment	a-b		3,000	50	83	Military	299.585		10.0139	0.0028				0.2531		
		b-c		6,000	100	94	Military	430.389		13.9409	0.0039				0.3524		
		c-d		11,000	1,100	94	Intermediate	464.145		23.6995	0.0066			0.5991			
		d-e		12,000	2,000	87	Approach	388.194		30.9124	0.0086		0.7814				
		e-f		10,850	2,000	87	Approach	303.804		35.7138	0.0099		0.9028				
		f-g		6,000	300	87	Approach	248.951		24.1012	0.0067		0.6092				
		F1529LCP1	274														
	Segment	a-b		3,000	50	83	Military	299.585		10.0139	0.0028				0.7622		
		b-c		6,000	100	94	Military	430.389		13.9409	0.0039				1.0611		
		c-d		11,000	1,100	94	Intermediate	464.145		23.6995	0.0066			1.8038			
		d-e		12,000	2,000	87	Approach	388.194		30.9124	0.0086		2.3528				
		e-f		10,850	2,000	87	Approach	303.804		35.7138	0.0099		2.7182				
		f-g		6,000	300	87	Approach	248.951		24.1012	0.0067		1.8344				
		Total F-16 =	**6,077**									**1418.4800 hrs in Idle**	**171.0722 hrs in Approach**	**30.4816 hrs in Intermediate**	**15.6253 hrs in Military**	**11.2810 hrs in AB-5**	**5382.0000 hrs in Cruise**

Mode	Totsl TIM (hr)	Fuel Flow Rate, lbs/hr	Emission Indices, lbs/1000 lbs fuel: CO2	CH4	N2O	Total Emissions, lbs/year: CO2	CH4	N2O
Idle	1418.5	1,084	3100.00	0.09	0.10	9533320.38	267.55	307.53
Approach	171.1	3,837	3100.00	0.09	0.10	4069703.99	114.21	131.28
Intermediate	30.5	5,770	3100.00	0.09	0.10	1090448.61	30.60	35.18
Military	15.6	9,679	3100.00	0.09	0.10	937671.76	26.32	30.25
AB-5	11.3	41,682	3100.00	0.09	0.10	2915319.79	81.82	94.04
Cruise	5382.0	3,837	3100.00	0.09	0.10	1280334550.80	3593.23	4130.15
Total Aircraft Emissions						**146581015.34**	**4113.73**	**4728.42**
						73290.51	**2.06**	**2.36**

Table 37. Annual Flight Operations for 144th Fighter Wing - Alternative 2 GHG Emissions, March ARB

Aircraft Type	Engine Model	Type of Operation	Baseline Total Number of Operations	Segment Length, feet	Height above AGL, ft	Power Setting	Modeled Power Setting	Speed, kts	No. of Engines	Time in Mode, hours	Total Time In Mode (TIM) Total TIM = TIM x #of Operations: Idle (hr)	Approach (hr)	Intermediate (hr)	Military (hr)	AB-5 (hr)	Cruise (hr)
F-15	F100-PW-220															
		Departures =	**438**						**2**							
		F15DA	22													
		Taxi Out					**Idle**	Idle		0.3083	6.7833					
	Segment	a-b		3000	0	90	AB-5	135.024	22.2183	0.0062					0.1358	
		b-c		7000	200	91	AB-5	388.194	18.0322	0.0050					0.1102	
		c-d		18000	2900	90	Military	548.535	32.8147	0.0091				0.2005		
		d-3000		872.6708075	3000	90	Military	590.730	1.4773	0.0004				0.0090		
		Cruise					Cruise			1.5000						33.0000
		F15DB	416													
		Taxi Out					**Idle**	Idle		0.3083	128.2667					
	Segment	a-b		3,000	0	90	AB-5	135.024	22.2183	0.0062					2.5674	
		b-c		7,000	200	91	AB-5	388.194	18.0322	0.0050					2.0837	
		c-d		18,000	2,900	90	Military	548.535	32.8147	0.0091				3.7919		
		d-3000		873	3,000	90	Military	590.730	1.4773	0.0004				0.1707		
		Cruise					Cruise			1.5000						624.0000
		Arrivals =	448													
		F15AA	182													
	Segment	3000-c		16,473	3,000	76	Approach	506.340	32.5331	0.0090		1.6447				
		c-d		29,820	1,970	76	Approach	506.340	58.8932	0.0164		2.9774				
		d-e		8,372	1,965	76	Approach	455.706	18.3715	0.0051		0.9288				
		e-f		3,490	1,965	76	Approach	388.194	8.9904	0.0025		0.4545				
		f-g		3,429	1,965	85	Approach	354.438	9.6745	0.0027		0.4891				
		g-h		9,426	1,965	85	Approach	320.682	29.3936	0.0082		1.4860				
		h-i		6,000	300	82	Approach	286.926	20.9113	0.0058		1.0572				
		Taxi In					**Idle**	Idle		0.1883	34.2767					
		F15AB	257													
	Segment	3000-d		21,198	3,000	76	Approach	346.327	61.2080	0.0170		4.3696				
		d-e		14,414	2,065	80	Approach	303.804	47.4451	0.0132		3.3871				
		e-f		38,496	2,065	80	Approach	261.609	147.1509	0.0409		10.5049				
		Taxi In					**Idle**	Idle		0.1883	48.4017					
		F15AC	9													
	Segment	3000-c		32,268	3,000	76	Approach	348.090	92.6987	0.0257		0.2317				
		c-d		9,000	1,565	80	Approach	303.804	29.6244	0.0082		0.0741				
		d-e		33,000	1,565	80	Approach	261.609	126.1424	0.0350		0.3154				
		Taxi In					**Idle**	Idle		0.1883	1.6950					
		Closed Pattern Ops =	442													
		F15CA	89													
	Segment	a-b		1,000	50	75	Approach	248.951	4.0169	0.0011		0.0993				
		b-c		12,300	100	92	Military	299.585	41.0569	0.0114				1.0150		
		c-d		18,076	1,000	85	Military	379.755	47.5991	0.0132				1.1768		
		d-e		102,945	2,465	82	Intermediate	421.950	243.9744	0.0678			6.0316			
		e-f		36,179	2,465	85	Intermediate	379.755	95.2693	0.0265			2.3553			
		f-g		39,930	2,465	75	Approach	303.804	131.4334	0.0365		3.2493				
		g-h		38,442	2,065	75	Approach	253.170	151.8426	0.0422		3.7539				
		F15CB	353													
	Segment	a-b		1,000	50	75	Approach	253.170	3.9499	0.0011		0.3873				
		b-c		12,300	100	92	Military	303.804	40.4866	0.0112				3.9699		
		c-d		11,640	1,000	85	Military	379.755	30.6513	0.0085				3.0055		
		d-e		5,060	1,965	82	Intermediate	396.633	12.7574	0.0035			1.2509			
		e-f		13,000	1,965	85	Approach	337.560	38.5117	0.0107		3.7763				
		f-g		11,000	1,965	80	Approach	286.926	38.3374	0.0106		3.7592				
		g-h		6,591	300	80	Approach	253.170	26.0339	0.0072		2.5528				
											219.4233	**45.4985**	**9.6378**	**13.3394**	**4.8971**	**657.0000**
											hrs in Idle	**hrs in Approach**	**hrs in Intermediate**	**hrs in Military**	**hrs in AB-5**	**hrs in Cruise**
Total Aircraft Emissions																

Mode Variables: Mode	Totsl TIM (hr)	Fuel Flow Rate, lbs/hr	Emission Indices, lbs/1000 lbs fuel: CO2	CH4	N2O	Total Emissions, lbs/year: CO2	CH4	N2O
Idle	219.4	1,084	3100.00	0.09	0.10	1474700.34	41.39	47.57
Approach	45.5	3,837	3100.00	0.09	0.10	1082381.94	30.38	34.92
Intermediate	9.6	5,770	3100.00	0.09	0.10	344782.34	9.68	11.12
Military	13.3	9,679	3100.00	0.09	0.10	800496.75	22.47	25.82
AB-5	4.9	41,682	3100.00	0.09	0.10	1265560.92	35.52	40.82
Cruise	657.0	3,837	3100.00	0.09	0.10	15629635.80	438.64	504.18
Total Aircraft Emissions						**20597558.09**	**578.06**	**664.44**
						10298.78	**0.29**	**0.33**

NOTES: Emission Indices from *Air Emissions Factor Guide to Air Force Mobile Sources*, Air Force Center for Engineering and the Environment, December 2003
Flight Profiles from B. Wear, from noise analysis.
Refueling emissions from total fuel used, calculation from *Air Emissions Inventory Guidance Document for Stationary Sources at Air Force Installations*, December 2003.

Table 38. Annual Baseline GHG Emissions from Engine Runups

Baseline Runup Emissions - F100-PW-220				Emission Indices, lbs/1000 lbs fuel			Emissions, lbs/year		
Total Minutes of Testing	Power Setting	Total TIM per setting, hours	Fuel Flow, lbs/hr	CO2	CH4	N2O	CO2	CH4	N2O
5280	Idle	88	1,084	3100.00	0.09	0.10	295715.20	8.30	9.54
Total Aircraft Emissions							**295715.20**	**8.30**	**9.54**
							147.86	**0.00**	**0.00**

Table 39. Annual Preferred Alternative (1) and Alternative 2 GHG Emissions from Engine Runups

Runup Emissions - F100-PW-220				Emission Indices, lbs/1000 lbs fuel			Emissions, lbs/year		
Number of Engines Tested	Power Setting	Total TIM per setting, hours	Fuel Flow, lbs/hr	CO2	CH4	N2O	CO2	CH4	N2O
10560	Idle	176	1,084	3100.00	0.09	0.10	591430.40	16.60	19.08
Total Aircraft Emissions							**591430.40**	**16.60**	**19.08**
							295.72	**0.01**	**0.01**

NOTES: Emission Indices from *Air Emissions Factor Guide to Air Force Mobile Sources*, Air Force Center for Engineering and the Environment, December 2003. Number of engine tests assumed to be the same for baseline and proposed action. 34 uninstalled engine tests and 4 installed engine tests total.

Table 40. Annual Aerospace Ground Equipment GHG Emissions - 144th Fighter Wing, Fresno-Yosemite International Airport

NOTE: Assumed that during combustion, all sulfur in the fuel reacts to form SO2 or sulfates. Therefore, for JP-8 at 0.06wt%:

EF(SO2) = wt% x (1/100) x Fuel FLow x 7 lb/gal x 2 mol SO2/1mol S

Fuel Flow = hp x 7000 Btu/hp-hr x 1 gal/124000 Btu

Baseline AGE

							Emission Factors, lbs/hr			Total Annual Emissions (lbs/yr)		
AGE Type	Model	Operating Time/LTO, hrs	LTOs	Fuel Flow, gal/hr	hp	lbs/hp-hr	CO2	CH4	N2O	CO2	CH4	N2O
Generator	A/M32A-86D	0.33	2,198	6.47	N/A		21.09	1.22E-03	5.44E-04	98974.31	5.73	2.55
Start Cart	A/M32A-60A	0.33	2,198	10.161	180		1.17	6.80E-05	1.02E-05	152756.60	8.88	1.33
Heater/AC	H1	0.5	2,198	0.39	6.5		21.09	1.22E-03	5.44E-04	9039.38	0.52	0.23
Hydraulic Test Stand	MJ-2A	0.5	2,198	11.008	195		1.17	6.80E-05	1.02E-05	250736.85	14.57	2.19
Light Cart	NF-2	1	2,198	1.016	18		1.17	6.80E-05	1.02E-05	46289.88	2.69	0.40
Air Compressor	MC-7	0.25	2,198	3.3	52		21.09	1.22E-03	5.44E-04	38243.55	2.21	0.99
Bomb Lift	MJ-1B	1	2,198	1.637	29		1.17	6.80E-05	1.02E-05	74578.14	4.33	0.65
Total										**670618.72**	**38.94**	**8.34**
Total, tpy										335.31	0.02	0.00

Preferred Alternative AGE

			Total Fuel Used				Emission Factors, lbs/hr			Total Annual Emissions (lbs/yr)		
AGE Type	Model	Operating Time/LTO, hrs	LTOs	Fuel Flow, gal/hr	hp	lbs/hp-hr	CO2	CH4	N2O	CO2	CH4	N2O
Generator	A/M32A-86D	0.33	2,198	6.47	N/A		21.09	1.22E-03	5.44E-04	98974.31	5.73	2.55
Start Cart	A/M32A-60A	0.33	2,198	10.161	180		1.17	6.80E-05	1.02E-05	152756.60	8.88	1.33
Heater/AC	H1	0.5	2,198	0.39	6.5		21.09	1.22E-03	5.44E-04	9039.38	0.52	0.23
Hydraulic Test Stand	MJ-2A	0.5	2,198	11.008	195		1.17	6.80E-05	1.02E-05	250736.85	14.57	2.19
Light Cart	NF-2	1	2,198	1.016	18		1.17	6.80E-05	1.02E-05	46289.88	2.69	0.40
Air Compressor	MC-7	0.25	2,198	3.3	52		21.09	1.22E-03	5.44E-04	38243.55	2.21	0.99
Bomb Lift	MJ-1B	1	2,198	1.637	29		1.17	6.80E-05	1.02E-05	74578.14	4.33	0.65
Total										**670618.72**	**38.94**	**8.34**
Total, tpy										335.31	0.02	0.00

Assume AGE for Preferred Alternative is proportional to the number of flight operations

Alternative 2 AGE

			Total Fuel Used				Emission Factors, lbs/hr			Total Annual Emissions (lbs/yr)		
AGE Type	Model	Operating Time/LTO, hrs	LTOs	Fuel Flow, gal/hr	hp	lbs/hp-hr	CO2	CH4	N2O	CO2	CH4	N2O
Generator	A/M32A-86D	0.33	2,856	6.47	N/A		21.09	1.22E-03	5.44E-04	128603.56	7.44	3.32
Start Cart	A/M32A-60A	0.33	2,856	10.161	180		1.17	6.80E-05	1.02E-05	198486.29	11.54	1.73
Heater/AC	H1	0.5	2,856	0.39	6.5		21.09	1.22E-03	5.44E-04	11745.44	0.68	0.30
Hydraulic Test Stand	MJ-2A	0.5	2,856	11.008	195		1.17	6.80E-05	1.02E-05	325798.20	18.94	2.84
Light Cart	NF-2	1	2,856	1.016	18		1.17	6.80E-05	1.02E-05	60147.36	3.50	0.52
Air Compressor	MC-7	0.25	2,856	3.3	52		21.09	1.22E-03	5.44E-04	49692.26	2.87	1.28
Bomb Lift	MJ-1B	1	2,856	1.637	29		1.17	6.80E-05	1.02E-05	96904.08	5.63	0.84
Total										**871377.19**	**50.59**	**10.84**
Total, tpy										435.69	0.03	0.01

Assume AGE for Alternative 2 is proportional to the number of flight operations

Table 41. Annual Aerospace Ground Equipment GHG Emissions - 144th Fighter Wing, March Air Reserve Base

Baseline AGE

			Total Fuel Used				Emission Factors, lbs/hr			Total Annual Emissions (lbs/yr)		
AGE Type	Model	Operating Time/LTO, hrs	LTOs	Fuel Flow, gal/hr	hp	lbs/hp-hr	CO2	CH4	N2O	CO2	CH4	N2O
Generator	A/M32A-86D	0.33	438	6.47	N/A		21.09	1.22E-03	5.44E-04	19722.82	1.14	0.51
Start Cart	A/M32A-60A	0.33	438	10.161	180		1.17	6.80E-05	1.02E-05	30440.12	1.77	0.27
Heater/AC	H1	0.5	438	0.39	6.5		21.09	1.22E-03	5.44E-04	1801.30	0.10	0.05
Hydraulic Test Stand	MJ-2A	0.5	438	11.008	195		1.17	6.80E-05	1.02E-05	49964.85	2.90	0.44
Light Cart	NF-2	1	438	1.016	18		1.17	6.80E-05	1.02E-05	9224.28	0.54	0.08
Air Compressor	MC-7	0.25	438	3.3	52		21.09	1.22E-03	5.44E-04	7620.87	0.44	0.20
Bomb Lift	MJ-1B	1	438	1.637	29		1.17	6.80E-05	1.02E-05	14861.34	0.86	0.13
Total										**51964.24**	**3.01**	**0.82**
Total, tpy										25.98	0.00	0.00

Preferred Alternative AGE

			Total Fuel Used				Emission Factors, lbs/hr			Total Annual Emissions (lbs/yr)		
AGE Type	Model	Operating Time/LTO, hrs	LTOs	Fuel Flow, gal/hr	hp	lbs/hp-hr	CO2	CH4	N2O	CO2	CH4	N2O
Generator	A/M32A-86D	0.33	438	6.47	N/A		21.09	1.22E-03	5.44E-04	19722.82	1.14	0.51
Start Cart	A/M32A-60A	0.33	438	10.161	180		1.17	6.80E-05	1.02E-05	30440.12	1.77	0.27
Heater/AC	H1	0.5	438	0.39	6.5		21.09	1.22E-03	5.44E-04	1801.30	0.10	0.05
Hydraulic Test Stand	MJ-2A	0.5	438	11.008	195		1.17	6.80E-05	1.02E-05	49964.85	2.90	0.44
Light Cart	NF-2	1	438	1.016	18		1.17	6.80E-05	1.02E-05	9224.28	0.54	0.08
Air Compressor	MC-7	0.25	438	3.3	52		21.09	1.22E-03	5.44E-04	7620.87	0.44	0.20
Bomb Lift	MJ-1B	1	438	1.637	29		1.17	6.80E-05	1.02E-05	14861.34	0.86	0.13
Total										**51964.24**	**3.01**	**0.82**
Total, tpy										25.98	0.00	0.00

Alternative 2 AGE

			Total Fuel Used				Emission Factors, lbs/hr			Total Annual Emissions (lbs/yr)		
AGE Type	Model	Operating Time/LTO, hrs	LTOs	Fuel Flow, gal/hr	hp	lbs/hp-hr	CO2	CH4	N2O	CO2	CH4	N2O
Generator	A/M32A-86D	0.33	438	6.47	N/A		21.09	1.22E-03	5.44E-04	19722.82	1.14	0.51
Start Cart	A/M32A-60A	0.33	438	10.161	180		1.17	6.80E-05	1.02E-05	30440.12	1.77	0.27
Heater/AC	H1	0.5	438	0.39	6.5		21.09	1.22E-03	5.44E-04	1801.30	0.10	0.05
Hydraulic Test Stand	MJ-2A	0.5	438	11.008	195		1.17	6.80E-05	1.02E-05	49964.85	2.90	0.44
Light Cart	NF-2	1	438	1.016	18		1.17	6.80E-05	1.02E-05	9224.28	0.54	0.08
Air Compressor	MC-7	0.25	438	3.3	52		21.09	1.22E-03	5.44E-04	7620.87	0.44	0.20
Bomb Lift	MJ-1B	1	438	1.637	29		1.17	6.80E-05	1.02E-05	14861.34	0.86	0.13
Total										**51964.24**	**3.01**	**0.82**
Total, tpy										25.98	0.00	0.00

Assume AGE for Alternative 2 is proportional to the number of flight operations

Table 42. Annual Ground Vehicle Baseline GHG Emissions - 144th Fighter Wing, Fresno

Vehicle Category	Fraction of Trips	Personnel	VMT	CO2		CH4		N2O							
			(mi/year)	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]	CO2	CH4	N2O	CO2	CH4	N2O
POVs (Daily Employees)		**327**	**Per trip: 0.2 on-base; 9.57 off base**												
LDGV	0.8083	264	2582	338.923	163.505	0.021	0.04	0.01748	0.03933	1930.26	0.12	0.10	250.93	0.02	0.01
LDGT12	0.1917	63	612	420.633	194.855	0.025	0.041	0.02774	0.03781	568.80	0.03	0.04	73.94	0.00	0.00
POVs (Weekend Employees)		**718**		319.478	162.144	0.016	0.034	0	0						
LDGV	0.8083	580	5670	338.923	163.505	0.021	0.04	0.01748	0.03933	4237.44	0.26	0.22	220.35	0.01	0.01
LDGT12	0.1917	138	1345	420.633	194.855	0.025	0.041	0.02774	0.03781	1247.90	0.07	0.08	64.89	0.00	0.00
													610.11	**0.04**	**0.03**

NOTES: Emission factors from EMFAC2007 Model, Fresno County, 2012, average speed 30 mph from CalEEMod default.
Trip length assume 0.2 miles on base (from Inventory); 9.57 miles off base (from CalEEMod default, home-work commute).
Assume personal vehicles would include light-duty auto and light-duty truck trips only. Assume 80.83% LDA and 19.17% LDT based on EMFAC2007 Model, Fresno County, 2012
Assume startup after 8 hours, running time 45 minutes.

Table 43. Annual Ground Vehicle Baseline GHG Emissions - 144th Fighter Wing, March ARB

Vehicle Category	Fraction of Trips	Personnel	VMT	CO2		CH4		N2O							
			(mi/year)	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]	CO22	CH4	N2O	CO22	CH4	N2O
POVs (Daily Employees)		**1400**	**Per trip: 2 on-base; 9.57 off base**												
LDGV	0.8267	1157	11308	337.885	162.08	0.019	0.034	0.015865	0.03553	8423.89	0.47	0.40	1095.11	0.06	0.05
LDGT12	0.1733	243	2370	420.302	192.959	0.023	0.034	0.02565	0.03572	2197.29	0.12	0.13	285.65	0.02	0.02
													1380.75	**0.08**	**0.07**

NOTES: Emission factors from EMFAC2007 Model, SCAB-Riverside County, 2012, average speed 30 mph from CalEEMod default.
Trip length assume 0.2 miles on base (from Inventory); 9.57 miles off base (from CalEEMod default, home-work commute).
Assume personal vehicles would include light-duty auto and light-duty truck trips only. Assume 82.67% LDA and 17.33% LDT based on EMFAC2007 Model, SCAB-Riverside County, 2012
Assume startup after 8 hours, running time 45 minutes.

Table 44. Annual Ground Vehicle GHG Emissions - 144th Fighter Wing, Preferred Alternative, Fresno

Vehicle Category	Fraction of Trips	Personnel	VMT (mi/year)	CO2 Running Exhaust (g/mi)	CO2 Start-Up (g/start)[a]	CH4 Running Exhaust (g/mi)	CH4 Start-Up (g/start)[a]	N2O Running Exhaust (g/mi)	N2O Start-Up (g/start)[a]	CO2	CH4	N2O	CO2	CH4	N2O
POVs (Daily Employees)		**350**	**Per trip: 0.2 on-base; 9.57 off base**												
LDGV	0.8083	283	2764	338.923	163.505	0.021	0.04	0.01748	0.03933	2065.97	0.13	0.11	268.58	0.02	0.01
LDGT12	0.1917	67	656	420.633	194.855	0.025	0.041	0.02774	0.03781	608.75	0.04	0.04	79.14	0.00	0.01
POVs (Weekend Employees)		**717**		319.478	162.144	0.016	0.034	0	0						
LDGV	0.8083	580	5662	338.923	163.505	0.021	0.04	0.01748	0.03933	4231.53	0.26	0.22	220.04	0.01	0.01
LDGT12	0.1917	137	1343	420.633	194.855	0.025	0.041	0.02774	0.03781	1246.16	0.07	0.08	64.80	0.00	0.00
													632.55	**0.04**	**0.03**

NOTES: Emission factors from EMFAC2007 Model, Fresno County, 2012, average speed 30 mph from CalEEMod default.
Trip length assume 0.2 miles on base (from Inventory); 9.57 miles off base (from CalEEMod default, home-work commute).
Assume personal vehicles would include light-duty auto and light-duty truck trips only. Assume 80.83% LDA and 19.17% LDT based on EMFAC2007 Model, Fresno County, 2012
Assume startup after 8 hours, running time 45 minutes.

Table 45. Annual Ground Vehicle GHG Emissions - 144th Fighter Wing, Preferred Alternative, March ARB

Vehicle Category	Fraction of Trips	Personnel	VMT (mi/year)	CO2 Running Exhaust (g/mi)	CO2 Start-Up (g/start)[a]	CH4 Running Exhaust (g/mi)	CH4 Start-Up (g/start)[a]	N2O Running Exhaust (g/mi)	N2O Start-Up (g/start)[a]	CO2	CH4	N2O	CO2	CH4	N2O
POVs (Daily Employees)		**1400**	**Per trip: 2 on-base; 9.57 off base**												
LDGV	0.8267	1157	11308	337.885	162.08	0.019	0.034	0.015865	0.03553	8423.89	0.47	0.40	1095.11	0.06	0.05
LDGT12	0.1733	243	2370	420.302	192.959	0.023	0.034	0.02565	0.03572	2197.29	0.12	0.13	285.65	0.02	0.02
													1380.75	**0.08**	**0.07**

NOTES: Emission factors from EMFAC2007 Model, SCAB-Riverside County, 2012, average speed 30 mph from CalEEMod default.
Trip length assume 0.2 miles on base (from Inventory); 9.57 miles off base (from CalEEMod default, home-work commute).
Assume personal vehicles would include light-duty auto and light-duty truck trips only. Assume 82.67% LDA and 17.33% LDT based on EMFAC2007 Model, SCAB-Riverside County, 2012
Assume startup after 8 hours, running time 45 minutes.

Table 46. Annual Ground Vehicle GHG Emissions - 144th Fighter Wing, Alternative 2, Fresno

Vehicle Category	Fraction of Trips	Personnel	VMT (mi/year)	CO2 Running Exhaust (g/mi)	CO2 Start-Up (g/start)[a]	CH4 Running Exhaust (g/mi)	CH4 Start-Up (g/start)[a]	N2O Running Exhaust (g/mi)	N2O Start-Up (g/start)[a]	CO2	CH4	N2O	CO2	CH4	N2O
POVs (Daily Employees)		**350**	**Per trip: 0.2 on-base; 9.57 off base**												
LDGV	0.8083	283	2764	338.923	163.505	0.021	0.04	0.01748	0.03933	2065.97	0.13	0.11	268.58	0.02	0.01
LDGT12	0.1917	67	656	420.633	194.855	0.025	0.041	0.02774	0.03781	608.75	0.04	0.04	79.14	0.00	0.01
POVs (Weekend Employees)		**717**		319.478	162.144	0.016	0.034	0	0						
LDGV	0.8083	580	5662	338.923	163.505	0.021	0.04	0.01748	0.03933	4231.53	0.26	0.22	220.04	0.01	0.01
LDGT12	0.1917	137	1343	420.633	194.855	0.025	0.041	0.02774	0.03781	1246.16	0.07	0.08	64.80	0.00	0.00
													632.55	**0.04**	**0.03**

NOTES: Emission factors from EMFAC2007 Model, Fresno County, 2012, average speed 30 mph from CalEEMod default.
Trip length assume 0.2 miles on base (from Inventory); 9.57 miles off base (from CalEEMod default, home-work commute).
Assume personal vehicles would include light-duty auto and light-duty truck trips only. Assume 80.83% LDA and 19.17% LDT based on EMFAC2007 Model, Fresno County, 2012
Assume startup after 8 hours, running time 45 minutes.

Table 47. Annual Ground Vehicle GHG Emissions - 144th Fighter Wing, Alternative 2, March ARB

Vehicle Category	Fraction of Trips	Personnel	VMT (mi/year)	CO2 Running Exhaust (g/mi)	CO2 Start-Up (g/start)[a]	CH4 Running Exhaust (g/mi)	CH4 Start-Up (g/start)[a]	N2O Running Exhaust (g/mi)	N2O Start-Up (g/start)[a]	CO2	CH4	N2O	CO2	CH4	N2O
POVs (Daily Employees)		**1400**	**Per trip: 2 on-base; 9.57 off base**												
LDGV	0.8267	1157	11308	337.885	162.08	0.019	0.034	0.015865	0.03553	8423.89	0.47	0.40	1095.11	0.06	0.05
LDGT12	0.1733	243	2370	420.302	192.959	0.023	0.034	0.02565	0.03572	2197.29	0.12	0.13	285.65	0.02	0.02
													1380.75	**0.08**	**0.07**

NOTES: Emission factors from EMFAC2007 Model, SCAB-Riverside County, 2012, average speed 30 mph from CalEEMod default.
Trip length assume 0.2 miles on base (from Inventory); 9.57 miles off base (from CalEEMod default, home-work commute).
Assume personal vehicles would include light-duty auto and light-duty truck trips only. Assume 82.67% LDA and 17.33% LDT based on EMFAC2007 Model, SCAB-Riverside County, 2012
Assume startup after 8 hours, running time 45 minutes.

Table 48. Annual Baseline GHG Emissions - 144th Fighter Wing, Fresno-Yosemite Airport

	Emissions, tons/year		
Source Type	*CO2*	*CH4*	*N2O*
Aircraft	23140.423	0.649	0.746
Engine Runups	147.858	0.004	0.005
Aerospace Ground Equipment	335.309	0.019	0.004
Personal-Owned Vehicles	610.115	0.038	0.034
Total Emissions Baseline	**24233.70**	**0.71**	**0.789**

Table 49. Annual Preferred Alternative GHG Emissions - 144th Fighter Wing, Preferred Alternative, Fresno-Yosemite Airport

	Emissions, tons/year		
Source Type	*CO2*	*CH4*	*N2O*
Aircraft	46334.651	1.300	1.495
Engine Runups	295.715	0.008	0.010
Aerospace Ground Equipment	335.309	0.019	0.004
Personal-Owned Vehicles	632.554	0.039	0.035
Total Emissions Preferred Alternative	**47598.23**	**1.37**	**1.543**
Net Increase	**23364.52**	**0.66**	**0.754**

Table 50. Annual Alternative 2 GHG Emissions - 144th Fighter Wing, Alternative 2, Fresno-Yosemite Airport

	Emissions, tons/year		
Source Type	*CO2*	*CH4*	*N2O*
Aircraft	73290.508	2.057	2.364
Engine Runups	295.715	0.008	0.010
Aerospace Ground Equipment	435.689	0.025	0.005
Personal-Owned Vehicles	632.554	0.039	0.035
Total Emissions Alternative 2	**74654.47**	**2.13**	**2.41**
Net Increase	**50420.76**	**1.42**	**1.62**

Table 51. Annual Baseline GHG Emissions - 144th Fighter Wing, March ARB

	Emissions, tons/year		
Source Type	*CO2*	*CH4*	*N2O*
Aircraft	5149.390	0.145	0.166
Aerospace Ground Equipment	25.982	0.002	0.000
Personal-Owned Vehicles	1380.754	0.077	0.069
Total Emissions Baseline	**6556.13**	**0.22**	**0.235**

Table 52. Annual Preferred Alternative GHG Emissions - 144th Fighter Wing, Preferred Alternative, March ARB

	Emissions, tons/year		
Source Type	*CO2*	*CH4*	*N2O*
Aircraft	10298.779	0.289	0.332
Aerospace Ground Equipment	25.982	0.002	0.000
Personal-Owned Vehicles	1380.754	0.077	0.069
Total Emissions Preferred Alternative	**11705.51**	**0.37**	**0.402**
Net Increase	**5149.39**	**0.14**	**0.166**

Table 53. Annual Alternative 2 GHG Emissions - 144th Fighter Wing, Alternative 2, March ARB

	Emissions, tons/year		
Source Type	*CO2*	*CH4*	*N2O*
Aircraft	10298.779	0.289	0.332
Aerospace Ground Equipment	25.982	0.002	0.000
Personal-Owned Vehicles	1380.754	0.077	0.069
Total Emissions Alternative 2	**11705.51**	**0.37**	**0.40**
Net Increase	**5149.39**	**0.14**	**0.17**

Table 54. Annual Baseline GHG Emissions - 144th Fighter Wing, Fresno-Yosemite Airport

	Emissions, tons/year		
Source Type	*CO2*	*CH4*	*N2O*
Aircraft	23140.423	0.649	0.746
Engine Runups	147.858	0.004	0.005
Aerospace Ground Equipment	335.309	0.019	0.004
Personal-Owned Vehicles	610.115	0.038	0.034
Total Emissions Baseline	**24233.70**	**0.71**	**0.79**

Table 55. Annual Preferred Alternative GHG Emissions - 144th Fighter Wing, Preferred Alternative, Fresno-Yosemite Airport, 2012

	Emissions, tons/year		
Source Type	*CO2*	*CH4*	*N2O*
F-16 Aircraft Operations	15542.791	0.436	0.501
F-15 Aircraft Operations	1180.352	0.033	0.038
Engine Runups	295.715	0.008	0.010
Aerospace Ground Equipment	335.309	0.019	0.004
Personal-Owned Vehicles	632.554	0.039	0.035
Total Operations Emissions Preferred Alternative	**17986.72**	**0.54**	**0.59**
Construction Emissions	0.64	1.11	0.14
Total Emissions Preferred Alternative	**17987.36**	**1.65**	**0.73**
Net Increase	**-6246.34**	**0.94**	**-0.06**

Table 56. Annual Preferred Alternative GHG Emissions - 144th Fighter Wing, Preferred Alternative, Fresno-Yosemite Airport, 2013

	Emissions, tons/year		
Source Type	*CO2*	*CH4*	*N2O*
Aircraft	24979.852	0.701	0.806
Engine Runups	295.715	0.008	0.010
Aerospace Ground Equipment	335.309	0.019	0.004
Personal-Owned Vehicles	632.554	0.039	0.035
Total Operations Emissions Preferred Alternative	**26243.43**	**0.77**	**0.85**
Construction Emissions	2.34	4.75	1.65
Total Emissions Preferred Alternative	**26245.77**	**5.52**	**2.50**
Net Increase	**2012.07**	**4.81**	**1.72**

Appendix D

Final Conformity Determination

FINAL

General Conformity Determination F-15 Aircraft Conversion Environmental Impact Statement 144th Fighter Wing California Air National Guard Fresno-Yosemite International Airport

March 2013

National Guard Bureau

ACRONYMS AND ABBREVIATIONS

144 FW	144th Fighter Wing
162 FW	162d Fighter Wing
ACA	Aerospace Control Alert
AFI	Air Force Instruction
AGE	Aerospace Ground Equipment
AGL	Above Ground Level
ARB	Air Reserve Base
CAA	Clean Air Act
CA ANG	California Air National Guard
CAAQS	California Ambient Air Quality Standards
CARB	California Air Resources Board
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO	Carbon Monoxide
°F	Degrees Fahrenheit
EIS	Environmental Impact Statement
HAP	Hazardous Air Pollutant
IAP	International Airport
$\mu g/m^3$	Micrograms Per Cubic Meter
mg/m^3	Milligrams Per Cubic Meter
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NGB	National Guard Bureau
NO_2	Nitrogen Dioxide
NOA	Notice of Availability
NO_x	Oxides of Nitrogen
O_3	Ozone
PAA	Primary Assigned Aircraft
Pb	Lead
$PM_{2.5}$	Particulate Matter Less Than or Equal to 2.5 Microns in Diameter
PM_{10}	Particulate Matter Less Than or Equal to 10 Microns in Diameter
ppm	Parts Per Million
PSD	Prevention of Significant Deterioration
ROI	Region of Influence
SIP	State Implementation Plan
SJVAPCD	San Joaquin Valley Air Pollution Control District
SO_2	Sulfur Dioxide
SO_x	Oxides of Sulfur
tpy	Tons Per Year
U.S.	United States
USAF	United States Air Force
USC	United States Code
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound

GENERAL CONFORMITY DETERMINATION FOR THE PROPOSED F-15 AIRCRAFT CONVERSION, 144TH FIGHTER WING, CALIFORNIA AIR NATIONAL GUARD, FRESNO-YOSEMITE INTERNATIONAL AIRPORT

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EXECUTIVE SUMMARY

PROPOSED ACTION

Under the Proposed Action, the 144th Fighter Wing (144 FW) would convert from 18 F-16 aircraft to 18 F-15 aircraft. In general, at least three of these aircraft would always be located at March Air Reserve Base (ARB), serving the Aerospace Control Alert (ACA) mission out of that location. Thus, 15 F-15 aircraft would be based at their installation at Fresno-Yosemite International Airport (IAP). Concurrent with the beddown of the 18 F-15 Primary Assigned Aircraft (PAA) at Fresno-Yosemite IAP and March ARB, the existing fleet of 18 F-16 aircraft would be relocated to the 162d Fighter Wing (162 FW) at Tucson IAP, Tucson, Arizona. Under this alternative, the 144 FW would implement construction projects necessary for the conversion, as well as other construction, alteration, and demolition projects associated with their Installation Development Plan at Fresno-Yosemite IAP.

DIFFERENCES BETWEEN THE DRAFT AND FINAL CONFORMITY DETERMINATION

This Final Conformity Determination is, in large part, the same as the Draft Conformity Determination. The Final Conformity Determination reflects final confirmation from the San Joaquin Valley Air Pollution Control District that emissions associated with the Proposed Action are included within the currently approved SIP. No comments on the Draft Conformity Determination were received during the public comment period. The analysis and conclusions presented in this Final Conformity Determination therefore remain consistent with those presented in the Draft.

CONFORMITY BACKGROUND

Air quality at a specific location is described by the concentration of various pollutants in the atmosphere, and is determined by local, regional, and global emissions, the size and topography of the air basin, and local and regional meteorological influences. The significance of a pollutant concentration in a region or geographical area is determined by comparing it to federal and/or state ambient air quality standards. Under the authority of the Clean Air Act (CAA) and subsequent amendments, the United States Environmental Protection Agency (USEPA) has established National Ambient Air Quality Standards (NAAQS) to protect public health and welfare, with an adequate margin of safety. These NAAQS represent the maximum allowable atmospheric concentrations and were established for seven "criteria" pollutants: ozone (O_3), nitrogen dioxide (NO_2), carbon monoxide (CO), sulfur dioxide (SO_2), particulate matter less than or equal to 10 microns in diameter (PM_{10}), particulate matter less than or equal to 2.5 microns in diameter ($PM_{2.5}$), and lead (Pb). Oxides of nitrogen (NO_x) include nitric oxide (NO), NO_2, and other nitrogen compounds. Because volatile organic compounds (VOCs) and NO_x are precursors to the formation of O_3 in the atmosphere, control of these pollutants is the primary method of reducing O_3 concentrations in the atmosphere. Because NO_x, VOCs, and oxides of sulfur (SO_x)

are precursors to the formation of $PM_{2.5}$ in the atmosphere, these pollutants are considered in the analysis.

The USEPA has classified the San Joaquin Valley Air Basin as an extreme nonattainment area for the federal 8-hour O_3 standard, a nonattainment area for the federal $PM_{2.5}$ standard, and a maintenance area for the federal CO and PM_{10} standards. The San Joaquin Valley Air Basin is also classified as a nonattainment area for the California state O_3, PM_{10}, and the 1997 and 2006 $PM_{2.5}$ standards. The USEPA has classified the South Coast Air Basin as an extreme nonattainment area for the federal 8-hour O_3 standard, and a nonattainment area for both the federal $PM_{2.5}$ and PM_{10} standards; however, the air basin has recently attained the PM_{10} standard and has applied for redesignation as a maintenance area to the USEPA. The South Coast Air Basin is also classified as a maintenance area for the federal CO standard. The South Coast Air Basin is also classified as a nonattainment area for the California state O_3, PM_{10}, and $PM_{2.5}$ standards.

According to the CAA general conformity rule, a federal agency (in this case, the National Guard Bureau [NGB]) must assess whether their Proposed Action would contribute to the further degradation of air quality or prevent attainment of air quality standards in areas that are designated as nonattainment or maintenance.

The General Conformity Regulations were revised by the USEPA on April 5, 2010, and changed the existing regulations found in 40 Code of Federal Regulations (CFR) Part 51, subpart W and Part 93, subpart B (USEPA 2010).

The NGB, therefore, is conducting this review to document whether the Proposed Action meets the conformity rule. There are two main components to this documentation of conformity: 1) an applicability analysis to determine whether a conformity determination is required and, if it is, 2) a conformity determination to evaluate whether the action conforms to the attainment plans in the California State Implementation Plan (SIP).

Under the 2010 United States Air Force (USAF) Conformity Guide (USAF 2010), air emissions from a Proposed Action must be below *de minimis* levels for nonattainment or maintenance pollutants to be exempt from a formal conformity determination. Proposed Actions that equal or exceed these thresholds in any given year must undergo a detailed analysis, and a formal conformity determination is required. General Conformity applicability analyses and determinations are not required for those criteria pollutants that are designated as being in attainment of the NAAQS.

EXISTING CONDITIONS

Fresno-Yosemite IAP. Emissions associated with F-16 operations at the 144 FW at Fresno-Yosemite IAP include emissions of VOCs and NO_x, both of which are precursors to O_3, as well as CO, NO_2, SO_2, $PM_{2.5}$, and PM_{10}. Emissions of Pb are not addressed because the affected

areas contain no significant sources of this criteria pollutant, and 144 FW operations would not result in substantial emissions of Pb. In 2007, the 144 FW held 16 operating permits. The permitted sources include the 144 FW's engine test cell, diesel emergency generators, degreasers, abrasive blasting unit, and spray paint booth. Emissions also arise from area sources such as chemical usage, small arms firing, and abrasive blasting.

Mobile source emissions include emissions from aircraft operations (take-offs and landings), aerospace ground equipment (AGE), ground vehicle operations, and maintenance aircraft operations performed with the engines still mounted on the aircraft (engine run-ups and trim checks).

March ARB. Emissions associated with F-16 operations of the 144 FW at March ARB include emissions of VOCs and NO_x, both of which are precursors to O_3, as well as CO, NO_2, SO_2, $PM_{2.5}$, and PM_{10}. Emissions of Pb are not addressed because the affected areas contain no significant sources of this criteria pollutant, and 144 FW operations would not result in substantial emissions of Pb. March ARB currently holds an operating permit that includes 61 individual permitted sources.

Mobile source emissions include emissions from aircraft operations (take-offs and landings), AGE, ground vehicle operations, and maintenance aircraft operations performed with the engines still mounted on the aircraft (engine run-ups and trim checks).

CONCLUSIONS OF THE GENERAL CONFORMITY DETERMINATION

Based on this evaluation of the emissions associated with the implementation of the Proposed Action, the estimated annual net increase in NO_x emissions from both construction and operations in 2014 would equal 11.15 tons per year (tpy); and in 2015 and beyond the net increase in annual operational emissions of NO_x will be 10.93 tpy. The net emissions increase exceeds the applicable *de minimis* threshold of 10 tpy by more than one (1) ton in 2014 and by almost 1 tpy in 2015 and beyond. Therefore, a positive conformity determination is required. To demonstrate positive conformity, the USAF first asked San Joaquin Valley Air Pollution Control District (SJVAPCD) to determine if the projected peak net NO_x emissions increase was already covered by the emissions inventory or budget in the applicable SIP. Appendix B contains SJVAPCD's (final) written determination, per 40 CFR § 93.158(a)(5)(i)(A), that the net NO_x emissions from the USAF action, together with all other NO_x emissions in the O_3 nonattainment area, would not exceed the emissions budgets in the applicable SIP.

PUBLIC AND AGENCY INVOLVEMENT

The Draft Conformity Determination was made available for public and agency review and comment as an appendix to the Draft Environmental Impact Statement (EIS) for the proposed action. A notice of availability was published in the *Federal Register,* the *Fresno Bee,* and the

Press Enterprise requesting any comments on the draft document be submitted no later than June 25, 2012. No comments were received on the Draft Conformity Determination.

FINDING OF CONFORMITY

The USAF has reviewed and evaluated the conformity applicability analysis and documentation, and it has determined that a finding of conformity may be made based on the SJVAPCD's written determination per 40 CFR § 93.158(a)(5)(i)(A).

1.0 INTRODUCTION

The National Guard Bureau (NGB) proposes to implement an aircraft conversion for the 144th Fighter Wing (144 FW) at Fresno-Yosemite International Airport (IAP) in Fresno, California. The 144 FW currently flies and maintains 18 F-16 Fighting Falcon aircraft. The proposal is to convert the unit from the F-16 Fighting Falcon aircraft and operations to the F-15 Eagle aircraft and operations at Fresno-Yosemite IAP, which would also include Detachment 1, based at March Air Reserve Base (ARB). The 144 FW currently provides support for federal, state, and community interests by maintaining a highly trained, well-equipped military force that provides combat-ready support elements in response to wartime and peacetime tasking; protecting life and property; and preserving peace, order, and public safety.

In accordance with the National Environmental Policy Act (NEPA) of 1969 (42 United States Code [USC] 4321-4347), Council on Environmental Quality (CEQ) *Regulations for Implementing the Procedural Provisions of NEPA* (40 Code of Federal Regulations [CFR] Parts 1500-1508), and Air Force Instruction (AFI) 32-7061 as promulgated at 32 CFR Part 989 *et seq.*, *Environmental Impact Analysis Process*, the NGB has prepared an Environmental Impact Statement (EIS), which considers the potential consequences to the human and natural environment that may result from implementation of this action. This Conformity Determination is included as Appendix D of the EIS.

This document addresses the United States Environmental Protection Agency's (USEPA) General Conformity Rule requirements and how they relate to the actions associated with the implementation of the Proposed Action. The Clean Air Act (CAA) requires any federal agency, such as the NGB, to assess whether their proposed action would contribute to further degradation of air quality or prevent the attainment of air quality standards. The NGB proposes to implement a major federal action that would contribute to regional air emissions at the Fresno-Yosemite IAP in Fresno, California, and at the March ARB in Riverside, California. Therefore, the Region of Influence (ROI) includes the San Joaquin Valley Air Basin and the South Coast Air Basin, both are areas that do not meet air quality standards for several air pollutants (refer to Section 3.5, *Existing Air Quality Attainment Status*).

2.0 AIR QUALITY STANDARDS

Individual states are delegated the responsibility to regulate air quality in order to achieve or maintain air quality in attainment with these standards. The California Air Resources Board (CARB) enforces air pollution regulations and sets guidelines to attain and maintain the National Ambient Air Quality Standards (NAAQS) and California Ambient Air Quality Standards (CAAQS) within the state of California. These guidelines are found in the California State Implementation Plan (SIP). The NAAQS and CAAQS are summarized in Table 1.

Table 1. Ambient Air Quality Standards

Pollutant	Averaging Time	National Standards [A]		California Standards
		Primary [b,c]	Secondary [b,d]	
O_3	8-hour	0.075 ppm (147 µg/m^3)	Same as primary	0.070 ppm (137 µg/m^3)
	1-hour	—	—	0.09 ppm (176 µg/m^3)
CO	8-hour	9 ppm (10 mg/m^3)	—	9.0 ppm (10 mg/m^3)
	1-hour	35 ppm (40 mg/m^3)	—	20 ppm (23 mg/m^3)
NO_2	Annual	0.053 ppm (100 µg/m^3)	Same as primary	0.030 ppm (56 µg/m^3)
	1-hour	0.100 ppm (188 µg/m^3)	—	0.18 ppm (338 µg/m^3)
SO_2	24-hour	—	—	0.04 ppm (105 µg/m^3)
	3-hour	—	0.5 ppm (1,300 µg/m^3)	—
	1-hour	0.075 ppm (189 µg/m^3)	—	0.25 ppm (655 µg/m^3)
PM_{10}	Annual	150 µg/m^3	Same as primary	20 µg/m^3
	24-hour	—	Same as primary	50 µg/m^3
$PM_{2.5}$	Annual	15 µg/m^3	Same as primary	12 µg/m^3
	24-hour	35 µg/m^3	Same as primary	—
Pb	Calendar Quarter	1.5 µg/m^3	Same as primary	—
	Rolling 3-month period	0.15 µg/m^3	Same as primary	—
	30-Day Average	—	—	1.5 µg/m^3
Sulfates	24 hours	—	—	25 µg/m^3
Hydrogen Sulfide	1 hour	—	—	0.03 ppm (42 µg/m^3)
Vinyl Chloride	24 hours	—	—	0.010 ppm (26 µg/m^3)

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

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

c Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health. Each state must attain the primary standards no later than 3 years after that state's implementation plan is approved by the USEPA.

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

µg/m^3 = micrograms per cubic meter; CO = carbon monoxide; mg/m^3 = milligrams per cubic meter; NO_2 = nitrogen dioxide; O_3 = ozone; Pb = lead; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; PM_{10} = particulate matter less than or equal to 10 microns in diameter; ppm = parts per million; SO_2 = sulfur dioxide.

The California CAA of 1988, as amended in 1992, outlines a program to attain the CAAQS for ozone (O_3), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter, and carbon monoxide (CO) by the earliest practical date. Since the CAAQS are more stringent than the NAAQS, emissions reductions beyond what would be required to show attainment for the NAAQS would be needed to show compliance with the CAAQS. The CARB delegates the authority to regulate stationary source emissions to local air quality management districts. The CARB requires these agencies to develop their own strategies for achieving compliance with the NAAQS and CAAQS, but maintains regulatory authority over these strategies, as well as all mobile source emissions throughout the state. The San Joaquin Valley Air Pollution Control District (SJVAPCD) is the local agency responsible for enforcement of air quality regulations in the Fresno area. The South Coast Air Quality Management District is the local agency responsible for enforcement of air quality regulations in the March ARB area.

The CAA also established a national goal of preventing degradation or impairment in federally designated Class I areas. Class I areas are defined as those areas where any appreciable degradation in air quality or associated visibility impairment is considered significant. As part of the Prevention of Significant Deterioration (PSD) Program, Congress assigned mandatory Class I status to all national parks, national wilderness areas (excluding wilderness study areas or wild and scenic rivers), and memorial parks greater than 5,000 acres. In Class I areas, visibility impairment is defined as atmospheric discoloration (such as from an industrial smokestack), and a reduction in regional visual range. Visibility impairment or haze results from smoke, dust, moisture, and vapor suspended in the air. Very small particles are either formed from gases (sulfates, nitrates) or are emitted directly into the atmosphere from sources like electric utilities, industrial processes, and vehicle emissions. Stationary sources are regulated under the PSD Program, and the PSD permitting process requires a review of impacts to all Class I areas within 62 miles (100 kilometers) of any proposed major stationary source. Mobile sources, including aircraft and associated operations such as those occurring at Air National Guard installations, are not subject to the requirements of PSD.

In addition to criteria pollutants, the USEPA has defined 187 substances as hazardous air pollutants (HAPs). HAPS are substances that have been determined to present some level of acute or chronic health risk (cancer or non-cancer) to the general public. These pollutants may be emitted in trace amounts from various types of sources, including combustion sources. HAPs are regulated for specific source categories under the USEPA's National Emission Standards for Hazardous Air Pollutants regulations.

2.1 AIR QUALITY DESIGNATIONS

As part of the CAA, the USEPA has established criteria for seven major pollutants of concern, called "criteria pollutants." These criteria pollutants include CO, SO_2, NO_2, O_3, particulate matter less than or equal to 10 microns in diameter (PM_{10}), particulate matter less than or equal

to 2.5 microns in diameter ($PM_{2.5}$), and lead (Pb). Emissions of Pb are not addressed because the affected areas contain no significant sources of this criteria pollutant, and 144 FW operations would not result in substantial emissions of Pb. The criteria set for these pollutants, the NAAQS, represent maximum levels of background pollution that are considered safe, with an adequate margin of safety to protect the public health and welfare. Based on measured ambient criteria pollutant data, the USEPA designates areas in the United States (U.S.) as having air quality better than (attainment) or worse than (nonattainment) the NAAQS. Areas that lack monitoring data to demonstrate attainment or nonattainment status are designated as unclassified and are treated as attainment areas for regulatory purposes. Varying levels of attainment have been established for O_3, CO, and PM_{10} to indicate the severity of the air quality problem (i.e., the classification runs from moderate to serious for CO and PM_{10} and from marginal to extreme for O_3).

2.2 FEDERAL REQUIREMENTS

The CAA (42 USC §§ 7401-7671q, as amended) provided the authority for the USEPA to establish nationwide air quality standards to protect public health and welfare. Federal standards, known as the NAAQS, were developed for six criteria pollutants: O_3, NO_2, CO, SO_2, both coarse and fine inhalable particulate matter PM_{10} and $PM_{2.5}$, and Pb (refer to Table 1). The Act also requires that each state prepare a SIP for maintaining and improving air quality and eliminating violations of the NAAQS. In nonattainment and maintenance areas, the CAA requires federal agencies to determine whether their proposed actions conform with the applicable SIP and demonstrate that their actions will not (1) cause or contribute to a new violation of the NAAQS, (2) increase the frequency or severity of any existing violation, or (3) delay timely attainment of any standard, emission reduction, or milestone contained in the SIP.

2.3 STATE REQUIREMENTS

The CAA requires each state to develop, adopt, and implement a SIP to achieve, maintain, and enforce federal air quality standards throughout the state. States develop SIPs on a pollutant-by-pollutant basis whenever there is a violation of one or more air quality standards. State standards, established by the CARB, are termed the CAAQS. The CAAQS are at least as restrictive as the NAAQS and include pollutants for which national standards do not exist (refer to Table 1).

2.4 GENERAL CONFORMITY REGULATIONS

The General Conformity Rule was promulgated by the USEPA on November 30, 1993 at 40 CFR Part 93 Subpart B *"Determining Conformity of General Federal Actions to State or Federal Implementation Plans"* for all federal activities except those covered under transportation conformity (USEPA 1993). The General Conformity Regulations were revised by the USEPA on April 5, 2010 (75 *Federal Register* 17253-17279) and changed the existing regulations found in 40 CFR Part 51, subpart W, and Part 93, subpart B (USEPA 2010). The

USEPA's modifications to 40 CFR Part 51, Subpart W, changed State or Tribal adoption and submittal of general conformity SIPs from a requirement to a voluntary measure in 40 CFR § 51.851(a). In addition, the USEPA provided in 40 CFR § 51.851(b) that until such time as USEPA approves a State's or Tribe's revision to the conformity implementation plan permitted under this section, that federal agencies must meet the requirements of 40 CFR Part 93, Subpart B. These modifications, taken together, effectively render SJVAPCD's existing Rule 9110 (October 20, 1994), promulgated and approved under USEPA's legacy general conformity regulations, moot and inapplicable to the Proposed Action.

The General Conformity Rule requires any federal agency responsible for an action in a nonattainment or maintenance area to determine that the action conforms to the applicable SIP. Emissions of attainment pollutants are exempt from conformity analysis. Actions would conform to a SIP if their annual direct and indirect emissions would remain less than the applicable *de minimis* thresholds. Formal conformity determinations are required for any actions that would equal or exceed these thresholds. The conformity determination process is intended to demonstrate that a proposed federal action would not: (1) cause or contribute to a new violation of the NAAQS, (2) increase the frequency or severity of any existing violation, or (3) delay timely attainment of any standard, emission reduction, or milestone contained in the SIP.

Analyses required by the General Conformity Regulations focus on the net increase in air emissions from a Proposed Action compared to ongoing historical conditions. Existing SIPs are presumed to have accounted for routine, ongoing federal agency activities. Conformity analyses are further limited to those direct and indirect emissions over which the federal agency has continuing program responsibility and control over. General conformity analyses are not required to analyze emission sources beyond the responsibility and control of the federal agency. Conformity determinations are also not required to address emissions that are not reasonably foreseeable or reasonably quantifiable.

2.5 GENERAL CONFORMITY ANALYSIS PROCEDURES

The USEPA General Conformity Regulations incorporate a stepwise process, beginning with an applicability analysis (USEPA 1993, 2010). According to USEPA guidance, before any approval is given for a federal action to go forward, the regulating federal agency must apply the applicability requirements found at 40 CFR § 93.153(b) to the federal action to evaluate whether, on a pollutant-by-pollutant basis, a determination of general conformity is required. If the regulating federal agency determines that the General Conformity Regulations do not apply to the federal action, no further analysis or documentation is required. However, if the General Conformity Regulations do apply to a federal action, the action proponent must make its own conformity determination in accordance with the criteria and procedures outlined in the implementing regulations, publish a draft determination of general conformity for public review,

consider comments from interested parties, and then publish the final determination of general conformity.

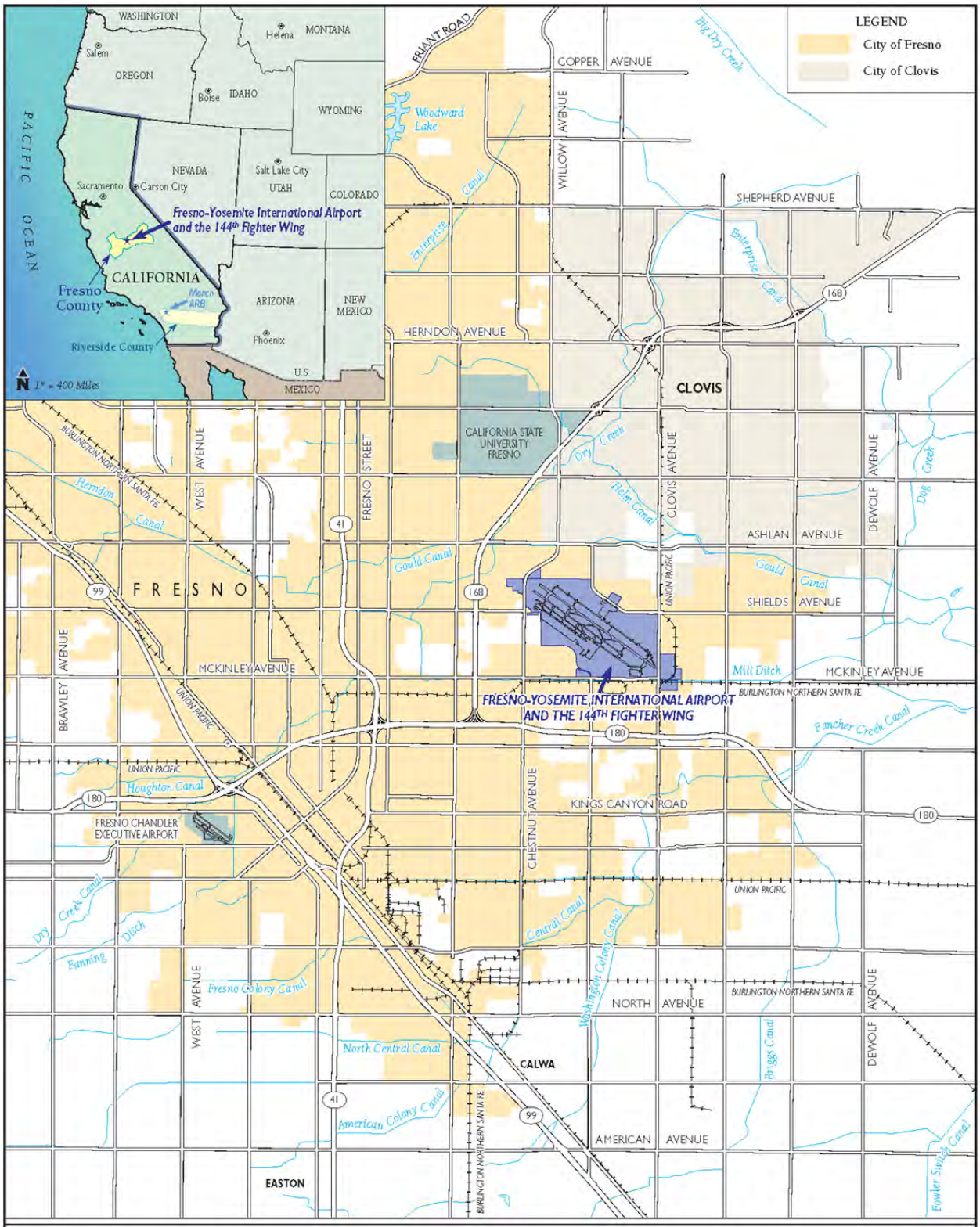
3.0 SUMMARY OF THE PROPOSED ACTION

3.1 LOCATION OF THE PROPOSED ACTION

Fresno-Yosemite IAP is located in the City of Fresno approximately 5 miles east of downtown Fresno, in Fresno County, California (Figure 1). Fresno-Yosemite IAP is a commercial service airport owned and operated by the City of Fresno. March ARB is located in Riverside County, California between the cities of Moreno Valley and Riverside (Figure 2). The 144 FW of the California Air National Guard (CA ANG) is collocated with, and operates on a lease basis, at Fresno-Yosemite IAP. The 144 FW currently leases 110.5 acres from the City of Fresno.

3.2 PROPOSED ACTION DESCRIPTION

The NGB proposes to implement an aircraft conversion for the 144 FW at Fresno-Yosemite IAP in Fresno, California. The 144 FW currently flies and maintains 18 F-16 Fighting Falcon aircraft. The proposal is to convert the unit (including Detachment 1 based at March ARB) from F-16 Fighting Falcon aircraft and operations to the F-15 Eagle aircraft and operations at Fresno-Yosemite IAP. Under the Proposed Action, the 18 F-16 aircraft would be relocated to the 162^{d} Fighter Wing (162 FW) in Tucson, Arizona. In addition, the 144 FW would implement construction projects associated with aircraft conversion and/or their installation master plan at Fresno-Yosemite IAP. The 144 FW currently provides support for federal, state, and community interests by maintaining highly trained, well-equipped, military forces to provide combat-ready support elements in response to wartime and peacetime tasking; protecting life and property; and preserving peace, order, and public safety.



Kilometers 0 3
Miles 0 2

Figure 1
Regional Location
Fresno-Yosemite IAP

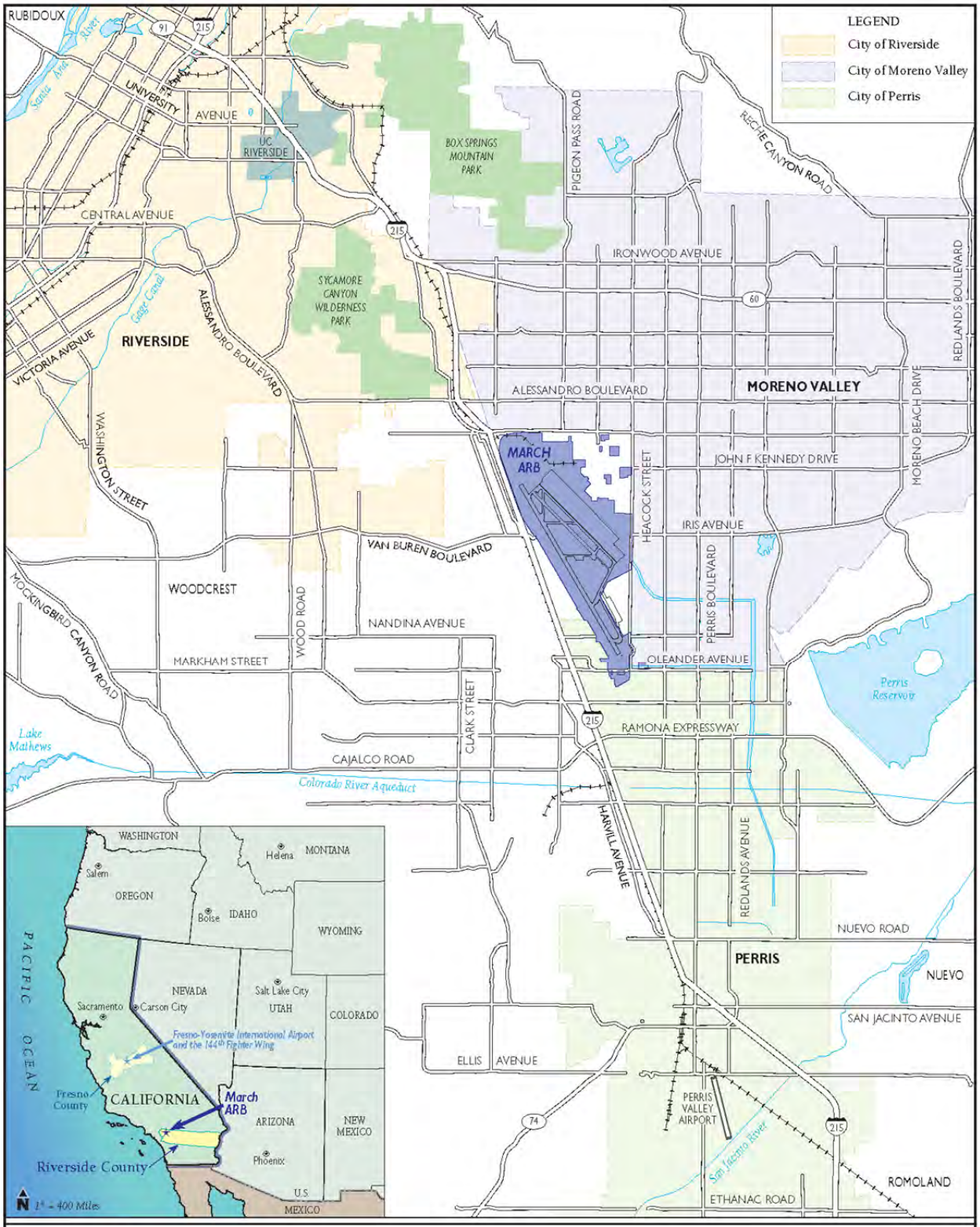


Figure 2
Regional Location
March ARB

As a result of the Proposed Action, there would be a change to the type of aircraft based at Fresno-Yosemite IAP and March ARB for the 144 FW; a change to the type of aircraft using the associated airspace; changes to staffing and manpower at the 144 FW; as well as some proposed construction, building renovation, and facility demolition (at Fresno-Yosemite IAP only). There would be no new airspace required to implement the Proposed Action. The proposed conversion would begin in 2012, while it is unlikely that construction would begin before 2013. Although proposed construction is necessary for the long-term viability of the conversion, aircraft operations with the F-15 could begin prior to implementation of the construction.

3.3 ELEMENTS OF THE PROPOSED ACTION RESULTING IN INCREASED AIR QUALITY EMISSIONS

The Proposed Action involves both construction of new facilities to accommodate the F-15 aircraft, and operational emissions associated with the F-15 aircraft.

Construction Emissions

The Proposed Action would include construction activities at the 144 FW installation at Fresno-Yosemite IAP; no construction is proposed for March ARB. Air quality impacts from construction would occur from (1) combustion emissions due to the use of fossil fuel-powered equipment and (2) fugitive dust emissions (PM_{10}) during demolition activities, earth-moving activities, and the operation of equipment on bare soil.

The construction at the Fresno-Yosemite IAP for the 144 FW associated with the Proposed Action would occur during calendar years 2012 through 2014. Only construction of the Aircraft Corrosion Control Hangar (Project HAYW109006) would require more than 12 months to complete.

Operational Emissions

Operational emissions associated with the Proposed Action include emissions associated with aircraft operations and associated equipment. Mobile source emissions include emissions from aircraft operations (take-offs and landings), aerospace ground equipment (AGE), personal vehicle operations, and maintenance aircraft operations performed with the engines still mounted on the aircraft (engine run-ups and trim checks).

Under the Proposed Action, the 144 FW would convert from 18 F-16 aircraft to 18 F-15 aircraft. In general, three of these aircraft would be based at March ARB, and would serve the Aerospace Control Alert (ACA) mission out of that location. Baseline operations at Fresno-Yosemite IAP total 122,319 annual operations. The number of operations would remain unchanged under the Proposed Action.

There would be an increase in the number of previously evaluated closed patterns flown at March ARB by the F-15 aircraft. An increase of 122 closed patterns (244 airfield operations) would be flown annually by the replacement F-15 aircraft at March ARB.

3.4 EXISTING CONDITIONS – CLIMATE

The San Joaquin Valley has a Mediterranean climate that is generally hot and dry during the summer, and cool and damp in winter, when frequent ground fog known regionally as "tule fog" can occur. Mid-autumn to mid-spring comprises the rainy season, although during the late summer southeasterly winds aloft can bring thunderstorms of a tropical origin. Frost occurs at times in the winter months, but snow is extremely rare.

Mean annual temperatures vary from an average maximum temperature of 76.5 degrees Fahrenheit (°F) to an average minimum temperature of 50.4°F with a yearly average of 63.4°F. The warmest month is July, with an average maximum temperature of 98.3°F; the coldest month is December, with an average minimum temperature of 37.3°F. Summer heat waves can bring temperatures as high as 113°F in the Fresno area. The lowest minimum temperature recorded was 18°F.

In Fresno, average annual precipitation (1948-2010) was 10.99 inches. The majority of precipitation occurs in the winter months, from November through March (Western Regional Climate Center 2011).

The climate of the March ARB area is characterized as Mediterranean to semi-arid. The climate in the region varies according to elevation and distance from the Pacific Ocean. The weather generally consists of warm to hot, dry, summers and mild winters. Annual average temperatures in the Riverside area range from an average minimum temperature of 50.5ºF to an average maximum temperature of 79.0ºF, with a yearly average of 64ºF. December is the coldest month, with average minimum temperatures of 41.3°F. August is the hottest month in the area, with average maximum temperatures reaching 94.4°F (Western Regional Climate Center 2011).

In Riverside, average annual precipitation (1948-2010) was 10.09 inches. The majority of precipitation occurs in the winter months, from November through March (Western Regional Climate Center 2011).

3.5 EXISTING AIR QUALITY ATTAINMENT STATUS

The San Joaquin Valley Air Basin encompasses eight counties in California's Central Valley: San Joaquin, Stanislaus, Merced, Madera, Fresno, Kings, Tulare, and the San Joaquin Valley Air Basin portion of Kern County. The South Coast Air Basin encompasses Los Angeles and Orange counties and the western portion of Riverside and San Bernardino counties. The USEPA has classified the San Joaquin Valley Air Basin as an extreme nonattainment area for the federal 8-hour O_3 standard, a nonattainment area for the federal $PM_{2.5}$ standard, and a maintenance area for the federal PM_{10} standard. The San Joaquin Valley Air Basin is also classified as a nonattainment area for the California state O_3, PM_{10}, and the 1997 and 2006 $PM_{2.5}$ standards. The USEPA has classified the South Coast Air Basin as an extreme nonattainment area for the federal 8-hour O_3 standard, and a nonattainment area for both the federal $PM_{2.5}$ and PM_{10}

standards; however, the air basin has recently attained the PM_{10} standard and has applied for redesignation as a maintenance area to the USEPA. The South Coast Air Basin is also classified as a nonattainment area for the California state O_3, PM_{10}, and $PM_{2.5}$ standards.

The applicable *de minims* thresholds for the affected air basins are listed in Table 2.

Table 2. Applicable Criteria Pollutant *de minimis* Thresholds(1) (tpy)

Affected Air Basin	*CO*	*NO_x*	*VOCs*	*SO_x*	*PM_{10}*	*$PM_{2.5}$*
San Joaquin Valley Air Basin	100	10	10	100	100	100
South Coast Air Basin	100	10	10	100	100	100

Notes: (1) Based on the federal *de minimis* threshold for NO_x, VOCs, PM_{10}, and $PM_{2.5}$ and its precursor pollutants NO_x, VOCs, and SO_x, and the major source threshold of 100 tons/year for attainment pollutants.
CO = carbon monoxide; NO_x = oxides of nitrogen; PM_{10} = particulate matter less than or equal to 10 microns in diameter; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; SO_x = oxides of sulfur; tpy = tons per year; VOC = volatile organic compound

4.0 GENERAL CONFORMITY DETERMINATION

4.1 APPLICABILITY ANALYSIS

The first step in a general conformity evaluation is an analysis of whether the requirements apply to the federal action that is proposed in a nonattainment or a maintenance area. Unless exempted by the regulations or otherwise presumed to conform, a federal action requires a general conformity determination for each pollutant where the total of direct and indirect emissions caused by the federal action would equal or exceed an annual *de minimis* emission rate for any given maintenance or nonattainment pollutant (or precursor). If a Proposed Action would result in emission increases less than the identified applicable *de minimis* thresholds, then no conformity determination is required.

4.2 ATTAINMENT STATUS OF THE SAN JOAQUIN VALLEY AIR BASIN AND SOUTH COAST AIR BASIN

As discussed in Section 3.5, the USEPA has classified the San Joaquin Valley Air Basin as an extreme nonattainment area for the federal 8-hour O_3 standard, a nonattainment area for the federal $PM_{2.5}$ standard, and a maintenance area for the federal CO and PM_{10} standard. The San Joaquin Valley Air Basin is also classified as a nonattainment area for the California state O_3, PM_{10}, and the 1997 and 2006 $PM_{2.5}$ standards. The USEPA has classified the South Coast Air Basin as an extreme nonattainment area for the federal 8-hour O_3 standard, a maintenance area for the federal CO standard, and a nonattainment area for both the federal $PM_{2.5}$ and PM_{10} standards. The South Coast Air Basin is also classified as a nonattainment area for the California state O_3, PM_{10}, and $PM_{2.5}$ standards.

4.3 EXEMPTIONS FROM GENERAL CONFORMITY REQUIREMENTS

The general conformity requirements apply to a federal action if the net project emissions equal or exceed certain *de minimis* emission rates established in the General Conformity Regulations. The *de minimis* thresholds differ based on the severity of the nonattainment status. The only exceptions to this applicability criterion include certain federal actions that are presumed to conform because of the thorough air quality analysis required to comply with other statutory requirements. Examples of these actions include those subject to the New Source Review program and remedial activities under the Comprehensive Environmental Response, Compensation, and Liability Act. Other federal actions exempt from the conformity process include those actions that would result in no increase in emissions, or an increase in emissions that is clearly *de minimis*. Examples include continuing or recurring activities, routine maintenance and repair, and administrative and planning actions; however, the emissions that would result from this federal action do not meet any of these exempt categories.

4.4 EMISSION ESTIMATES

SIP Baseline Emissions – Fresno-Yosemite IAP

Existing emissions quantified in the Air Emissions Inventory include emissions from the F-16 aircraft, which would be replaced under the Proposed Action by the F-15 aircraft. The emissions in the Air Emissions Inventory were not used for aircraft operations in the baseline analysis because they reflect existing emissions for all aircraft operating at the 144 FW (including transient aircraft) during the year 2007 and therefore do not provide a baseline for the Proposed Action. Further, the emissions estimates relied on default times in mode for aircraft operations rather than site-specific flight tracks used for the noise analysis in the EIS.

To provide a baseline for evaluating the net emissions increases/decreases associated with the Proposed Action, emissions from the F-16 aircraft operations, F-16 engine testing, F-16-related AGE, and privately-owned vehicles associated with F-16 flight operations were evaluated. Emissions from the F-16 aircraft operations were calculated based on number of operations identified as baseline in the noise analysis in Section 3.1.2 in the EIS, and utilized site specific flight tracks to calculate aircraft operations below a default mixing height of 3,000 feet above ground level (AGL). A discussion of the methodology for quantifying emissions is provided in Appendix C of the EIS. Emissions for the baseline emissions associated with baseline operations of the F-16 aircraft are provided in Table 3.

Table 3. 144 FW F-16 Baseline Emissions (Fresno-Yosemite IAP)

	EMISSIONS, TONS/YEAR					
Emission Source	*CO*	*NO_x*	*VOCs*	*SO_x*	*PM_{10}*	*$PM_{2.5}$*
F-16 Baseline Aircraft Operations	23.631	10.401	6.500	1.364	2.271	2.248
Refueling Emissions	-	-	0.007	-	-	-
Engine Testing	1.684	0.220	0.379	0.057	0.098	0.097
Aerospace Ground Equipment	7.594	11.483	3.698	0.135	1.088	1.078
Privately-Owned Vehicles	3.858	0.353	0.120	0.005	0.056	0.032
Total Baseline Emissions	36.77	22.46	10.70	1.56	3.51	3.45

Notes: CO = carbon monoxide; NO_x = oxides of nitrogen; PM_{10} = particulate matter less than or equal to 10 microns in diameter; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; SO_x = oxides of sulfur; VOC = volatile organic compound

Baseline Emissions – March ARB

Existing emissions quantified in the Air Emissions Inventory include emissions from the F-16 aircraft, which would be replaced under the Proposed Action by the F-15 aircraft. The emissions in the Air Emissions Inventory were not used for aircraft operations in the baseline analysis because they reflect existing emissions for all aircraft operating at March ARB (including transient aircraft) during the year 2009 and therefore do not provide a baseline for the Proposed Action. Further, the emissions estimates relied on default times in mode for aircraft operations rather than site-specific flight tracks used for the noise analysis in the EIS.

To provide a baseline for evaluating the net emissions increases/decreases associated with the Proposed Action, emissions from the F-16 aircraft operations, F-16 engine testing, F-16-related AGE, and privately-owned vehicles associated with F-16 flight operations were evaluated. Emissions from the F-16 aircraft operations were calculated based on number of operations identified as baseline in the noise analysis in this EIS, and utilized site-specific flight tracks to calculate aircraft operations below a default mixing height of 3,000 feet AGL. Emissions for the baseline emissions associated with current operations of the F-16 aircraft are provided in Table 4.

Table 4. 144 FW F-16 Baseline Emissions (March ARB)

	EMISSIONS, TONS/YEAR					
Emission Source	*CO*	*NO_x*	*VOCs*	*SO_x*	*PM_{10}*	*$PM_{2.5}$*
F-16 Baseline Aircraft Operations	5.669	5.006	1.743	0.481	0.735	0.728
Refueling	-	-	0.002	-	-	-
Aerospace Ground Equipment	0.524	0.723	0.045	0.010	0.022	0.022
Privately-Owned Vehicles	7.886	0.725	0.213	0.012	0.131	0.073
Total Baseline Emissions	14.08	6.45	2.00	0.50	0.89	0.82

Notes: CO = carbon monoxide; NO_x = oxides of nitrogen; PM_{10} = particulate matter less than or equal to 10 microns in diameter; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; SO_x = oxides of sulfur; VOC = volatile organic compound

Fresno-Yosemite IAP

The Proposed Action will commence in August 2012 with drawdown of the F-16 aircraft from Fresno-Yosemite IAP. Construction associated with the Proposed Action will commence in November 2012. The following construction projects are proposed:

Non-Destructive Inspection Shop Interior renovations only; construction will commence in November 2012 and will require 12 months to complete; completion in October 2013.

Arm/DeArm Pad Construction will commence in January 2013 and will require 11 months to complete; completion in November 2013.

Munitions Storage Construction will commence in November 2012 and will require 12 months to complete; completion in October 2013.

Corrosion Control Construction will commence in November 2012 and will require 18 months to complete; completion in March 2014.

Table 5 presents a summary of the aircraft operational schedule for the Proposed Action based on information provided by the 144 FW.

Table 5. 144 FW F-16 Baseline Emissions (March ARB)

Month	*F-15 sorties*	*F-16 sorties*
January 2012 – July 2012	0	1363
August 2012	0	160
September 2012	4	12
October 2012	8	12
November 2012	8	12
December 2012	40	12
January 2013	60	0
February 2013	60	0
March 2013	60	0
April 2013	80	0
May 2013	80	0
June 2013	80	0
July 2013	120	0
August 2013	120	0
September 2013	120	0
October 2013	160	0
November 2013	160	0
December 2013	160	0
January 2014 and beyond	Full tempo	0

Table 6 summarizes the annual and total construction emissions associated with the Proposed Action. The data in Table 6 show that annual emissions for proposed construction activities would not exceed the CAA major source thresholds and/or the General Conformity Rule *de*

minimis thresholds as set forth in the CAA (100 tons per year [tpy] for attainment pollutants, 10 tpy for O_3 precursors). Air quality impacts associated with these emissions alone would not be significant.

Table 6. 144 FW Construction Emissions

144 FW Construction Project	EMISSIONS, TONS/YEAR					
	CO	*NO_x*	*VOCs*	*SO_x*	*PM_{10}*	*$PM_{2.5}$*
2012						
Project #1 – Construction of New Aircraft Corrosion Control Hangar and Shops	0.27	0.47	0.06	0.00	0.04	0.02
Project #2 – Expansion of Existing Arm and Dearm Pad	0.41	0.59	0.09	0.00	0.06	0.04
Project #3 – Addition to Existing Munitions Storage Facility	0.27	0.47	0.06	0.00	0.04	0.02
Project #4 – Addition to Existing Non-Destructive Inspection Shop	0.10	0.17	0.02	0.00	0.01	0.01
Total Annual Emissions	1.05	1.70	0.23	0.00	0.15	0.09
2013						
Project #1 – Construction of New Aircraft Corrosion Control Hangar and Shops	0.98	1.34	0.19	0.00	0.09	0.08
Project #2 – Expansion of Existing Arm and Dearm Pad	0.57	0.77	0.12	0.00	0.11	0.06
Project #3 – Addition to Existing Munitions Storage Facility	0.59	0.84	0.11	0.00	0.05	0.04
Project #4 – Addition to Existing Non-Destructive Inspection Shop	0.52	0.81	0.13	0.00	0.05	0.04
Total Annual Emissions	2.66	3.76	0.55	0.00	0.30	0.22
2014						
Project #1 – Construction of New Aircraft Corrosion Control Hangar and Shops	0.17	0.23	0.13	0.00	0.01	0.01
Total Annual Emissions	0.17	0.23	0.13	0.00	0.01	0.01

Notes: CO = carbon monoxide; NO_x = oxides of nitrogen; PM_{10} = particulate matter less than or equal to 10 microns in diameter; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; SO_x = oxides of sulfur; VOC = volatile organic compound

Project construction equipment would emit minor amounts of HAPs that could potentially impact public health. The main source of HAPs would occur in the form of particulates from the combustion of diesel fuel. Due to the mobile and intermittent operation of proposed diesel-powered construction equipment over a large construction area and the lack of sensitive receptors in the immediate vicinity of the construction, they would produce minimal ambient impacts of HAPs in a localized area. As a result, construction related to the Proposed Action would produce less than significant impacts to public health.

Based on the phasing schedule, the F-16 aircraft would depart Fresno-Yosemite IAP in 2012 and the F-15 aircraft would arrive at Fresno-Yosemite IAP in 2012. Based on projected arrival of aircraft and timing of construction, the 144 FW would phase in operation of the F-15 aircraft during calendar years 2012 and 2013, and would be fully operational by 2014. Construction emissions would therefore be added to operational emissions for calendar years 2012, 2013, and

2014. Operational emissions associated with the Proposed Action are summarized in Tables 7 through 10, along with a comparison with the baseline emissions for the F-16.

Table 7 presents a summary of the emissions associated with the Proposed Action in 2012. As discussed above, construction on the Non-Destructive Inspection facility, Munitions Storage facility, and Corrosion Control Building would commence in November 2012. The operational tempo for the F-16 aircraft would decrease starting in August 2012 as aircraft being transferred out of Fresno-Yosemite IAP. F-15 aircraft would arrive at Fresno-Yosemite IAP in September 2012, and would conduct limited sorties as shown in Table 5.

Table 7. 144 FW Projected Emissions, Fresno-Yosemite IAP, 2012

Emission Source	EMISSIONS, TONS/YEAR					
	CO	*NO_x*	*VOCs*	*SO_x*	*PM_{10}*	*$PM_{2.5}$*
2012						
F-16 Aircraft Operations	15.871	6.987	4.366	0.916	1.526	1.510
F-15 Aircraft Operations	1.205	0.537	0.334	0.070	0.117	0.116
Refueling Emissions	-	-	0.005	-	-	-
Engine Testing	3.367	0.440	0.757	0.114	0.197	0.195
Aerospace Ground Equipment	7.594	11.483	3.698	0.135	1.088	1.078
Privately-Owned Vehicles	4.000	0.366	0.125	0.006	0.058	0.033
Total Operational Emissions	32.04	19.81	9.29	1.24	2.99	2.93
Construction Emissions	0.64	1.11	0.14	0.00	0.09	0.05
Total Emissions	32.68	20.92	9.33	1.24	3.08	2.98
Baseline Emissions	36.77	22.46	10.70	1.56	3.51	3.45
Net Emissions Decrease	(4.09)	(1.54)	(1.37)	(0.32)	(0.43)	(0.47)
Threshold [(1)]	100	10	10	100	100	100
Equals or Exceeds Threshold?	No	No	No	No	No	No

Notes: 1. Based on the federal *de minimis* threshold for NO_x, VOCs, PM_{10}, and $PM_{2.5}$ and its precursor pollutants NO_x, VOCs, and SO_x, and the major source threshold of 100 tons/year for attainment pollutants.
CO = carbon monoxide; NO_x = oxides of nitrogen; PM_{10} = particulate matter less than or equal to 10 microns in diameter; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; SO_x = oxides of sulfur; VOC = volatile organic compound

Table 8 presents a summary of the emissions associated with the Proposed Action in 2013. As discussed above, construction on the Non-Destructive Inspection facility, Munitions Storage facility, and Corrosion Control Building would continue through 2013, and construction of the Arm/DeArm Pad would commence in January 2013. All F-16 aircraft would depart by January 2013. F-15 aircraft would conduct limited sorties during 2013 as shown in Table 5.

Table 8. 144 FW Projected Emissions, Fresno-Yosemite IAP, 2013

Emission Source	EMISSIONS, TONS/YEAR					
	CO	*NO_x*	*VOCs*	*SO_x*	*PM_{10}*	*$PM_{2.5}$*
2013						
F-15 Aircraft Operations	25.497	11.370	7.072	1.485	2.482	2.457
Refueling Emissions	-	-	0.006	-	-	-
Engine Testing	3.367	0.440	0.757	0.114	0.197	0.195
Aerospace Ground Equipment	7.594	11.483	3.698	0.135	1.088	1.078
Privately-Owned Vehicles	4.000	0.366	0.125	0.006	0.058	0.033
Total Operational Emissions	40.46	23.66	11.66	1.74	3.82	3.76
Construction Emissions	2.34	4.75	1.65	0.00	0.39	0.28
Total Emissions	42.80	28.41	13.31	1.74	4.21	4.04
Baseline Emissions	36.77	22.46	10.70	1.56	3.51	3.45
Net Emissions Increase	6.03	5.95	2.60	0.18	0.70	0.59
Threshold (1)	100	10	10	100	100	100
Equals or Exceeds Threshold?	No	No	No	No	No	No

Notes: 1. Based on the federal *de minimis* threshold for NO_x, VOCs, PM_{10}, and $PM_{2.5}$ and its precursor pollutants NO_x, VOCs, and SO_x, and the major source threshold of 100 tons/year for attainment pollutants.
CO = carbon monoxide; NO_x = oxides of nitrogen; PM_{10} = particulate matter less than or equal to 10 microns in diameter; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; SO_x = oxides of sulfur; VOC = volatile organic compound

Table 9 presents a summary of the emissions associated with the Proposed Action in 2014. As discussed above, construction of the Corrosion Control Building would continue through early 2014. F-15 aircraft would operate at full operational tempo in 2014.

Table 9. 144 FW Projected Emissions, Fresno-Yosemite IAP, 2014

Emission Source	EMISSIONS, TONS/YEAR					
	CO	*NO_x*	*VOCs*	*SO_x*	*PM_{10}*	*$PM_{2.5}$*
2014						
F-15 Aircraft Operations	47.293	21.094	13.118	2.755	4.604	4.558
Refueling Emissions	-	-	0.011	-	-	-
Engine Testing	3.367	0.440	0.757	0.114	0.197	0.195
Aerospace Ground Equipment	7.594	11.483	3.698	0.135	1.088	1.078
Privately-Owned Vehicles	4.000	0.366	0.125	0.006	0.058	0.033
Total Operational Emissions	62.25	33.38	17.71	3.01	5.95	5.86
Construction Emissions	0.17	0.23	0.13	0.00	0.01	0.01
Total Emissions	62.42	33.61	17.84	3.01	5.96	5.87
Baseline Emissions	36.77	22.46	10.70	1.56	3.51	3.45
Net Emissions Increase	25.65	11.15	7.14	1.45	2.45	2.42
Threshold (1)	100	10	10	100	100	100
Equals or Exceeds Threshold?	No	Yes	No	No	No	No

Notes: 1. Based on the federal *de minimis* threshold for NO_x, VOCs, PM_{10}, and $PM_{2.5}$ and its precursor pollutants NO_x, VOCs, and SO_x, and the major source threshold of 100 tons/year for attainment pollutants.

CO = carbon monoxide; NO_x = oxides of nitrogen; PM_{10} = particulate matter less than or equal to 10 microns in diameter; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; SO_x = oxides of sulfur; VOC = volatile organic compound

Table 10 presents a summary of the emissions associated with the Proposed Action in 2015 and beyond. All construction would be complete by 2015. F-15 aircraft would operate at full operational tempo in 2015 and beyond.

Table 10. 144 FW Projected Emissions, Fresno-Yosemite IAP, 2015 and beyond

Emission Source	EMISSIONS, TONS/YEAR					
	CO	*NO_x*	*VOCs*	*SO_x*	*PM_{10}*	*$PM_{2.5}$*
2015 and beyond						
F-15 Aircraft Operations	47.293	21.094	13.118	2.755	4.604	4.558
Refueling Emissions	-	-	0.011	-	-	-
Engine Testing	3.367	0.440	0.757	0.114	0.197	0.195
Aerospace Ground Equipment	7.594	11.483	3.698	0.135	1.088	1.078
Privately-Owned Vehicles	4.000	0.366	0.125	0.006	0.058	0.033
Total Operational Emissions	62.25	33.38	17.71	3.01	5.95	5.86
Baseline Emissions	36.77	22.46	10.70	1.56	3.52	3.45
Net Emissions Increase	25.49	10.93	7.01	1.45	2.43	2.41
Threshold [(1)]	100	10	10	100	100	100
Equals or Exceeds Threshold?	No	Yes	No	No	No	No

Notes: 1. Based on the federal *de minimis* threshold for NO_x, VOCs, PM_{10}, and $PM_{2.5}$ and its precursor pollutants NO_x, VOCs, and SO_x, and the major source threshold of 100 tons/year for attainment pollutants.
CO = carbon monoxide; NO_x = oxides of nitrogen; PM_{10} = particulate matter less than or equal to 10 microns in diameter; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; SO_x = oxides of sulfur; VOC = volatile organic compound.

As shown in Tables 7 through 10, emissions associated with the Proposed Action at Fresno-Yosemite IAP would be below the CAA major source thresholds for attainment pollutants, and starting in 2014 and beyond would be below the General Conformity Rule *de minimis* thresholds for all pollutants except oxides of nitrogen (NO_x).

March ARB

No construction would be required at March ARB under the Proposed Action. There would be an increase in the number of previously evaluated closed patterns flown at March ARB by the F-15 aircraft. An increase of 122 closed patterns (244 airfield operations) would be flown annually by the replacement F-15 aircraft at March ARB. Operational emissions at March ARB associated with the Proposed Action are summarized in Table 11, along with a comparison with the baseline emissions for the F-16.

Table 11. 144 FW Projected Emissions, March ARB

	EMISSIONS, TONS/YEAR					
Emission Source	*CO*	*NO_x*	*VOCs*	*SO_x*	*PM_{10}*	*$PM_{2.5}$*
F-15 Aircraft Operations	11.338	10.011	3.487	0.962	1.470	1.455
Refueling Emissions	-	-	0.003	-	-	-
Aerospace Ground Equipment	0.524	0.723	0.045	0.010	0.022	0.022
Privately-Owned Vehicles	7.886	0.725	0.213	0.012	0.131	0.073
Total Emissions	19.75	11.46	3.75	0.98	1.63	1.55
Baseline Emissions	14.08	6.45	2.00	0.50	0.89	0.82
Net Emissions Increase	5.67	5.01	1.75	0.48	0.74	0.73
Threshold (1)	100	10	10	100	100	100
Equals or Exceeds Threshold?	No	No	No	No	No	No

Notes: 1. Based on the federal *de minimis* threshold for NO_x, VOCs, PM_{10}, and $PM_{2.5}$ and its precursor pollutants NO_x, VOCs, and SO_x, and the major source threshold of 100 tons/year for attainment pollutants.
CO = carbon monoxide; NO_x = oxides of nitrogen; PM_{10} = particulate matter less than or equal to 10 microns in diameter; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter; SO_x = oxides of sulfur; VOC = volatile organic compound

As shown in Table 11, emissions associated with the Proposed Action at March ARB would be below the General Conformity Rule *de minimis* thresholds for all pollutants.

4.5 APPLICABILITY OF GENERAL CONFORMITY TO THIS FEDERAL ACTION

The applicability of the General Conformity requirements to the Proposed Action was determined by comparing the federal action emissions to the conformity *de minimis* thresholds for all nonattainment and maintenance pollutants in the San Joaquin Valley Air Basin and South Coast Air Basin. As shown in Tables 7 through 10, the emissions of all pollutants except for NO_x in the San Joaquin Valley Air Basin are lower than their applicable *de minimis* thresholds. As shown in Table 11, emissions of all pollutants are below their applicable *de minimis* thresholds. Consequently, a conformity determination is only needed for NO_x in the San Joaquin Valley Air Basin, as the estimated annual NO_x emissions are projected to exceed the applicable 10 tpy *de minimis* threshold for that pollutant. As shown in Tables 7 through 10 and Appendix A, this increase in NO_x emissions is primarily due to increases in aircraft operations related to training activities. Therefore, the NGB must make a positive conformity determination for NO_x using one of the criteria under 40 CFR § 93.158.

4.6 GENERAL CONFORMITY DETERMINATION

In accordance with 40 CFR Part 93, Subpart B, 40 CFR Part 51, Subpart W and the 2010 United States Air Force (USAF) Conformity Guide, the incremental increase in emissions above the existing conditions due to the Proposed Action was considered and includes reasonable foreseeable direct and indirect emissions. The applicability analysis has found that this federal

action is subject to general conformity, so the federal agency must demonstrate conformity to the SIP.

Based on the evaluation of the emissions associated with the implementation of the Proposed Action, the estimated annual net increase in NO_x emissions from both construction and operations in 2014 would equal 11.15 tpy; and in 2015 and beyond the net increase in annual operational emissions of NO_x will be 10.93 tpy. The net emissions increase exceeds the applicable *de minimis* threshold of 10 tpy by more than one (1) ton in 2014 and by almost 1 tpy in 2015 and beyond. Therefore, a positive conformity determination is required. To demonstrate positive conformity, the USAF first asked SJVAPCD to determine if the projected peak net NO_x emissions increase was already covered by the emissions inventory or budget in the applicable SIP. SJVAPCD has reviewed the estimated actual emissions in the final conformity determination and has issued a letter which determines that the peak net NO_x emissions from the USAF action, together with all other NO_x emissions in the O_3 nonattainment area, would not exceed the emissions budgets in the applicable SIP. In short, the SJVAPCD concurs that the emissions set forth in this proposed conformity determination conform to the applicable approved budgets. Appendix B contains SJVAPCD's written determination, per 40 CFR § 93.158(a)(5)(i)(A), that the net NO_x emissions from the USAF action, together with all other NO_x emissions in the O_3 nonattainment area, would not exceed the emissions budgets in the applicable SIP.

Conclusion

Based on the evaluation of the emissions associated with the implementation of the Proposed Action, the estimated annual net increase in NO_x emissions from both construction and operations in 2014 would equal 11.15 tpy; and in 2015 and beyond the net increase in annual operational emissions of NO_x will be 10.93 tpy. Therefore, a conformity determination was conducted, and it was found that the emission increase associated with the Proposed Action is accounted for in the currently approved SIP emissions budget. Accordingly, the Proposed Action will conform to the currently approved SIP.

5.0 FINDING OF CONFORMITY

The USAF has reviewed and evaluated the conformity determination and documentation, and it has determined that a finding of conformity may be made based on the SJVAPCD's written determination per 40 CFR § 93.158(a)(5)(i)(A).

6.0 LIST OF PREPARERS AND CONTRIBUTORS

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7.0 REFERENCES

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APPENDIX A

Emission Calculations

URBEMIS Model Outputs

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Urbemis 2007 Version 9.2.4

Combined Annual Emissions Reports (Tons/Year)

File Name: C:\Urbemis\Urbemis 9.2.2\Projects\Fresno ANG EA Arm DeArml.urb924

Project Name: Fresno ANG Arm DeArm Pads

Project Location: Fresno County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2013 TOTALS (tons/year unmitigated)	0.25	1.76	1.22	0.00	0.24	0.12	0.35	0.05	0.11	0.16	200.61
2013 TOTALS (tons/year mitigated)	0.25	1.76	1.22	0.00	0.08	0.12	0.20	0.02	0.11	0.12	200.61
Percent Reduction	0.00	0.00	0.00	0.00	64.33	0.00	43.26	64.14	0.00	20.43	0.00

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2013	0.25	1.76	1.22	0.00	0.24	0.12	0.35	0.05	0.11	0.16	200.61

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Fine Grading 01/01/2013-03/31/2013	0.08	0.66	0.38	0.00	0.18	0.03	0.21	0.04	0.03	0.07	75.19
Fine Grading Dust	0.00	0.00	0.00	0.00	0.18	0.00	0.18	0.04	0.00	0.04	0.00
Fine Grading Off Road Diesel	0.08	0.66	0.36	0.00	0.00	0.03	0.03	0.00	0.03	0.03	71.91
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.28
Asphalt 04/01/2013-06/30/2013	0.05	0.33	0.27	0.00	0.00	0.03	0.03	0.00	0.03	0.03	37.92
Paving Off-Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.05	0.33	0.22	0.00	0.00	0.03	0.03	0.00	0.02	0.02	31.82
Paving On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.27
Paving Worker Trips	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.83
Fine Grading 06/01/2013-06/30/2013	0.03	0.21	0.12	0.00	0.06	0.01	0.07	0.01	0.01	0.02	23.50
Fine Grading Dust	0.00	0.00	0.00	0.00	0.06	0.00	0.06	0.01	0.00	0.01	0.00
Fine Grading Off Road Diesel	0.03	0.21	0.11	0.00	0.00	0.01	0.01	0.00	0.01	0.01	22.47
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.03
Asphalt 07/01/2013-11/30/2013	0.09	0.56	0.45	0.00	0.00	0.05	0.05	0.00	0.04	0.04	63.99
Paving Off-Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.09	0.55	0.37	0.00	0.00	0.05	0.05	0.00	0.04	0.04	53.86
Paving On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.27
Paving Worker Trips	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.87

Phase Assumptions

Phase: Fine Grading 1/1/2013 - 3/31/2013 - Default Fine Site Grading Description

Total Acres Disturbed: 0.9

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Maximum Daily Acreage Disturbed: 0.28

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Graders (174 hp) operating at a 0.61 load factor for 6 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 6 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Fine Grading 6/1/2013 - 6/30/2013 - Default Building Construction Description

Total Acres Disturbed: 0.9

Maximum Daily Acreage Disturbed: 0.28

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Graders (174 hp) operating at a 0.61 load factor for 6 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 6 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Paving 4/1/2013 - 6/30/2013 - Default Paving Description

Acres to be Paved: 0.45

Off-Road Equipment:

4 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 6 hours per day

1 Pavers (100 hp) operating at a 0.62 load factor for 7 hours per day

1 Rollers (95 hp) operating at a 0.56 load factor for 7 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

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Phase: Paving 7/1/2013 - 11/30/2013 - Default Architectural Coating Description

Acres to be Paved: 0.45

Off-Road Equipment:

4 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 6 hours per day

1 Pavers (100 hp) operating at a 0.62 load factor for 7 hours per day

1 Rollers (95 hp) operating at a 0.56 load factor for 7 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

Construction Mitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Mitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2

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2013	0.25	1.76	1.22	0.00	0.08	0.12	0.20	0.02	0.11	0.12	200.61
Fine Grading 01/01/2013-03/31/2013	0.08	0.66	0.38	0.00	0.06	0.03	0.10	0.01	0.03	0.04	75.19
Fine Grading Dust	0.00	0.00	0.00	0.00	0.06	0.00	0.06	0.01	0.00	0.01	0.00
Fine Grading Off Road Diesel	0.08	0.66	0.36	0.00	0.00	0.03	0.03	0.00	0.03	0.03	71.91
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.28
Asphalt 04/01/2013-06/30/2013	0.05	0.33	0.27	0.00	0.00	0.03	0.03	0.00	0.03	0.03	37.92
Paving Off-Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.05	0.33	0.22	0.00	0.00	0.03	0.03	0.00	0.02	0.02	31.82
Paving On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.27
Paving Worker Trips	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.83
Fine Grading 06/01/2013-06/30/2013	0.03	0.21	0.12	0.00	0.02	0.01	0.03	0.00	0.01	0.01	23.50
Fine Grading Dust	0.00	0.00	0.00	0.00	0.02	0.00	0.02	0.00	0.00	0.00	0.00
Fine Grading Off Road Diesel	0.03	0.21	0.11	0.00	0.00	0.01	0.01	0.00	0.01	0.01	22.47
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.03
Asphalt 07/01/2013-11/30/2013	0.09	0.56	0.45	0.00	0.00	0.05	0.05	0.00	0.04	0.04	63.99
Paving Off-Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.09	0.55	0.37	0.00	0.00	0.05	0.05	0.00	0.04	0.04	53.86
Paving On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.27
Paving Worker Trips	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.87

Construction Related Mitigation Measures

The following mitigation measures apply to Phase: Fine Grading 1/1/2013 - 3/31/2013 - Default Fine Site Grading Description

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For Soil Stablizing Measures, the Water exposed surfaces 3x daily watering mitigation reduces emissions by:

PM10: 61% PM25: 61%

For Unpaved Roads Measures, the Reduce speed on unpaved roads to less than 15 mph mitigation reduces emissions by:

PM10: 44% PM25: 44%

For Unpaved Roads Measures, the Manage haul road dust 3x daily watering mitigation reduces emissions by:

PM10: 61% PM25: 61%

The following mitigation measures apply to Phase: Fine Grading 6/1/2013 - 6/30/2013 - Default Building Construction Description

For Soil Stablizing Measures, the Water exposed surfaces 3x daily watering mitigation reduces emissions by:

PM10: 61% PM25: 61%

For Unpaved Roads Measures, the Reduce speed on unpaved roads to less than 15 mph mitigation reduces emissions by:

PM10: 44% PM25: 44%

For Unpaved Roads Measures, the Manage haul road dust 3x daily watering mitigation reduces emissions by:

PM10: 61% PM25: 61%

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Urbemis 2007 Version 9.2.4

Combined Annual Emissions Reports (Tons/Year)

File Name:

Project Name: Fresno ANG Corrosion Control

Project Location: Fresno County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2012 TOTALS (tons/year unmitigated)	0.06	0.47	0.27	0.00	0.04	0.02	0.07	0.01	0.02	0.03	50.52
2012 TOTALS (tons/year mitigated)	0.06	0.47	0.27	0.00	0.02	0.02	0.04	0.00	0.02	0.02	50.52
Percent Reduction	0.00	0.00	0.00	0.00	64.44	0.00	41.95	64.33	0.00	19.16	0.00
2013 TOTALS (tons/year unmitigated)	0.19	1.34	0.98	0.00	0.00	0.09	0.09	0.00	0.08	0.08	180.48
2013 TOTALS (tons/year mitigated)	0.19	1.34	0.98	0.00	0.00	0.09	0.09	0.00	0.08	0.08	180.48
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2014 TOTALS (tons/year unmitigated)	0.13	0.23	0.17	0.00	0.00	0.01	0.01	0.00	0.01	0.01	35.12
2014 TOTALS (tons/year mitigated)	0.13	0.23	0.17	0.00	0.00	0.01	0.01	0.00	0.01	0.01	35.12
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2012	0.06	0.47	0.27	0.00	0.04	0.02	0.07	0.01	0.02	0.03	50.52
Fine Grading 11/01/2012-12/31/2012	0.06	0.47	0.27	0.00	0.04	0.02	0.07	0.01	0.02	0.03	50.52
Fine Grading Dust	0.00	0.00	0.00	0.00	0.04	0.00	0.04	0.01	0.00	0.01	0.00
Fine Grading Off Road Diesel	0.06	0.47	0.25	0.00	0.00	0.02	0.02	0.00	0.02	0.02	48.32
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.20
2013	0.19	1.34	0.98	0.00	0.00	0.09	0.09	0.00	0.08	0.08	180.48
Building 01/01/2013-03/31/2014	0.13	1.01	0.71	0.00	0.00	0.06	0.06	0.00	0.05	0.05	142.76
Building Off Road Diesel	0.12	0.95	0.58	0.00	0.00	0.06	0.06	0.00	0.05	0.05	116.59
Building Vendor Trips	0.00	0.06	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	16.06
Building Worker Trips	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.11
Asphalt 04/01/2013-06/30/2013	0.05	0.33	0.27	0.00	0.00	0.03	0.03	0.00	0.03	0.03	37.72
Paving Off-Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.05	0.33	0.22	0.00	0.00	0.03	0.03	0.00	0.02	0.02	31.82
Paving On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06
Paving Worker Trips	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.83

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2014	0.13	0.23	0.17	0.00	0.00	0.01	0.01	0.00	0.01	0.01	35.12
Building 01/01/2013-03/31/2014	0.03	0.23	0.17	0.00	0.00	0.01	0.01	0.00	0.01	0.01	35.01
Building Off Road Diesel	0.03	0.21	0.14	0.00	0.00	0.01	0.01	0.00	0.01	0.01	28.59
Building Vendor Trips	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.94
Building Worker Trips	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.48
Coating 01/01/2014-03/30/2014	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12
Architectural Coating	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12

Phase Assumptions

Phase: Fine Grading 11/1/2012 - 12/31/2012 - Default Fine Site Grading Description

Total Acres Disturbed: 0.41

Maximum Daily Acreage Disturbed: 0.1

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Graders (174 hp) operating at a 0.61 load factor for 6 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 6 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Paving 4/1/2013 - 6/30/2013 - Default Paving Description

Acres to be Paved: 0.1

Off-Road Equipment:

4 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 6 hours per day

1 Pavers (100 hp) operating at a 0.62 load factor for 7 hours per day

1 Rollers (95 hp) operating at a 0.56 load factor for 7 hours per day

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1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

Phase: Building Construction 1/1/2013 - 3/31/2014 - Default Building Construction Description

Off-Road Equipment:

1 Cranes (399 hp) operating at a 0.43 load factor for 4 hours per day

2 Forklifts (145 hp) operating at a 0.3 load factor for 6 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

Phase: Architectural Coating 1/1/2014 - 3/30/2014 - Default Architectural Coating Description

Rule: Residential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 130

Rule: Residential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 130

Rule: Nonresidential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Nonresidential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Construction Mitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Mitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2012	0.06	0.47	0.27	0.00	0.02	0.02	0.04	0.00	0.02	0.02	50.52
Fine Grading 11/01/2012-12/31/2012	0.06	0.47	0.27	0.00	0.02	0.02	0.04	0.00	0.02	0.02	50.52
Fine Grading Dust	0.00	0.00	0.00	0.00	0.02	0.00	0.02	0.00	0.00	0.00	0.00
Fine Grading Off Road Diesel	0.06	0.47	0.25	0.00	0.00	0.02	0.02	0.00	0.02	0.02	48.32
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.20

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2013	0.19	1.34	0.98	0.00	0.00	0.09	0.09	0.00	0.08	0.08	180.48
Building 01/01/2013-03/31/2014	0.13	1.01	0.71	0.00	0.00	0.06	0.06	0.00	0.05	0.05	142.76
Building Off Road Diesel	0.12	0.95	0.58	0.00	0.00	0.06	0.06	0.00	0.05	0.05	116.59
Building Vendor Trips	0.00	0.06	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	16.06
Building Worker Trips	0.00	0.00	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.11
Asphalt 04/01/2013-06/30/2013	0.05	0.33	0.27	0.00	0.00	0.03	0.03	0.00	0.03	0.03	37.72
Paving Off-Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.05	0.33	0.22	0.00	0.00	0.03	0.03	0.00	0.02	0.02	31.82
Paving On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06
Paving Worker Trips	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.83
2014	0.13	0.23	0.17	0.00	0.00	0.01	0.01	0.00	0.01	0.01	35.12
Building 01/01/2013-03/31/2014	0.03	0.23	0.17	0.00	0.00	0.01	0.01	0.00	0.01	0.01	35.01
Building Off Road Diesel	0.03	0.21	0.14	0.00	0.00	0.01	0.01	0.00	0.01	0.01	28.59
Building Vendor Trips	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.94
Building Worker Trips	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.48
Coating 01/01/2014-03/30/2014	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12
Architectural Coating	0.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12

Construction Related Mitigation Measures

The following mitigation measures apply to Phase: Fine Grading 11/1/2012 - 12/31/2012 - Default Fine Site Grading Description

For Soil Stablizing Measures, the Water exposed surfaces 3x daily watering mitigation reduces emissions by:

PM10: 61% PM25: 61%

For Unpaved Roads Measures, the Reduce speed on unpaved roads to less than 15 mph mitigation reduces emissions by:

PM10: 44% PM25: 44%

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For Unpaved Roads Measures, the Manage haul road dust 3x daily watering mitigation reduces emissions by:

PM10: 61% PM25: 61%

1/28/2012 3:44:48 PM

Urbemis 2007 Version 9.2.4

Combined Annual Emissions Reports (Tons/Year)

File Name:

Project Name: Fresno ANG Munitions Storage

Project Location: Fresno County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2012 TOTALS (tons/year unmitigated)	0.06	0.47	0.27	0.00	0.04	0.02	0.07	0.01	0.02	0.03	50.52
2012 TOTALS (tons/year mitigated)	0.06	0.47	0.27	0.00	0.02	0.02	0.04	0.00	0.02	0.02	50.52
Percent Reduction	0.00	0.00	0.00	0.00	64.44	0.00	41.95	64.33	0.00	19.16	0.00
2013 TOTALS (tons/year unmitigated)	0.11	0.84	0.59	0.00	0.00	0.05	0.05	0.00	0.04	0.04	118.27
2013 TOTALS (tons/year mitigated)	0.11	0.84	0.59	0.00	0.00	0.05	0.05	0.00	0.04	0.04	118.27
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2

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2012	0.06	0.47	0.27	0.00	0.04	0.02	0.07	0.01	0.02	0.03	50.52
Fine Grading 11/01/2012-12/31/2012	0.06	0.47	0.27	0.00	0.04	0.02	0.07	0.01	0.02	0.03	50.52
Fine Grading Dust	0.00	0.00	0.00	0.00	0.04	0.00	0.04	0.01	0.00	0.01	0.00
Fine Grading Off Road Diesel	0.06	0.47	0.25	0.00	0.00	0.02	0.02	0.00	0.02	0.02	48.32
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.20
2013	0.11	0.84	0.59	0.00	0.00	0.05	0.05	0.00	0.04	0.04	118.27
Building 01/01/2013-10/31/2013	0.11	0.84	0.59	0.00	0.00	0.05	0.05	0.00	0.04	0.04	118.27
Building Off Road Diesel	0.10	0.79	0.49	0.00	0.00	0.05	0.05	0.00	0.04	0.04	97.38
Building Vendor Trips	0.00	0.05	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.82
Building Worker Trips	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.07

Phase Assumptions

Phase: Fine Grading 11/1/2012 - 12/31/2012 - Default Fine Site Grading Description

Total Acres Disturbed: 0.39

Maximum Daily Acreage Disturbed: 0.1

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Graders (174 hp) operating at a 0.61 load factor for 6 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 6 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Building Construction 1/1/2013 - 10/31/2013 - Default Building Construction Description

Off-Road Equipment:

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1 Cranes (399 hp) operating at a 0.43 load factor for 4 hours per day

2 Forklifts (145 hp) operating at a 0.3 load factor for 6 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

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Construction Mitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Mitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2012	0.06	0.47	0.27	0.00	0.02	0.02	0.04	0.00	0.02	0.02	50.52
Fine Grading 11/01/2012-12/31/2012	0.06	0.47	0.27	0.00	0.02	0.02	0.04	0.00	0.02	0.02	50.52
Fine Grading Dust	0.00	0.00	0.00	0.00	0.02	0.00	0.02	0.00	0.00	0.00	0.00
Fine Grading Off Road Diesel	0.06	0.47	0.25	0.00	0.00	0.02	0.02	0.00	0.02	0.02	48.32
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.20
2013	0.11	0.84	0.59	0.00	0.00	0.05	0.05	0.00	0.04	0.04	118.27
Building 01/01/2013-10/31/2013	0.11	0.84	0.59	0.00	0.00	0.05	0.05	0.00	0.04	0.04	118.27
Building Off Road Diesel	0.10	0.79	0.49	0.00	0.00	0.05	0.05	0.00	0.04	0.04	97.38
Building Vendor Trips	0.00	0.05	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.82
Building Worker Trips	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.07

Construction Related Mitigation Measures

The following mitigation measures apply to Phase: Fine Grading 11/1/2012 - 12/31/2012 - Default Fine Site Grading Description

For Soil Stablizing Measures, the Water exposed surfaces 3x daily watering mitigation reduces emissions by:

PM10: 61% PM25: 61%

For Unpaved Roads Measures, the Reduce speed on unpaved roads to less than 15 mph mitigation reduces emissions by:

PM10: 44% PM25: 44%

For Unpaved Roads Measures, the Manage haul road dust 3x daily watering mitigation reduces emissions by:

PM10: 61% PM25: 61%

1/28/2012 3:52:57 PM

Urbemis 2007 Version 9.2.4

Combined Annual Emissions Reports (Tons/Year)

File Name:

Project Name: Fresno ANG NDI

Project Location: Fresno County

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2012 TOTALS (tons/year unmitigated)	0.02	0.17	0.10	0.00	0.00	0.01	0.01	0.00	0.01	0.01	20.41
2013 TOTALS (tons/year unmitigated)	0.13	0.81	0.52	0.00	0.00	0.05	0.05	0.00	0.04	0.04	103.48

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2

1/28/2012 3:52:57 PM

2012	0.02	0.17	0.10	0.00	0.00	0.01	0.01	0.00	0.01	0.01	20.41
Building 11/01/2012-10/31/2013	0.02	0.17	0.10	0.00	0.00	0.01	0.01	0.00	0.01	0.01	20.41
Building Off Road Diesel	0.02	0.17	0.10	0.00	0.00	0.01	0.01	0.00	0.01	0.01	19.21
Building Vendor Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.73
Building Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.46
2013	0.13	0.81	0.52	0.00	0.00	0.05	0.05	0.00	0.04	0.04	103.48
Building 11/01/2012-10/31/2013	0.11	0.81	0.52	0.00	0.00	0.05	0.05	0.00	0.04	0.04	103.45
Building Off Road Diesel	0.10	0.79	0.49	0.00	0.00	0.05	0.05	0.00	0.04	0.04	97.38
Building Vendor Trips	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.73
Building Worker Trips	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.35
Coating 10/01/2013-10/31/2013	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03
Architectural Coating	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03

Phase Assumptions

Phase: Building Construction 11/1/2012 - 10/31/2013 - Default Building Construction Description

Off-Road Equipment:

1 Cranes (399 hp) operating at a 0.43 load factor for 4 hours per day

2 Forklifts (145 hp) operating at a 0.3 load factor for 6 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

Phase: Architectural Coating 10/1/2013 - 10/31/2013 - Default Architectural Coating Description

Rule: Residential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 130

Rule: Residential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 130

Rule: Nonresidential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Nonresidential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Emission Calculations

Table 1. Annual Flight Operations for 144th Fighter Wing - Baseline, Fresno

Aircraft Type	Engine Model	Type of Operation (Flight Profile)	Baseline Total Number of Operations	Segment Length, feet	Height above AGL, ft	Power Setting	Modeled Power Setting	Average speed per segment, feet/sec	No. of Engines	Time in Mode, seconds	Time in Mode, hours	Total Time In Mode (TIM) Total TIM = TIM x #of Operations: Idle (hr)	Approach (hr)	Intermediate (hr)	Military (hr)	AB-5 (hr)
F-16C/D	F100-PW-220															
		Departures =	**2,199**						1							
		F1611LD6	460													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	141.8333				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					1.8170
		b-c		6000	1400	91	Military	464.145		12.9270	0.0036				1.6518	
		c-d		1500	1600	91	Military	506.340		2.9624	0.0008				0.3785	
		d-e		13500	2500	86	Intermediate	506.340		26.6619	0.0074			3.4068		
		e-f		5772	3000	86	Intermediate	506.340		11.3995	0.0032			1.4566		
		F1611LD8	81													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	24.9750				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.3199
		b-c		6000	1400	91	Military	464.145		12.9270	0.0036				0.2909	
		c-d		1500	1600	91	Military	506.340		2.9624	0.0008				0.0667	
		d-e		13500	2500	86	Intermediate	506.340		26.6619	0.0074			0.5999		
		e-3000		3428.571429	3000	86	Intermediate	506.340		6.7713	0.0019			0.1524		
		F1629LD1	18													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	5.5500				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.0711
		b-c		6240	1300	91	Military	464.145		13.4441	0.0037				0.0672	
		c-d		1760	1600	88	Military	506.340		3.4759	0.0010				0.0174	
		d-e		13000	2500	86	Intermediate	506.340		25.6744	0.0071			0.1284		
		e-3000		3428.571429	3000	86	Intermediate	506.340		6.7713	0.0019			0.0339		
		F1629LD2	7													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	2.1583				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.0276
		b-c		6240	1300	91	Military	464.145		13.4441	0.0037				0.0261	
		c-d		1760	1600	88	Military	506.34		3.4759	0.0010				0.0068	
		d-e		13000	2500	86	Intermediate	506.34		25.6744	0.0071			0.0499		
		e-3000		3428.571429	3000	86	Intermediate	506.34		6.7713	0.0019			0.0132		
		F1629RD8	1,356													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	418.1000				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					5.3561
		b-c		6000	1300	91	Military	464.145		12.9270	0.0036				4.8692	
		c-d		2000	1600	91	Military	506.34		3.9499	0.0011				1.4878	
		d-e		13000	2500	86	Intermediate	506.34		25.6744	0.0071			9.6707		
		e-3000		3428.571429	3000	86	Intermediate	506.34		6.7713	0.0019			2.5505		
		F1629RD9	277													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	85.4083				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					1.0941
		b-c		6000	1300	91	Military	464.145		12.9270	0.0036				0.9947	
		c-d		2000	1600	88	Military	506.34		3.9499	0.0011				0.3039	
		d-e		13000	2500	86	Intermediate	506.34		25.6744	0.0071			1.9755		
		e-3000		3428.571429	3000	86	Intermediate	506.34		6.7713	0.0019			0.5210		
		Arrivals =	**2,198**													
		F1611LA1OH	296													
	Segment	a-b		30000	3000	85	Approach	506.340		59.2487	0.0165		4.8716			
		b-c		12000	2000	85	Approach	506.340		23.6995	0.0066		1.9486			
		c-d		26000	2000	80	Approach	430.389		60.4105	0.0168		4.9671			
		d-e		12000	2000	80	Approach	345.999		34.6822	0.0096		2.8516			
		e-f		14000	2000	80	Approach	295.365		47.3990	0.0132		3.8972			
		f-g		6000	300	80	Approach	248.951		24.1012	0.0067		1.9817			
		Taxi In					**Idle**	Idle			0.1883	55.7467				
		F1611LA2	146													
	Segment	a-b		15760	3000	88	Approach	430.389		36.6180	0.0102		1.4851			
		b-c		15000	2200	88	Approach	354.438		42.3205	0.0118		1.7163			
		c-d		12000	1500	85	Approach	329.121		36.4608	0.0101		1.4787			
		d-e		12000	1000	80	Approach	278.487		43.0900	0.0120		1.7475			
		e-f		6000	300	80	Approach	244.731		24.5167	0.0068		0.9943			
		Taxi In					**Idle**	Idle			0.1883	27.4967				
		F1611A4BF	14													
	Segment	b-c		26000	3000	88	Approach	421.950		61.6187	0.0171		0.2396			
		c-d		9000	2500	87	Approach	337.560		26.6619	0.0074		0.1037			
		d-e		9000	2500	87	Approach	295.365		30.4708	0.0085		0.1185			
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.0937			
		Taxi In					**Idle**	Idle			0.1883	2.6367				
		F1611LA4HF	15													
	Segment	3000-e		3375	3000	75	Approach	284.816		11.8497	0.0033		0.0494			
		e-f		6000	300	75	Approach	253.170		23.6995	0.0066		0.0987			
		Taxi In					**Idle**	Idle			0.1883	2.8250				
		F1611LA4LF	14													
	Segment	3000-e		6567.567568	3000	75	Approach	290.119		22.6375	0.0063		0.0880			
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.0937			
		Taxi In					**Idle**	Idle			0.1883	2.6367				
		F1629RA1BF	42													
	Segment	b-c		26000	3000	88	Approach	421.950		61.6187	0.0171		0.7189			
		c-d		9000	2500	87	Approach	337.560		26.6619	0.0074		0.3111			
		d-e		9000	2500	87	Approach	295.365		30.4708	0.0085		0.3555			
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.2812			
		Taxi In					**Idle**	Idle			0.1883	7.9100				
		F1629RA1HF	43													
	Segment	3000-e		3375	3000	75	Approach	284.816		11.8497	0.0033		0.1415			
		e-f		6000	300	75	Approach	248.951		24.1012	0.0067		0.2879			
		Taxi In					**Idle**	Idle			0.1883	8.0983				
		F1629RA1LF	42													
	Segment	3000-e		6567.567568	3000	75	Approach	290.119		22.6375	0.0063		0.2641			
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.2812			
		Taxi In					**Idle**	Idle			0.1883	7.9100				
		F1629RA2	326													
	Segment	3000-d		3612	3000	86	Approach	445.5792		8.1063	0.0023		0.7341			
		d-e		12180	2700	85	Approach	354.438		34.3643	0.0095		3.1119			
		e-f		6500	2100	85	Approach	354.438		18.3389	0.0051		1.6607			
		f-g		5620	1800	85	Approach	329.121		17.0758	0.0047		1.5463			
		g-h		12380	1500	85	Approach	303.804		40.7500	0.0113		3.6901			
		h-i		11924	900	80	Approach	278.487		42.8171	0.0119		3.8773			
		i-j		6076	300	80	Approach	244.731		24.8273	0.0069		2.2482			
		Taxi In					**Idle**	Idle			0.1883	61.3967				
		F1629RA5OH	1,260													
	Segment	e-f		6076	3000	85	Approach	506.34		11.9998	0.0033		4.1999			
		f-g		6076	2500	85	Approach	430.389		14.1175	0.0039		4.9411			
		g-h		23856	2000	80	Approach	354.438		67.3066	0.0187		23.5573			
		h-i		13512	2000	80	Approach	345.999		39.0521	0.0108		13.6682			
		i-j		12760	2000	80	Approach	295.365		43.2008	0.0120		15.1203			
		j-k		6100	500	80	Approach	248.9505		24.5029	0.0068		8.5760			
		Taxi In					**Idle**	Idle			0.1883	237.3000				
		Closed Pattern Ops =	**281**													
		F1611LCP1	70													
	Segment	a-b		3,000	50	83	Military	299.585		10.0139	0.0028				0.1947	
		b-c		6,000	100	94	Military	430.389		13.9409	0.0039				0.2711	
		c-d		11,000	1,100	94	Intermediate	464.145		23.6995	0.0066			0.4608		
		d-e		12,000	2,000	87	Approach	388.194		30.9124	0.0086		0.6011			
		e-f		10,850	2,000	87	Approach	303.804		35.7138	0.0099		0.6944			
		f-g		6,000	300	87	Approach	248.951		24.1012	0.0067		0.4686			
		F1629LCP1	211													
	Segment	a-b		3,000	50	83	Military	299.585		10.0139	0.0028				0.5869	
		b-c		6,000	100	94	Military	430.389		13.9409	0.0039				0.8171	
		c-d		11,000	1,100	94	Intermediate	464.145		23.6995	0.0066			1.3891		
		d-e		12,000	2,000	87	Approach	388.194		30.9124	0.0086		1.8118			
		e-f		10,850	2,000	87	Approach	303.804		35.7138	0.0099		2.0932			
		f-g		6,000	300	87	Approach	248.951		24.1012	0.0067		1.4126			
		Total F-16 =	**4,678**									**1091.9817 hrs in Idle**	**125.4798 hrs in Approach**	**22.4086 hrs in Intermediate**	**12.0307 hrs in Military**	**8.6859 hrs in AB-5**

Mode	Mode Variables: Totsl TIM (hr)	Fuel Flow Rate, lbs/hr	Emission Indices, lbs/1000 lbs fuel: CO	NOx	VOC	SOx	PM10	Total Emissions, lbs/year: CO	NOx	VOC	SOx	PM10
Idle	1092.0	1,084	35.30	4.61	7.94	1.20	2.06	41784.90	5456.89	9398.64	1420.45	2438.44
Approach	125.5	3,837	1.92	12.53	5.12	1.20	2.63	924.41	6032.77	2465.11	577.76	1266.26
Intermediate	22.4	5,770	0.86	22.18	2.89	1.20	2.06	111.20	2867.82	373.67	155.16	266.35
Military	12.0	9,679	0.86	29.32	1.79	1.20	1.33	100.14	3414.17	208.44	139.73	154.87
AB-5	8.7	41,682	11.99	8.37	1.53	1.20	1.15	4340.91	3030.31	553.93	434.45	416.35

Total Aircraft Emissions

	CO	NOx	VOC	SOx	PM10
Total Emissions (lbs/yr) =	**47261.56**	**20801.96**	**12999.78**	**2727.55**	**4542.27**
Total Emissions (tons/yr) =	**23.63**	**10.40**	**6.50**	**1.36**	**2.27**

Total fuel transferred, lbs	**2272960.62**
Total fuel transferred, gal	**336236.7781**
Refueling emissions, lbs/year	**13.81264009**

Table 2. Annual Flight Operations for 144th Fighter Wing - Baseline, March ARB

Aircraft Type	Engine Model	Type of Operation	Baseline Total Number of Operations	Segment Length, feet	Height above AGL, ft	Power Setting	Modeled Power Setting	Speed, kts	No. of Engines	Time in Mode, hours	Total Time In Mode (TIM) Total TIM = TIM x #of Operations: Idle (hr)	Approach (hr)	Intermediate (hr)	Military (hr)	AB-5 (hr)
F-16C/D	F100-PW-220														
		Departures =	**438**						**1**						
		F16DA	22												
		Taxi Out					**Idle**	Idle		0.3083	6.7833				
	Segment	a-b		3000	0	90	AB-5	135.024	22.2183	0.0062					0.1358
		b-c		7000	200	91	AB-5	388.194	18.0322	0.0050					0.1102
		c-d		18000	2900	90	Military	548.535	32.8147	0.0091				0.2005	
		d-3000		872.6708075	3000	90	Military	590.730	1.4773	0.0004				0.0090	
		F16DB	416												
		Taxi Out					**Idle**	Idle		0.3083	128.2667				
	Segment	a-b		3,000	0	90	AB-5	135.024	22.2183	0.0062					2.5674
		b-c		7,000	200	91	AB-5	388.194	18.0322	0.0050					2.0837
		c-d		18,000	2,900	90	Military	548.535	32.8147	0.0091				3.7919	
		d-3000		873	3,000	90	Military	590.730	1.4773	0.0004				0.1707	
		Arrivals =	448												
		F16AA	182												
	Segment	3000-c		16,473	3,000	76	Approach	506.340	32.5331	0.0090		1.6447			
		c-d		29,820	1,970	76	Approach	506.340	58.8932	0.0164		2.9774			
		d-e		8,372	1,965	76	Approach	455.706	18.3715	0.0051		0.9288			
		e-f		3,490	1,965	76	Approach	388.194	8.9904	0.0025		0.4545			
		f-g		3,429	1,965	85	Approach	354.438	9.6745	0.0027		0.4891			
		g-h		9,426	1,965	85	Approach	320.682	29.3936	0.0082		1.4860			
		h-i		6,000	300	82	Approach	286.926	20.9113	0.0058		1.0572			
		Taxi In					**Idle**	Idle		0.1883	34.2767				
		F16AB	257												
	Segment	3000-d		21,198	3,000	76	Approach	346.327	61.2080	0.0170		4.3696			
		d-e		14,414	2,065	80	Approach	303.804	47.4451	0.0132		3.3871			
		e-f		38,496	2,065	80	Approach	261.609	147.1509	0.0409		10.5049			
		Taxi In					**Idle**	Idle		0.1883	48.4017				
		F16AC	9												
	Segment	3000-c		32,268	3,000	76	Approach	348.090	92.6987	0.0257		0.2317			
		c-d		9,000	1,565	80	Approach	303.804	29.6244	0.0082		0.0741			
		d-e		33,000	1,565	80	Approach	261.609	126.1424	0.0350		0.3154			
		Taxi In					**Idle**	Idle		0.1883	1.6950				
		Closed Pattern Ops =	442												
		F16CA	89												
	Segment	a-b		1,000	50	75	Approach	248.951	4.0169	0.0011		0.0993			
		b-c		12,300	100	92	Military	299.585	41.0569	0.0114				1.0150	
		c-d		18,076	1,000	85	Military	379.755	47.5991	0.0132				1.1768	
		d-e		102,945	2,465	82	Intermediate	421.950	243.9744	0.0678			6.0316		
		e-f		36,179	2,465	85	Intermediate	379.755	95.2693	0.0265			2.3553		
		f-g		39,930	2,465	75	Approach	303.804	131.4334	0.0365		3.2493			
		g-h		38,442	2,065	75	Approach	253.170	151.8426	0.0422		3.7539			
		F16CB	353												
	Segment	a-b		1,000	50	75	Approach	253.170	3.9499	0.0011		0.3873			
		b-c		12,300	100	92	Military	303.804	40.4866	0.0112				3.9699	
		c-d		11,640	1,000	85	Military	379.755	30.6513	0.0085				3.0055	
		d-e		5,060	1,965	82	Intermediate	396.633	12.7574	0.0035			1.2509		
		e-f		13,000	1,965	85	Approach	337.560	38.5117	0.0107		3.7763			
		f-g		11,000	1,965	80	Approach	286.926	38.3374	0.0106		3.7592			
		g-h		6,591	300	80	Approach	253.170	26.0339	0.0072		2.5528			
Total Aircraft Emissions											**219.4233 hrs in Idle**	**45.4985 hrs in Approach**	**9.6378 hrs in Intermediate**	**13.3394 hrs in Military**	**4.8971 hrs in AB-5**

Mode	Totsl TIM (hr)	Fuel Flow Rate, lbs/hr	Emission Indices, lbs/1000 lbs fuel: CO	NOx	VOC	SOx	PM10	Total Emissions, lbs/year: CO	NOx	VOC	SOx	PM10
Idle	219.4	1,084	35.30	4.61	7.94	1.20	2.06	8396.28	1096.51	1888.57	285.43	489.98
Approach	45.5	3,837	1.92	12.53	5.12	1.20	2.63	335.19	2187.46	893.84	209.49	459.14
Intermediate	9.6	5,770	0.86	22.18	2.89	1.20	2.06	47.82	1233.43	160.71	66.73	114.56
Military	13.3	9,679	0.86	29.32	1.79	1.20	1.33	111.04	3785.57	231.11	154.93	171.72
AB-5	4.9	41,682	11.99	8.37	1.53	1.20	1.15	2447.43	1708.51	312.31	244.95	234.74

Total Aircraft Emissions

	CO	NOx	VOC	SOx	PM10
Total Emissions (lbs/yr) =	**11337.76**	**10011.48**	**3486.54**	**961.53**	**1470.14**
Total Emissions (tons/yr) =	**5.67**	**5.01**	**1.74**	**0.48**	**0.74**

Total fuel transferred, lbs	**801277.8**
Total fuel transferred, gal	**118532.2**
Refueling emissions, lbs/yea	**4.869315**

NOTES: Emission Indices from *Air Emissions Factor Guide to Air Force Mobile Sources*, Air Force Center for Engineering and the Environment, December 2003.
Flight Profiles from B. Wear, from noise analysis.
Refueling emissions from total fuel used, calculation from *Air Emissions Inventory Guidance Document for Stationary Sources at Air Force Installations*, December 2003.

Table 3. Annual Flight Operations for 144th Fighter Wing - 2012 Phase Out, F-16

Aircraft Type	Engine Model	Type of Operation (Flight Profile)	Baseline Total Number of Operations	Segment Length, feet	Height above AGL, ft	Power Setting	Modeled Power Setting	Average speed per segment, feet/sec	No. of Engines	Time in Mode, seconds	Time in Mode, hours	Total Time in Mode (TIM): Idle (hr)	Approach (hr)	Intermediate (hr)	Military (hr)	AB-5 (hr)
												Total TIM = TIM x #of Operations				
F-16C/D	F100-PW-220															
		Departures =	**1,477**						1							
		F1611LD6	309													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	95.2750				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					1.2205
		b-c		6000	1400	91	Military	464.145		12.9270	0.0036				1.1096	
		c-d		1500	1600	91	Military	506.340		2.9624	0.0008				0.2543	
		d-e		13500	2500	86	Intermediate	506.340		26.6619	0.0074			2.2885		
		e-f		5772	3000	86	Intermediate	506.340		11.3995	0.0032			0.9785		
		F1611LD8	54													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	16.6500				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.2133
		b-c		6000	1400	91	Military	464.145		12.9270	0.0036				0.1939	
		c-d		1500	1600	91	Military	506.340		2.9624	0.0008				0.0444	
		d-e		13500	2500	86	Intermediate	506.340		26.6619	0.0074			0.3999		
		e-3000		3428.571429	3000	86	Intermediate	506.340		6.7713	0.0019			0.1016		
		F1629LD1	12													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	3.7000				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.0474
		b-c		6240	1300	91	Military	464.145		13.4441	0.0037				0.0448	
		c-d		1760	1600	88	Military	506.340		3.4759	0.0010				0.0116	
		d-e		13000	2500	86	Intermediate	506.340		25.6744	0.0071			0.0856		
		e-3000		3428.571429	3000	86	Intermediate	506.340		6.7713	0.0019			0.0226		
		F1629LD2	5													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	1.5417				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.0197
		b-c		6240	1300	91	Military	464.145		13.4441	0.0037				0.0187	
		c-d		1760	1600	88	Military	506.34		3.4759	0.0010				0.0048	
		d-e		13000	2500	86	Intermediate	506.34		25.6744	0.0071			0.0357		
		e-3000		3428.571429	3000	86	Intermediate	506.34		6.7713	0.0019			0.0094		
		F1629RD8	911													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	280.8917				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					3.5984
		b-c		6000	1300	91	Military	464.145		12.9270	0.0036				3.2712	
		c-d		2000	1600	91	Military	506.34		3.9499	0.0011				0.9995	
		d-e		13000	2500	86	Intermediate	506.34		25.6744	0.0071			6.4971		
		e-3000		3428.571429	3000	86	Intermediate	506.34		6.7713	0.0019			1.7135		
		F1629RD9	186													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	57.3500				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.7347
		b-c		6000	1300	91	Military	464.145		12.9270	0.0036				0.6679	
		c-d		2000	1600	88	Military	506.34		3.9499	0.0011				0.2041	
		d-e		13000	2500	86	Intermediate	506.34		25.6744	0.0071			1.3265		
		e-3000		3428.571429	3000	86	Intermediate	506.34		6.7713	0.0019			0.3498		
		Arrivals =	**1,476**													
		F1611LA1OH	199													
	Segment	a-b		30000	3000	85	Approach	506.340		59.2487	0.0165		3.2751			
		b-c		12000	2000	85	Approach	506.340		23.6995	0.0066		1.3101			
		c-d		26000	2000	80	Approach	430.389		60.4105	0.0168		3.3394			
		d-e		12000	2000	80	Approach	345.999		34.6822	0.0096		1.9172			
		e-f		14000	2000	80	Approach	295.365		47.3990	0.0132		2.6201			
		f-g		6000	300	80	Approach	248.951		24.1012	0.0067		1.3323			
		Taxi In					**Idle**	Idle			0.1883	37.4783				
		F1611LA2	98													
	Segment	a-b		15760	3000	88	Approach	430.389		36.6180	0.0102		0.9968			
		b-c		15000	2200	88	Approach	354.438		42.3205	0.0118		1.1521			
		c-d		12000	1500	85	Approach	329.121		36.4608	0.0101		0.9925			
		d-e		12000	1000	80	Approach	278.487		43.0900	0.0120		1.1730			
		e-f		6000	300	80	Approach	244.731		24.5167	0.0068		0.6674			
		Taxi In					**Idle**	Idle			0.1883	18.4567				
		F1611A4BF	9													
	Segment	b-c		26000	3000	88	Approach	421.950		61.6187	0.0171		0.1540			
		c-d		9000	2500	87	Approach	337.560		26.6619	0.0074		0.0667			
		d-e		9000	2500	87	Approach	295.365		30.4708	0.0085		0.0762			
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.0603			
		Taxi In					**Idle**	Idle			0.1883	1.6950				
		F1611LA4HF	10													
	Segment	3000-e		3375	3000	75	Approach	284.816		11.8497	0.0033		0.0329			
		e-f		6000	300	75	Approach	253.170		23.6995	0.0066		0.0658			
		Taxi In					**Idle**	Idle			0.1883	1.8833				
		F1611LA4LF	9													
	Segment	3000-e		6567.567568	3000	75	Approach	290.119		22.6375	0.0063		0.0566			
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.0603			
		Taxi In					**Idle**	Idle			0.1883	1.6950				
		F1629RA1BF	28													
	Segment	b-c		26000	3000	88	Approach	421.950		61.6187	0.0171		0.4793			
		c-d		9000	2500	87	Approach	337.560		26.6619	0.0074		0.2074			
		d-e		9000	2500	87	Approach	295.365		30.4708	0.0085		0.2370			
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.1875			
		Taxi In					**Idle**	Idle			0.1883	5.2733				
		F1629RA1HF	29													
	Segment	3000-e		3375	3000	75	Approach	284.816		11.8497	0.0033		0.0955			
		e-f		6000	300	75	Approach	248.951		24.1012	0.0067		0.1941			
		Taxi In					**Idle**	Idle			0.1883	5.4617				
		F1629RA1LF	28													
	Segment	3000-e		6567.567568	3000	75	Approach	290.119		22.6375	0.0063		0.1761			
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.1875			
		Taxi In					**Idle**	Idle			0.1883	5.2733				
		F1629RA2	219													
	Segment	3000-d		3612	3000	86	Approach	445.5792		8.1063	0.0023		0.4931			
		d-e		12180	2700	85	Approach	354.438		34.3643	0.0095		2.0905			
		e-f		6500	2100	85	Approach	354.438		18.3389	0.0051		1.1156			
		f-g		5620	1800	85	Approach	329.121		17.0758	0.0047		1.0388			
		g-h		12380	1500	85	Approach	303.804		40.7500	0.0113		2.4790			
		h-i		11924	900	80	Approach	278.487		42.8171	0.0119		2.6047			
		i-j		6076	300	80	Approach	244.731		24.8273	0.0069		1.5103			
		Taxi In					**Idle**	Idle			0.1883	41.2450				
		F1629RA5OH	847													
	Segment	e-f		6076	3000	85	Approach	506.34		11.9998	0.0033		2.8233			
		f-g		6076	2500	85	Approach	430.389		14.1175	0.0039		3.3215			
		g-h		23856	2000	80	Approach	354.438		67.3066	0.0187		15.8357			
		h-i		13512	2000	80	Approach	345.999		39.0521	0.0108		9.1881			
		i-j		12760	2000	80	Approach	295.365		43.2008	0.0120		10.1642			
		j-k		6100	500	80	Approach	248.9505		24.5029	0.0068		5.7650			
		Taxi In					**Idle**	Idle			0.1883	159.5183				
		Closed Pattern Ops =	**189**													
		F1611LCP1	47													
	Segment	a-b		3,000	50	83	Military	299.585		10.0139	0.0028				0.1307	
		b-c		6,000	100	94	Military	430.389		13.9409	0.0039				0.1820	
		c-d		11,000	1,100	94	Intermediate	464.145		23.6995	0.0066			0.3094		
		d-e		12,000	2,000	87	Approach	388.194		30.9124	0.0086		0.4036			
		e-f		10,850	2,000	87	Approach	303.804		35.7138	0.0099		0.4663			
		f-g		6,000	300	87	Approach	248.951		24.1012	0.0067		0.3147			
		F1629LCP1	142													
	Segment	a-b		3,000	50	83	Military	299.585		10.0139	0.0028				0.3950	
		b-c		6,000	100	94	Military	430.389		13.9409	0.0039				0.5499	
		c-d		11,000	1,100	94	Intermediate	464.145		23.6995	0.0066			0.9348		
		d-e		12,000	2,000	87	Approach	388.194		30.9124	0.0086		1.2193			
		e-f		10,850	2,000	87	Approach	303.804		35.7138	0.0099		1.4087			
		f-g		6,000	300	87	Approach	248.951		24.1012	0.0067		0.9507			
		Total F-16 =	**3,142**									**733.3883 hrs in Idle**	**84.3058 hrs in Approach**	**15.0528 hrs in Intermediate**	**8.0825 hrs in Military**	**5.8340 hrs in AB-5**

Mode	Totsl TIM (hr)	Fuel Flow Rate, lbs/hr	Emission Indices, lbs/1000 lbs fuel: CO	NOx	VOC	SOx	PM10	Total Emissions, lbs/year: CO	NOx	VOC	SOx	PM10
Idle	733.4	1,084	35.30	4.61	7.94	1.20	2.06	28063.25	3664.92	6312.24	953.99	1637.69
Approach	84.3	3,837	1.92	12.53	5.12	1.20	2.63	621.08	4053.22	1656.23	388.18	850.76
Intermediate	15.1	5,770	0.86	22.18	2.89	1.20	2.06	74.70	1926.44	251.01	104.23	178.92
Military	8.1	9,679	0.86	29.32	1.79	1.20	1.33	67.28	2293.71	140.03	93.88	104.05
AB-5	5.8	41,682	11.99	8.37	1.53	1.20	1.15	2915.65	2035.36	372.06	291.91	279.65

Total Aircraft Emissions

	CO	NOx	VOC	SOx	PM10
Total Emissions (lbs/yr) =	**31741.96**	**13973.66**	**8731.57**	**1832.08**	**3051.06**
Total Emissions (tons/yr) =	**15.87**	**6.99**	**4.37**	**0.92**	**1.53**

Total fuel transferred, lbs	**1526733.3**
Total fuel transferred, gal	**226848.1212**
Refueling emissions, lbs/year	**9.277863148**

Table 4. Annual Flight Operations for 144th Fighter Wing - Preferred Alternative, Fresno

Aircraft Type	Engine Model	Type of Operation (Flight Profile)	Baseline Total Number of Operations	Segment Length, feet	Height above AGL, ft	Power Setting	Modeled Power Setting	Average speed per segment, feet/sec	No. of Engines	Time in Mode, seconds	Time in Mode, hours	Total Time in Mode (TIM): Idle (hr)	Approach (hr)	Intermediate (hr)	Military (hr)	AB-5 (hr)
											Total TIM = TIM x #of Operations					
F-15	F100-PW-220															
		Departures =	**2,198**						2							
		F1511LD6	460													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	141.8333				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					1.8170
		b-c		6000	1400	91	Military	464.145		12.9270	0.0036				1.6518	
		c-d		1500	1600	91	Military	506.340		2.9624	0.0008				0.3785	
		d-e		13500	2500	86	Intermediate	506.340		26.6619	0.0074			3.4068		
		e-f		5772	3000	86	Intermediate	506.340		11.3995	0.0032			1.4566		
		F1511LD8	81													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	24.9750				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.3199
		b-c		6000	1400	91	Military	464.145		12.9270	0.0036				0.2909	
		c-d		1500	1600	91	Military	506.340		2.9624	0.0008				0.0667	
		d-e		13500	2500	86	Intermediate	506.340		26.6619	0.0074			0.5999		
		e-3000		3428.571429	3000	86	Intermediate	506.340		6.7713	0.0019			0.1524		
		F1529LD1	18													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	5.5500				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.0711
		b-c		6240	1300	91	Military	464.145		13.4441	0.0037				0.0672	
		c-d		1760	1600	88	Military	506.340		3.4759	0.0010				0.0174	
		d-e		13000	2500	86	Intermediate	506.340		25.6744	0.0071			0.1284		
		e-3000		3428.571429	3000	86	Intermediate	506.340		6.7713	0.0019			0.0339		
		F1529LD2	7													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	2.1583				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.0276
		b-c		6240	1300	91	Military	464.145		13.4441	0.0037				0.0261	
		c-d		1760	1600	88	Military	506.34		3.4759	0.0010				0.0068	
		d-e		13000	2500	86	Intermediate	506.34		25.6744	0.0071			0.0499		
		e-3000		3428.571429	3000	86	Intermediate	506.34		6.7713	0.0019			0.0132		
		F1529RD8	1,355													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	417.7917				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					5.3521
		b-c		6000	1300	91	Military	464.145		12.9270	0.0036				4.8656	
		c-d		2000	1600	91	Military	506.34		3.9499	0.0011				1.4867	
		d-e		13000	2500	86	Intermediate	506.34		25.6744	0.0071			9.6636		
		e-3000		3428.571429	3000	86	Intermediate	506.34		6.7713	0.0019			2.5486		
		F1529RD9	277													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	85.4083				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					1.0941
		b-c		6000	1300	91	Military	464.145		12.9270	0.0036				0.9947	
		c-d		2000	1600	88	Military	506.34		3.9499	0.0011				0.3039	
		d-e		13000	2500	86	Intermediate	506.34		25.6744	0.0071			1.9755		
		e-3000		3428.571429	3000	86	Intermediate	506.34		6.7713	0.0019			0.5210		
		Arrivals =	**2,198**													
		F1511LA1OH	327													
	Segment	a-b		30000	3000	85	Approach	506.340		59.2487	0.0165		5.3818			
		b-c		12000	2000	85	Approach	506.340		23.6995	0.0066		2.1527			
		c-d		26000	2000	80	Approach	430.389		60.4105	0.0168		5.4873			
		d-e		12000	2000	80	Approach	345.999		34.6822	0.0096		3.1503			
		e-f		14000	2000	80	Approach	295.365		47.3990	0.0132		4.3054			
		f-g		6000	300	80	Approach	248.951		24.1012	0.0067		2.1892			
		Taxi In					**Idle**	Idle			0.1883	61.5850				
		F1511LA2	157													
	Segment	a-b		15760	3000	88	Approach	430.389		36.6180	0.0102		1.5970			
		b-c		15000	2200	88	Approach	354.438		42.3205	0.0118		1.8456			
		c-d		12000	1500	85	Approach	329.121		36.4608	0.0101		1.5901			
		d-e		12000	1000	80	Approach	278.487		43.0900	0.0120		1.8792			
		e-f		6000	300	80	Approach	244.731		24.5167	0.0068		1.0692			
		Taxi In					**Idle**	Idle			0.1883	29.5683				
		F1511LA4BF	0													
	Segment	b-c		26000	3000	88	Approach	421.950		61.6187	0.0171		0.0000			
		c-d		9000	2500	87	Approach	337.560		26.6619	0.0074		0.0000			
		d-e		9000	2500	87	Approach	295.365		30.4708	0.0085		0.0000			
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.0000			
		Taxi In					**Idle**	Idle			0.1883	0.0000				
		F1511LA4HF	0													
	Segment	3000-e		3375	3000	75	Approach	284.816		11.8497	0.0033		0.0000			
		e-f		6000	300	75	Approach	253.170		23.6995	0.0066		0.0000			
		Taxi In					**Idle**	Idle			0.1883	0.0000				
		F1511LA4LF	0													
	Segment	3000-e		6567.567568	3000	75	Approach	290.119		22.6375	0.0063		0.0000			
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.0000			
		Taxi In					**Idle**	Idle			0.1883	0.0000				
		F1529RA1BF	0													
	Segment	b-c		26000	3000	88	Approach	421.950		61.6187	0.0171		0.0000			
		c-d		9000	2500	87	Approach	337.560		26.6619	0.0074		0.0000			
		d-e		9000	2500	87	Approach	295.365		30.4708	0.0085		0.0000			
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.0000			
		Taxi In					**Idle**	Idle			0.1883	0.0000				
		F1529RA1HF	0													
	Segment	3000-e		3375	3000	75	Approach	284.816		11.8497	0.0033		0.0000			
		e-f		6000	300	75	Approach	248.951		24.1012	0.0067		0.0000			
		Taxi In					**Idle**	Idle			0.1883	0.0000				
		F1529RA1LF	0													
	Segment	3000-e		6567.567568	3000	75	Approach	290.119		22.6375	0.0063		0.0000			
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.0000			
		Taxi In					**Idle**	Idle			0.1883	0.0000				
		F1529RA2	352													
	Segment	3000-d		3612	3000	86	Approach	445.5792		8.1063	0.0023		0.7926			
		d-e		12180	2700	85	Approach	354.438		34.3643	0.0095		3.3601			
		e-f		6500	2100	85	Approach	354.438		18.3389	0.0051		1.7931			
		f-g		5620	1800	85	Approach	329.121		17.0758	0.0047		1.6696			
		g-h		12380	1500	85	Approach	303.804		40.7500	0.0113		3.9844			
		h-i		11924	900	80	Approach	278.487		42.8171	0.0119		4.1866			
		i-j		6076	300	80	Approach	244.731		24.8273	0.0069		2.4276			
		Taxi In					**Idle**	Idle			0.1883	66.2933				
		F1529RA5OH	1,362													
	Segment	e-f		6076	3000	85	Approach	506.34		11.9998	0.0033		4.5399			
		f-g		6076	2500	85	Approach	430.389		14.1175	0.0039		5.3411			
		g-h		24608	2000	80	Approach	354.438		69.4282	0.0193		26.2670			
		h-i		12760	2000	80	Approach	345.999		36.8787	0.0102		13.9524			
		i-j		12760	2000	80	Approach	295.365		43.2008	0.0120		16.3443			
		j-k		6100	500	80	Approach	248.9505		24.5029	0.0068		9.2702			
		Taxi In					**Idle**	Idle			0.1883	256.5100				
		Closed Pattern Ops =	**281**													
		F1511LCP1	70													
	Segment	a-b		3,000	50	83	Military	299.585		10.0139	0.0028				0.1947	
		b-c		6,000	100	94	Military	430.389		13.9409	0.0039				0.2711	
		c-d		11,000	1,100	94	Intermediate	464.145		23.6995	0.0066			0.4608		
		d-e		12,000	2,000	87	Approach	388.194		30.9124	0.0086		0.6011			
		e-f		10,850	2,000	87	Approach	303.804		35.7138	0.0099		0.6944			
		f-g		6,000	300	87	Approach	248.951		24.1012	0.0067		0.4686			
		F1529LCP1	211													
	Segment	a-b		3,000	50	83	Military	299.585		10.0139	0.0028				0.5869	
		b-c		6,000	100	94	Military	430.389		13.9409	0.0039				0.8171	
		c-d		11,000	1,100	94	Intermediate	464.145		23.6995	0.0066			1.3891		
		d-e		12,000	2,000	87	Approach	388.194		30.9124	0.0086		1.8118			
		e-f		10,850	2,000	87	Approach	303.804		35.7138	0.0099		2.0932			
		f-g		6,000	300	87	Approach	248.951		24.1012	0.0067		1.4126			
		Total F-16 =	**4,677**									**1091.6733 hrs in Idle**	**131.6586 hrs in Approach**	**22.3996 hrs in Intermediate**	**12.0260 hrs in Military**	**8.6819 hrs in AB-5**

Mode Variables			Emission Indices, lbs/1000 lbs fuel					Total Emissions, lbs/year				
Mode	Totsl TIM (hr)	Fuel Flow Rate, lbs/hr	CO	NOx	VOC	SOx	PM10	CO	NOx	VOC	SOx	PM10
Idle	1091.7	1,084	35.30	4.61	7.94	1.20	2.06	83546.20	10910.71	18791.98	2840.10	4875.50
Approach	131.7	3,837	1.92	12.53	5.12	1.20	2.63	1939.87	12659.66	5172.98	1212.42	2657.21
Intermediate	22.4	5,770	0.86	22.18	2.89	1.20	2.06	222.30	5733.33	747.04	310.19	532.49
Military	12.0	9,679	0.86	29.32	1.79	1.20	1.33	200.21	6825.67	416.71	279.36	309.62
AB-5	8.7	41,682	11.99	8.37	1.53	1.20	1.15	8677.87	6057.86	1107.35	868.51	832.32

Total Aircraft Emissions

Total Emissions (lbs/yr) =	**94586.45**	**42187.23**	**26236.06**	**5510.57**	**9207.15**
Total Emissions (tons/yr) =	**47.29**	**21.09**	**13.12**	**2.76**	**4.60**

Total fuel transferred, lbs	**3479446.351**
Total fuel transferred, gal	**514710.9987**
Refueling emissions, lbs/year	**21.14437871**

Table 5. Annual Flight Operations for 144th Fighter Wing - Preferred Alternative, March ARB

Aircraft Type	Engine Model	Type of Operation	Baseline Total Number of Operations	Segment Length, feet	Height above AGL, ft	Power Setting	Modeled Power Setting	Speed, kts	No. of Engines	Time in Mode, hours	Total Time In Mode (TIM) Total TIM = TIM x #of Operations: Idle (hr)	Approach (hr)	Intermediate (hr)	Military (hr)	AB-5 (hr)
F-15	F100-PW-220														
		Departures =	**438**						**2**						
		F15DA	22												
		Taxi Out					**Idle**	Idle		0.3083	6.7833				
	Segment	a-b		3000	0	90	AB-5	135.024	22.2183	0.0062					0.1358
		b-c		7000	200	91	AB-5	388.194	18.0322	0.0050					0.1102
		c-d		18000	2900	90	Military	548.535	32.8147	0.0091				0.2005	
		d-3000		872.6708075	3000	90	Military	590.730	1.4773	0.0004				0.0090	
		F15DB	416												
		Taxi Out					**Idle**	Idle		0.3083	128.2667				
	Segment	a-b		3,000	0	90	AB-5	135.024	22.2183	0.0062					2.5674
		b-c		7,000	200	91	AB-5	388.194	18.0322	0.0050					2.0837
		c-d		18,000	2,900	90	Military	548.535	32.8147	0.0091				3.7919	
		d-3000		873	3,000	90	Military	590.730	1.4773	0.0004				0.1707	
		Arrivals =	448												
		F15AA	182												
	Segment	3000-c		16,473	3,000	76	Approach	506.340	32.5331	0.0090		1.6447			
		c-d		29,820	1,970	76	Approach	506.340	58.8932	0.0164		2.9774			
		d-e		8,372	1,965	76	Approach	455.706	18.3715	0.0051		0.9288			
		e-f		3,490	1,965	76	Approach	388.194	8.9904	0.0025		0.4545			
		f-g		3,429	1,965	85	Approach	354.438	9.6745	0.0027		0.4891			
		g-h		9,426	1,965	85	Approach	320.682	29.3936	0.0082		1.4860			
		h-i		6,000	300	82	Approach	286.926	20.9113	0.0058		1.0572			
		Taxi In					**Idle**	Idle		0.1883	34.2767				
		F15AB	257												
	Segment	3000-d		21,198	3,000	76	Approach	346.327	61.2080	0.0170		4.3696			
		d-e		14,414	2,065	80	Approach	303.804	47.4451	0.0132		3.3871			
		e-f		38,496	2,065	80	Approach	261.609	147.1509	0.0409		10.5049			
		Taxi In					**Idle**	Idle		0.1883	48.4017				
		F15AC	9												
	Segment	3000-c		32,268	3,000	76	Approach	348.090	92.6987	0.0257		0.2317			
		c-d		9,000	1,565	80	Approach	303.804	29.6244	0.0082		0.0741			
		d-e		33,000	1,565	80	Approach	261.609	126.1424	0.0350		0.3154			
		Taxi In					**Idle**	Idle		0.1883	1.6950				
		Closed Pattern Ops =	442												
		F15CA	89												
	Segment	a-b		1,000	50	75	Approach	248.951	4.0169	0.0011		0.0993			
		b-c		12,300	100	92	Military	299.585	41.0569	0.0114				1.0150	
		c-d		18,076	1,000	85	Military	379.755	47.5991	0.0132				1.1768	
		d-e		102,945	2,465	82	Intermediate	421.950	243.9744	0.0678			6.0316		
		e-f		36,179	2,465	85	Intermediate	379.755	95.2693	0.0265			2.3553		
		f-g		39,930	2,465	75	Approach	303.804	131.4334	0.0365		3.2493			
		g-h		38,442	2,065	75	Approach	253.170	151.8426	0.0422		3.7539			
		F15CB	353												
	Segment	a-b		1,000	50	75	Approach	253.170	3.9499	0.0011		0.3873			
		b-c		12,300	100	92	Military	303.804	40.4866	0.0112				3.9699	
		c-d		11,640	1,000	85	Military	379.755	30.6513	0.0085				3.0055	
		d-e		5,060	1,965	82	Intermediate	396.633	12.7574	0.0035			1.2509		
		e-f		13,000	1,965	85	Approach	337.560	38.5117	0.0107		3.7763			
		f-g		11,000	1,965	80	Approach	286.926	38.3374	0.0106		3.7592			
		g-h		6,591	300	80	Approach	253.170	26.0339	0.0072		2.5528			
											219.4233	**45.4985**	**9.6378**	**13.3394**	**4.8971**
											hrs in Idle	**hrs in Approac**	**hrs in Intermedia**	**hrs in Military**	**hrs in AB-5**
Total Aircraft Emissions															

Mode	Mode Variables: Totsl TIM (hr)	Fuel Flow Rate, lbs/hr	Emission Indices, lbs/1000 lbs fuel: CO	NOx	VOC	SOx	PM10	Total Emissions, lbs/year: CO	NOx	VOC	SOx	PM10
Idle	219.4	1,084	35.30	4.61	7.94	1.20	2.06	16792.56	2193.02	3777.14	570.85	979.96
Approach	45.5	3,837	1.92	12.53	5.12	1.20	2.63	670.38	4374.92	1787.68	418.99	918.28
Intermediate	9.6	5,770	0.86	22.18	2.89	1.20	2.06	95.65	2466.86	321.43	133.46	229.11
Military	13.3	9,679	0.86	29.32	1.79	1.20	1.33	222.07	7571.15	462.22	309.87	343.44
AB-5	4.9	41,682	11.99	8.37	1.53	1.20	1.15	4894.86	3417.01	624.62	489.89	469.48

Total Aircraft Emissions	**Total Emissions (lbs/yr) =**	**22675.52**	**20022.97**	**6973.08**	**1923.07**	**2940.28**
	Total Emissions (tons/yr) =	**11.34**	**10.01**	**3.49**	**0.96**	**1.47**

Total fuel transferred, l 1039133
Total fuel transferred, (153717.9
Refueling emissions, lt 6.314745

NOTES: Emission Indices from *Air Emissions Factor Guide to Air Force Mobile Sources* , Air Force Center for Engineering and the Environment, December 2003.
Flight Profiles from B. Wear, from noise analysis
Refueling emissions from total fuel used, calculation from *Air Emissions Inventory Guidance Document for Stationary Sources at Air Force Installations* , December 2003.

Table 6. Annual Flight Operations for 144th Fighter Wing - Preferred Alternative, Fresno, 2012 Phase In

Aircraft Type	Engine Model	Type of Operation (Flight Profile)	Baseline Total Number of Operations	Segment Length, feet	Height above AGL, ft	Power Setting	Modeled Power Setting	Average speed per segment, feet/sec	No. of Engines	Time in Mode, seconds	Time in Mode, hours	Total Time In Mode (TIM) Total TIM = TIM x #of Operations: Idle (hr)	Approach (hr)	Intermediate (hr)	Military (hr)	AB-5 (hr)
F-15	F100-PW-220															
		Departures =	**56**						**2**							
		F1511LD6	12													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	3.7000				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.0474
		b-c		6000	1400	91	Military	464.145		12.9270	0.0036				0.0431	
		c-d		1500	1600	91	Military	506.340		2.9624	0.0008				0.0099	
		d-e		13500	2500	86	Intermediate	506.340		26.6619	0.0074			0.0889		
		e-f		5772	3000	86	Intermediate	506.340		11.3995	0.0032			0.0380		
		F1511LD8	2													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	0.6167				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.0079
		b-c		6000	1400	91	Military	464.145		12.9270	0.0036				0.0072	
		c-d		1500	1600	91	Military	506.340		2.9624	0.0008				0.0016	
		d-e		13500	2500	86	Intermediate	506.340		26.6619	0.0074			0.0148		
		e-3000		3428.571429	3000	86	Intermediate	506.340		6.7713	0.0019			0.0038		
		F1529LD1	0													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	0.0000				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.0000
		b-c		6240	1300	91	Military	464.145		13.4441	0.0037				0.0000	
		c-d		1760	1600	88	Military	506.340		3.4759	0.0010				0.0000	
		d-e		13000	2500	86	Intermediate	506.340		25.6744	0.0071			0.0000		
		e-3000		3428.571429	3000	86	Intermediate	506.340		6.7713	0.0019			0.0000		
		F1529LD2	0													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	0.0000				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.0000
		b-c		6240	1300	91	Military	464.145		13.4441	0.0037				0.0000	
		c-d		1760	1600	88	Military	506.34		3.4759	0.0010				0.0000	
		d-e		13000	2500	86	Intermediate	506.34		25.6744	0.0071			0.0000		
		e-3000		3428.571429	3000	86	Intermediate	506.34		6.7713	0.0019			0.0000		
		F1529RD8	35													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	10.7917				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.1382
		b-c		6000	1300	91	Military	464.145		12.9270	0.0036				0.1257	
		c-d		2000	1600	91	Military	506.34		3.9499	0.0011				0.0384	
		d-e		13000	2500	86	Intermediate	506.34		25.6744	0.0071			0.2496		
		e-3000		3428.571429	3000	86	Intermediate	506.34		6.7713	0.0019			0.0658		
		F1529RD9	7													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	2.1583				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.0276
		b-c		6000	1300	91	Military	464.145		12.9270	0.0036				0.0251	
		c-d		2000	1600	88	Military	506.34		3.9499	0.0011				0.0077	
		d-e		13000	2500	86	Intermediate	506.34		25.6744	0.0071			0.0499		
		e-3000		3428.571429	3000	86	Intermediate	506.34		6.7713	0.0019			0.0132		
		Arrivals =	**56**													
		F1511LA1OH	8													
	Segment	a-b		30000	3000	85	Approach	506.340		59.2487	0.0165		0.1317			
		b-c		12000	2000	85	Approach	506.340		23.6995	0.0066		0.0527			
		c-d		26000	2000	80	Approach	430.389		60.4105	0.0168		0.1342			
		d-e		12000	2000	80	Approach	345.999		34.6822	0.0096		0.0771			
		e-f		14000	2000	80	Approach	295.365		47.3990	0.0132		0.1053			
		f-g		6000	300	80	Approach	248.951		24.1012	0.0067		0.0536			
		Taxi In					**Idle**	Idle			0.1883	1.5067				
		F1511LA2	4													
	Segment	a-b		15760	3000	88	Approach	430.389		36.6180	0.0102		0.0407			
		b-c		15000	2200	88	Approach	354.438		42.3205	0.0118		0.0470			
		c-d		12000	1500	85	Approach	329.121		36.4608	0.0101		0.0405			
		d-e		12000	1000	80	Approach	278.487		43.0900	0.0120		0.0479			
		e-f		6000	300	80	Approach	244.731		24.5167	0.0068		0.0272			
		Taxi In					**Idle**	Idle			0.1883	0.7533				
		F1511LA4BF	0													
	Segment	b-c		26000	3000	88	Approach	421.950		61.6187	0.0171		0.0000			
		c-d		9000	2500	87	Approach	337.560		26.6619	0.0074		0.0000			
		d-e		9000	2500	87	Approach	295.365		30.4708	0.0085		0.0000			
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.0000			
		Taxi In					**Idle**	Idle			0.1883	0.0000				
		F1511LA4HF	0													
	Segment	3000-e		3375	3000	75	Approach	284.816		11.8497	0.0033		0.0000			
		e-f		6000	300	75	Approach	253.170		23.6995	0.0066		0.0000			
		Taxi In					**Idle**	Idle			0.1883	0.0000				
		F1511LA4LF	0													
	Segment	3000-e		6567.567568	3000	75	Approach	290.119		22.6375	0.0063		0.0000			
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.0000			
		Taxi In					**Idle**	Idle			0.1883	0.0000				
		F1529RA1BF	0													
	Segment	b-c		26000	3000	88	Approach	421.950		61.6187	0.0171		0.0000			
		c-d		9000	2500	87	Approach	337.560		26.6619	0.0074		0.0000			
		d-e		9000	2500	87	Approach	295.365		30.4708	0.0085		0.0000			
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.0000			
		Taxi In					**Idle**	Idle			0.1883	0.0000				
		F1529RA1HF	0													
	Segment	3000-e		3375	3000	75	Approach	284.816		11.8497	0.0033		0.0000			
		e-f		6000	300	75	Approach	248.951		24.1012	0.0067		0.0000			
		Taxi In					**Idle**	Idle			0.1883	0.0000				
		F1529RA1LF	0													
	Segment	3000-e		6567.567568	3000	75	Approach	290.119		22.6375	0.0063		0.0000			
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.0000			
		Taxi In					**Idle**	Idle			0.1883	0.0000				
		F1529RA2	9													
	Segment	3000-d		3612	3000	86	Approach	445.5792		8.1063	0.0023		0.0203			
		d-e		12180	2700	85	Approach	354.438		34.3643	0.0095		0.0859			
		e-f		6500	2100	85	Approach	354.438		18.3389	0.0051		0.0458			
		f-g		5620	1800	85	Approach	329.121		17.0758	0.0047		0.0427			
		g-h		12380	1500	85	Approach	303.804		40.7500	0.0113		0.1019			
		h-i		11924	900	80	Approach	278.487		42.8171	0.0119		0.1070			
		i-j		6076	300	80	Approach	244.731		24.8273	0.0069		0.0621			
		Taxi In					**Idle**	Idle			0.1883	1.6950				
		F1529RA5OH	35													
	Segment	e-f		6076	3000	85	Approach	506.34		11.9998	0.0033		0.1167			
		f-g		6076	2500	85	Approach	430.389		14.1175	0.0039		0.1373			
		g-h		24608	2000	80	Approach	354.438		69.4282	0.0193		0.6750			
		h-i		12760	2000	80	Approach	345.999		36.8787	0.0102		0.3585			
		i-j		12760	2000	80	Approach	295.365		43.2008	0.0120		0.4200			
		j-k		6100	500	80	Approach	248.9505		24.5029	0.0068		0.2382			
		Taxi In					**Idle**	Idle			0.1883	6.5917				
		Closed Pattern Ops =	**7**													
		F1511LCP1	2													
	Segment	a-b		3,000	50	83	Military	299.585		10.0139	0.0028				0.0056	
		b-c		6,000	100	94	Military	430.389		13.9409	0.0039				0.0077	
		c-d		11,000	1,100	94	Intermediate	464.145		23.6995	0.0066			0.0132		
		d-e		12,000	2,000	87	Approach	388.194		30.9124	0.0086		0.0172			
		e-f		10,850	2,000	87	Approach	303.804		35.7138	0.0099		0.0198			
		f-g		6,000	300	87	Approach	248.951		24.1012	0.0067		0.0134			
		F1529LCP1	5													
	Segment	a-b		3,000	50	83	Military	299.585		10.0139	0.0028				0.0139	
		b-c		6,000	100	94	Military	430.389		13.9409	0.0039				0.0194	
		c-d		11,000	1,100	94	Intermediate	464.145		23.6995	0.0066			0.0329		
		d-e		12,000	2,000	87	Approach	388.194		30.9124	0.0086		0.0429			
		e-f		10,850	2,000	87	Approach	303.804		35.7138	0.0099		0.0496			
		f-g		6,000	300	87	Approach	248.951		24.1012	0.0067		0.0335			
		Total F-16 =	**119**									**27.8133 hrs in Idle**	**3.3457 hrs in Approach**	**0.5701 hrs in Intermediate**	**0.3053 hrs in Military**	**0.2212 hrs in AB-5**

Mode Variables			Emission Indices, lbs/1000 lbs fuel					Total Emissions, lbs/year				
Mode	Totsl TIM (hr)	Fuel Flow Rate, lbs/hr	CO	NOx	VOC	SOx	PM10	CO	NOx	VOC	SOx	PM10
Idle	27.8	1,084	35.30	4.61	7.94	1.20	2.06	2128.57	277.98	478.78	72.36	124.22
Approach	3.3	3,837	1.92	12.53	5.12	1.20	2.63	49.30	321.70	131.45	30.81	67.52
Intermediate	0.6	5,770	0.86	22.18	2.89	1.20	2.06	5.66	145.91	19.01	7.89	13.55
Military	0.3	9,679	0.86	29.32	1.79	1.20	1.33	5.08	173.26	10.58	7.09	7.86
AB-5	0.2	41,682	11.99	8.37	1.53	1.20	1.15	221.09	154.34	28.21	22.13	21.21

Total Aircraft Emissions

Total Emissions (lbs/yr) =	**2409.69**	**1073.20**	**668.03**	**140.28**	**234.36**
Total Emissions (tons/yr) =	**1.20**	**0.54**	**0.33**	**0.07**	**0.12**

Total fuel transferred, lbs	**88600.47168**
Total fuel transferred, gal	**13106.57865**
Refueling emissions, lbs/year	**0.538419547**

Table 7. Annual Flight Operations for 144th Fighter Wing - Preferred Alternative, Fresno, 2013 Phase In

Aircraft Type	Engine Model	Type of Operation (Flight Profile)	Baseline Total Number of Operations	Segment Length, feet	Height above AGL, ft	Power Setting	Modeled Power Setting	Average speed per segment, feet/sec	No. of Engines	Time in Mode, seconds	Time in Mode, hours	Total Time In Mode (TIM) Total TIM = TIM x #of Operations: Idle (hr)	Approach (hr)	Intermediate (hr)	Military (hr)	AB-5 (hr)
F-15	F100-PW-220															
		Departures =	**1,185**						2							
		F1511LD6	248													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	76.4667				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.9796
		b-c		6000	1400	91	Military	464.145		12.9270	0.0036				0.8905	
		c-d		1500	1600	91	Military	506.340		2.9624	0.0008				0.2041	
		d-e		13500	2500	86	Intermediate	506.340		26.6619	0.0074			1.8367		
		e-f		5772	3000	86	Intermediate	506.340		11.3995	0.0032			0.7853		
		F1511LD8	44													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	13.5667				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.1738
		b-c		6000	1400	91	Military	464.145		12.9270	0.0036				0.1580	
		c-d		1500	1600	91	Military	506.340		2.9624	0.0008				0.0362	
		d-e		13500	2500	86	Intermediate	506.340		26.6619	0.0074			0.3259		
		e-3000		3428.571429	3000	86	Intermediate	506.340		6.7713	0.0019			0.0828		
		F1529LD1	10													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	3.0833				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.0395
		b-c		6240	1300	91	Military	464.145		13.4441	0.0037				0.0373	
		c-d		1760	1600	88	Military	506.340		3.4759	0.0010				0.0097	
		d-e		13000	2500	86	Intermediate	506.340		25.6744	0.0071			0.0713		
		e-3000		3428.571429	3000	86	Intermediate	506.340		6.7713	0.0019			0.0188		
		F1529LD2	4													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	1.2333				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.0158
		b-c		6240	1300	91	Military	464.145		13.4441	0.0037				0.0149	
		c-d		1760	1600	88	Military	506.34		3.4759	0.0010				0.0039	
		d-e		13000	2500	86	Intermediate	506.34		25.6744	0.0071			0.0285		
		e-3000		3428.571429	3000	86	Intermediate	506.34		6.7713	0.0019			0.0075		
		F1529RD8	730													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	225.0833				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					2.8834
		b-c		6000	1300	91	Military	464.145		12.9270	0.0036				2.6213	
		c-d		2000	1600	91	Military	506.34		3.9499	0.0011				0.8010	
		d-e		13000	2500	86	Intermediate	506.34		25.6744	0.0071			5.2062		
		e-3000		3428.571429	3000	86	Intermediate	506.34		6.7713	0.0019			1.3731		
		F1529RD9	149													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	45.9417				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.5885
		b-c		6000	1300	91	Military	464.145		12.9270	0.0036				0.5350	
		c-d		2000	1600	88	Military	506.34		3.9499	0.0011				0.1635	
		d-e		13000	2500	86	Intermediate	506.34		25.6744	0.0071			1.0626		
		e-3000		3428.571429	3000	86	Intermediate	506.34		6.7713	0.0019			0.2803		
		Arrivals =	**1,185**													
		F1511LA1OH	176													
	Segment	a-b		30000	3000	85	Approach	506.340		59.2487	0.0165		2.8966			
		b-c		12000	2000	85	Approach	506.340		23.6995	0.0066		1.1586			
		c-d		26000	2000	80	Approach	430.389		60.4105	0.0168		2.9534			
		d-e		12000	2000	80	Approach	345.999		34.6822	0.0096		1.6956			
		e-f		14000	2000	80	Approach	295.365		47.3990	0.0132		2.3173			
		f-g		6000	300	80	Approach	248.951		24.1012	0.0067		1.1783			
		Taxi In					**Idle**	Idle			0.1883	33.1467				
		F1511LA2	85													
	Segment	a-b		15760	3000	88	Approach	430.389		36.6180	0.0102		0.8646			
		b-c		15000	2200	88	Approach	354.438		42.3205	0.0118		0.9992			
		c-d		12000	1500	85	Approach	329.121		36.4608	0.0101		0.8609			
		d-e		12000	1000	80	Approach	278.487		43.0900	0.0120		1.0174			
		e-f		6000	300	80	Approach	244.731		24.5167	0.0068		0.5789			
		Taxi In					**Idle**	Idle			0.1883	16.0083				
		F1511LA4BF	0													
	Segment	b-c		26000	3000	88	Approach	421.950		61.6187	0.0171		0.0000			
		c-d		9000	2500	87	Approach	337.560		26.6619	0.0074		0.0000			
		d-e		9000	2500	87	Approach	295.365		30.4708	0.0085		0.0000			
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.0000			
		Taxi In					**Idle**	Idle			0.1883	0.0000				
		F1511LA4HF	0													
	Segment	3000-e		3375	3000	75	Approach	284.816		11.8497	0.0033		0.0000			
		e-f		6000	300	75	Approach	253.170		23.6995	0.0066		0.0000			
		Taxi In					**Idle**	Idle			0.1883	0.0000				
		F1511LA4LF	0													
	Segment	3000-e		6567.567568	3000	75	Approach	290.119		22.6375	0.0063		0.0000			
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.0000			
		Taxi In					**Idle**	Idle			0.1883	0.0000				
		F1529RA1BF	0													
	Segment	b-c		26000	3000	88	Approach	421.950		61.6187	0.0171		0.0000			
		c-d		9000	2500	87	Approach	337.560		26.6619	0.0074		0.0000			
		d-e		9000	2500	87	Approach	295.365		30.4708	0.0085		0.0000			
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.0000			
		Taxi In					**Idle**	Idle			0.1883	0.0000				
		F1529RA1HF	0													
	Segment	3000-e		3375	3000	75	Approach	284.816		11.8497	0.0033		0.0000			
		e-f		6000	300	75	Approach	248.951		24.1012	0.0067		0.0000			
		Taxi In					**Idle**	Idle			0.1883	0.0000				
		F1529RA1LF	0													
	Segment	3000-e		6567.567568	3000	75	Approach	290.119		22.6375	0.0063		0.0000			
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.0000			
		Taxi In					**Idle**	Idle			0.1883	0.0000				
		F1529RA2	190													
	Segment	3000-d		3612	3000	86	Approach	445.5792		8.1063	0.0023		0.4278			
		d-e		12180	2700	85	Approach	354.438		34.3643	0.0095		1.8137			
		e-f		6500	2100	85	Approach	354.438		18.3389	0.0051		0.9679			
		f-g		5620	1800	85	Approach	329.121		17.0758	0.0047		0.9012			
		g-h		12380	1500	85	Approach	303.804		40.7500	0.0113		2.1507			
		h-i		11924	900	80	Approach	278.487		42.8171	0.0119		2.2598			
		i-j		6076	300	80	Approach	244.731		24.8273	0.0069		1.3103			
		Taxi In					**Idle**	Idle			0.1883	35.7833				
		F1529RA5OH	734													
	Segment	e-f		6076	3000	85	Approach	506.34		11.9998	0.0033		2.4466			
		f-g		6076	2500	85	Approach	430.389		14.1175	0.0039		2.8784			
		g-h		24608	2000	80	Approach	354.438		69.4282	0.0193		14.1556			
		h-i		12760	2000	80	Approach	345.999		36.8787	0.0102		7.5192			
		i-j		12760	2000	80	Approach	295.365		43.2008	0.0120		8.8082			
		j-k		6100	500	80	Approach	248.9505		24.5029	0.0068		4.9959			
		Taxi In					**Idle**	Idle			0.1883	138.2367				
		Closed Pattern Ops =	**151**													
		F1511LCP1	38													
	Segment	a-b		3,000	50	83	Military	299.585		10.0139	0.0028				0.1057	
		b-c		6,000	100	94	Military	430.389		13.9409	0.0039				0.1472	
		c-d		11,000	1,100	94	Intermediate	464.145		23.6995	0.0066			0.2502		
		d-e		12,000	2,000	87	Approach	388.194		30.9124	0.0086		0.3263			
		e-f		10,850	2,000	87	Approach	303.804		35.7138	0.0099		0.3770			
		f-g		6,000	300	87	Approach	248.951		24.1012	0.0067		0.2544			
		F1529LCP1	113													
	Segment	a-b		3,000	50	83	Military	299.585		10.0139	0.0028				0.3143	
		b-c		6,000	100	94	Military	430.389		13.9409	0.0039				0.4376	
		c-d		11,000	1,100	94	Intermediate	464.145		23.6995	0.0066			0.7439		
		d-e		12,000	2,000	87	Approach	388.194		30.9124	0.0086		0.9703			
		e-f		10,850	2,000	87	Approach	303.804		35.7138	0.0099		1.1210			
		f-g		6,000	300	87	Approach	248.951		24.1012	0.0067		0.7565			
		Total F-16 =	**2,521**									**588.5500 hrs in Idle**	**70.9615 hrs in Approach**	**12.0730 hrs in Intermediate**	**6.4802 hrs in Military**	**4.6806 hrs in AB-5**

Mode Variables			Emission Indices, lbs/1000 lbs fuel					Total Emissions, lbs/year				
Mode	Totsl TIM (hr)	Fuel Flow Rate, lbs/hr	CO	NOx	VOC	SOx	PM10	CO	NOx	VOC	SOx	PM10
Idle	588.6	1,084	35.30	4.61	7.94	1.20	2.06	45041.97	5882.25	10131.25	1531.17	2628.51
Approach	71.0	3,837	1.92	12.53	5.12	1.20	2.63	1045.55	6823.32	2788.14	653.47	1432.19
Intermediate	12.1	5,770	0.86	22.18	2.89	1.20	2.06	119.82	3090.18	402.64	167.19	287.01
Military	6.5	9,679	0.86	29.32	1.79	1.20	1.33	107.88	3677.99	224.54	150.53	166.84
AB-5	4.7	41,682	11.99	8.37	1.53	1.20	1.15	4678.47	3265.95	597.00	468.24	448.73

Total Aircraft Emissions

	CO	NOx	VOC	SOx	PM10
Total Emissions (lbs/yr) =	**50993.69**	**22739.69**	**14143.58**	**2970.60**	**4963.27**
Total Emissions (tons/yr) =	**25.50**	**11.37**	**7.07**	**1.49**	**2.48**

Total fuel transferred, lbs	**1875737.54**
Total fuel transferred, gal	**277475.9675**
Refueling emissions, lbs/year	**11.39874017**

Table 8. Annual Flight Operations for 144th Fighter Wing - Alternative 2, Fresno

Aircraft Type	Engine Model	Type of Operation (Flight Profile)	Baseline Total Number of Operations	Segment Length, feet	Height above AGL, ft	Power Setting	Modeled Power Setting	Average speed per segment, feet/sec	No. of Engines	Time in Mode, seconds	Time in Mode, hours	Total Time in Mode (TIM) Total TIM = TIM x #of Operations: Idle (hr)	Approach (hr)	Intermediate (hr)	Military (hr)	AB-5 (hr)
F-15	F100-PW-220															
		Departures =	**2,856**						2							
		F1511LD6	598													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	184.3833				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					2.3620
		b-c		6000	1400	91	Military	464.145		12.9270	0.0036				2.1473	
		c-d		1500	1600	91	Military	506.340		2.9624	0.0008				0.4921	
		d-e		13500	2500	86	Intermediate	506.340		26.6619	0.0074			4.4288		
		e-f		5772	3000	86	Intermediate	506.340		11.3995	0.0032			1.8936		
		F1511LD8	105													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	32.3750				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.4147
		b-c		6000	1400	91	Military	464.145		12.9270	0.0036				0.3770	
		c-d		1500	1600	91	Military	506.340		2.9624	0.0008				0.0864	
		d-e		13500	2500	86	Intermediate	506.340		26.6619	0.0074			0.7776		
		e-3000		3428.571429	3000	86	Intermediate	506.340		6.7713	0.0019			0.1975		
		F1529LD1	23													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	7.0917				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.0908
		b-c		6240	1300	91	Military	464.145		13.4441	0.0037				0.0859	
		c-d		1760	1600	88	Military	506.340		3.4759	0.0010				0.0222	
		d-e		13000	2500	86	Intermediate	506.340		25.6744	0.0071			0.1640		
		e-3000		3428.571429	3000	86	Intermediate	506.340		6.7713	0.0019			0.0433		
		F1529LD2	9													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	2.7750				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					0.0355
		b-c		6240	1300	91	Military	464.145		13.4441	0.0037				0.0336	
		c-d		1760	1600	88	Military	506.34		3.4759	0.0010				0.0087	
		d-e		13000	2500	86	Intermediate	506.34		25.6744	0.0071			0.0642		
		e-3000		3428.571429	3000	86	Intermediate	506.34		6.7713	0.0019			0.0169		
		F1529RD8	1,761													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	542.9750				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					6.9558
		b-c		6000	1300	91	Military	464.145		12.9270	0.0036				6.3235	
		c-d		2000	1600	91	Military	506.34		3.9499	0.0011				1.9322	
		d-e		13000	2500	86	Intermediate	506.34		25.6744	0.0071			12.5591		
		e-3000		3428.571429	3000	86	Intermediate	506.34		6.7713	0.0019			3.3123		
		F1529RD9	360													
		Taxi Out		0	0	Idle	Idle	0.000			0.3083	111.0000				
	Segment	a-b		3000	0	90	AB-5	210.975		14.2197	0.0039					1.4220
		b-c		6000	1300	91	Military	464.145		12.9270	0.0036				1.2927	
		c-d		2000	1600	88	Military	506.34		3.9499	0.0011				0.3950	
		d-e		13000	2500	86	Intermediate	506.34		25.6744	0.0071			2.5674		
		e-3000		3428.571429	3000	86	Intermediate	506.34		6.7713	0.0019			0.6771		
		Arrivals =	**2,856**													
		F1511LA1OH	425													
	Segment	a-b		30000	3000	85	Approach	506.340		59.2487	0.0165		6.9946			
		b-c		12000	2000	85	Approach	506.340		23.6995	0.0066		2.7979			
		c-d		26000	2000	80	Approach	430.389		60.4105	0.0168		7.1318			
		d-e		12000	2000	80	Approach	345.999		34.6822	0.0096		4.0944			
		e-f		14000	2000	80	Approach	295.365		47.3990	0.0132		5.5957			
		f-g		6000	300	80	Approach	248.951		24.1012	0.0067		2.8453			
		Taxi In					**Idle**	Idle			0.1883	80.0417				
		F1511LA2	204													
	Segment	a-b		15760	3000	88	Approach	430.389		36.6180	0.0102		2.0750			
		b-c		15000	2200	88	Approach	354.438		42.3205	0.0118		2.3982			
		c-d		12000	1500	85	Approach	329.121		36.4608	0.0101		2.0661			
		d-e		12000	1000	80	Approach	278.487		43.0900	0.0120		2.4418			
		e-f		6000	300	80	Approach	244.731		24.5167	0.0068		1.3893			
		Taxi In					**Idle**	Idle			0.1883	38.4200				
		F1511LA4BF	0													
	Segment	b-c		26000	3000	88	Approach	421.950		61.6187	0.0171		0.0000			
		c-d		9000	2500	87	Approach	337.560		26.6619	0.0074		0.0000			
		d-e		9000	2500	87	Approach	295.365		30.4708	0.0085		0.0000			
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.0000			
		Taxi In					**Idle**	Idle			0.1883	0.0000				
		F1511LA4HF	0													
	Segment	3000-e		3375	3000	75	Approach	284.816		11.8497	0.0033		0.0000			
		e-f		6000	300	75	Approach	253.170		23.6995	0.0066		0.0000			
		Taxi In					**Idle**	Idle			0.1883	0.0000				
		F1511LA4LF	0													
	Segment	3000-e		6567.567568	3000	75	Approach	290.119		22.6375	0.0063		0.0000			
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.0000			
		Taxi In					**Idle**	Idle			0.1883	0.0000				
		F1529RA1BF	0													
	Segment	b-c		26000	3000	88	Approach	421.950		61.6187	0.0171		0.0000			
		c-d		9000	2500	87	Approach	337.560		26.6619	0.0074		0.0000			
		d-e		9000	2500	87	Approach	295.365		30.4708	0.0085		0.0000			
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.0000			
		Taxi In					**Idle**	Idle			0.1883	0.0000				
		F1529RA1HF	0													
	Segment	3000-e		3375	3000	75	Approach	284.816		11.8497	0.0033		0.0000			
		e-f		6000	300	75	Approach	248.951		24.1012	0.0067		0.0000			
		Taxi In					**Idle**	Idle			0.1883	0.0000				
		F1529RA1LF	0													
	Segment	3000-e		6567.567568	3000	75	Approach	290.119		22.6375	0.0063		0.0000			
		e-f		6000	300	87	Approach	248.951		24.1012	0.0067		0.0000			
		Taxi In					**Idle**	Idle			0.1883	0.0000				
		F1529RA2	457													
	Segment	3000-d		3612	3000	86	Approach	445.5792		8.1063	0.0023		1.0291			
		d-e		12180	2700	85	Approach	354.438		34.3643	0.0095		4.3624			
		e-f		6500	2100	85	Approach	354.438		18.3389	0.0051		2.3280			
		f-g		5620	1800	85	Approach	329.121		17.0758	0.0047		2.1677			
		g-h		12380	1500	85	Approach	303.804		40.7500	0.0113		5.1730			
		h-i		11924	900	80	Approach	278.487		42.8171	0.0119		5.4354			
		i-j		6076	300	80	Approach	244.731		24.8273	0.0069		3.1517			
		Taxi In					**Idle**	Idle			0.1883	86.0683				
		F1529RA5OH	1,770													
	Segment	e-f		6076	3000	85	Approach	506.34		11.9998	0.0033		5.8999			
		f-g		6076	2500	85	Approach	430.389		14.1175	0.0039		6.9411			
		g-h		24608	2000	80	Approach	354.438		69.4282	0.0193		34.1355			
		h-i		12760	2000	80	Approach	345.999		36.8787	0.0102		18.1320			
		i-j		12760	2000	80	Approach	295.365		43.2008	0.0120		21.2404			
		j-k		6100	500	80	Approach	248.9505		24.5029	0.0068		12.0472			
		Taxi In					**Idle**	Idle			0.1883	333.3500				
		Closed Pattern Ops =	**365**													
		F1511LCP1	91													
	Segment	a-b		3,000	50	83	Military	299.585		10.0139	0.0028				0.2531	
		b-c		6,000	100	94	Military	430.389		13.9409	0.0039				0.3524	
		c-d		11,000	1,100	94	Intermediate	464.145		23.6995	0.0066			0.5991		
		d-e		12,000	2,000	87	Approach	388.194		30.9124	0.0086		0.7814			
		e-f		10,850	2,000	87	Approach	303.804		35.7138	0.0099		0.9028			
		f-g		6,000	300	87	Approach	248.951		24.1012	0.0067		0.6092			
		F1529LCP1	274													
	Segment	a-b		3,000	50	83	Military	299.585		10.0139	0.0028				0.7622	
		b-c		6,000	100	94	Military	430.389		13.9409	0.0039				1.0611	
		c-d		11,000	1,100	94	Intermediate	464.145		23.6995	0.0066			1.8038		
		d-e		12,000	2,000	87	Approach	388.194		30.9124	0.0086		2.3528			
		e-f		10,850	2,000	87	Approach	303.804		35.7138	0.0099		2.7182			
		f-g		6,000	300	87	Approach	248.951		24.1012	0.0067		1.8344			
		Total F-16 =	**6,077**									**1418.4800 hrs in Idle**	**171.0722 hrs in Approach**	**29.1048 hrs in Intermediate**	**15.6253 hrs in Military**	**11.2810 hrs in AB-5**

Mode	Totsl TIM (hr)	Fuel Flow Rate, lbs/hr	Emission Indices, lbs/1000 lbs fuel: CO	NOx	VOC	SOx	PM10	Total Emissions, lbs/year: CO	NOx	VOC	SOx	PM10
Idle	1418.5	1,084	35.30	4.61	7.94	1.20	2.06	108556.84	14176.97	24417.60	3690.32	6335.05
Approach	171.1	3,837	1.92	12.53	5.12	1.20	2.63	2520.59	16449.48	6721.58	1575.37	3452.68
Intermediate	29.1	5,770	0.86	22.18	2.89	1.20	2.06	288.85	7449.58	970.66	403.04	691.89
Military	15.6	9,679	0.86	29.32	1.79	1.20	1.33	260.13	8868.56	541.43	362.97	402.29
AB-5	11.3	41,682	11.99	8.37	1.53	1.20	1.15	11275.70	7871.36	1438.85	1128.51	1081.49

Total Aircraft Emissions

	CO	NOx	VOC	SOx	PM10
Total Emissions (lbs/yr) =	**122902.11**	**54815.95**	**34090.12**	**7160.21**	**11963.40**
Total Emissions (tons/yr) =	**61.45**	**27.41**	**17.05**	**3.58**	**5.98**

Total fuel transferred, lbs	**4521053.274**
Total fuel transferred, gal	**666794.863**
Refueling emissions, lbs/year	**27.47415909**

Table 9. Annual Flight Operations for 144th Fighter Wing - Alternative 2, March ARB

Aircraft Type	Engine Model	Type of Operation	Baseline Total Number of Operations	Segment Length, feet	Height above AGL, ft	Power Setting	Modeled Power Setting	Speed, kts	No. of Engines	Time in Mode, hours	Total Time In Mode (TIM) Total TIM = TIM x #of Operations: Idle (hr)	Approach (hr)	Intermediate (hr)	Military (hr)	AB-5 (hr)
F-15	F100-PW-220														
		Departures =	**438**						**2**						
		F15DA	22												
		Taxi Out					**Idle**	Idle		0.3083	6.7833				
	Segment	a-b		3000	0	90	AB-5	135.024	22.2183	0.0062					0.1358
		b-c		7000	200	91	AB-5	388.194	18.0322	0.0050					0.1102
		c-d		18000	2900	90	Military	548.535	32.8147	0.0091				0.2005	
		d-3000		872.6708075	3000	90	Military	590.730	1.4773	0.0004				0.0090	
		F15DB	416												
		Taxi Out					**Idle**	Idle		0.3083	128.2667				
	Segment	a-b		3,000	0	90	AB-5	135.024	22.2183	0.0062					2.5674
		b-c		7,000	200	91	AB-5	388.194	18.0322	0.0050					2.0837
		c-d		18,000	2,900	90	Military	548.535	32.8147	0.0091				3.7919	
		d-3000		873	3,000	90	Military	590.730	1.4773	0.0004				0.1707	
		Arrivals =	448												
		F15AA	182												
	Segment	3000-c		16,473	3,000	76	Approach	506.340	32.5331	0.0090		1.6447			
		c-d		29,820	1,970	76	Approach	506.340	58.8932	0.0164		2.9774			
		d-e		8,372	1,965	76	Approach	455.706	18.3715	0.0051		0.9288			
		e-f		3,490	1,965	76	Approach	388.194	8.9904	0.0025		0.4545			
		f-g		3,429	1,965	85	Approach	354.438	9.6745	0.0027		0.4891			
		g-h		9,426	1,965	85	Approach	320.682	29.3936	0.0082		1.4860			
		h-i		6,000	300	82	Approach	286.926	20.9113	0.0058		1.0572			
		Taxi In					**Idle**	Idle		0.1883	34.2767				
		F15AB	257												
	Segment	3000-d		21,198	3,000	76	Approach	346.327	61.2080	0.0170		4.3696			
		d-e		14,414	2,065	80	Approach	303.804	47.4451	0.0132		3.3871			
		e-f		38,496	2,065	80	Approach	261.609	147.1509	0.0409		10.5049			
		Taxi In					**Idle**	Idle		0.1883	48.4017				
		F15AC	9												
	Segment	3000-c		32,268	3,000	76	Approach	348.090	92.6987	0.0257		0.2317			
		c-d		9,000	1,565	80	Approach	303.804	29.6244	0.0082		0.0741			
		d-e		33,000	1,565	80	Approach	261.609	126.1424	0.0350		0.3154			
		Taxi In					**Idle**	Idle		0.1883	1.6950				
		Closed Pattern Ops =	442												
		F15CA	89												
	Segment	a-b		1,000	50	75	Approach	248.951	4.0169	0.0011		0.0993			
		b-c		12,300	100	92	Military	299.585	41.0569	0.0114				1.0150	
		c-d		18,076	1,000	85	Military	379.755	47.5991	0.0132				1.1768	
		d-e		102,945	2,465	82	Intermediate	421.950	243.9744	0.0678			6.0316		
		e-f		36,179	2,465	85	Intermediate	379.755	95.2693	0.0265			2.3553		
		f-g		39,930	2,465	75	Approach	303.804	131.4334	0.0365		3.2493			
		g-h		38,442	2,065	75	Approach	253.170	151.8426	0.0422		3.7539			
		F15CB	353												
	Segment	a-b		1,000	50	75	Approach	253.170	3.9499	0.0011		0.3873			
		b-c		12,300	100	92	Military	303.804	40.4866	0.0112				3.9699	
		c-d		11,640	1,000	85	Military	379.755	30.6513	0.0085				3.0055	
		d-e		5,060	1,965	82	Intermediate	396.633	12.7574	0.0035			1.2509		
		e-f		13,000	1,965	85	Approach	337.560	38.5117	0.0107		3.7763			
		f-g		11,000	1,965	80	Approach	286.926	38.3374	0.0106		3.7592			
		g-h		6,591	300	80	Approach	253.170	26.0339	0.0072		2.5528			
											219.4233	**45.4985**	**9.6378**	**13.3394**	**4.8971**
											hrs in Idle	**hrs in Approac**	**hrs in Intermedia**	**hrs in Military**	**hrs in AB-5**
Total Aircraft Emissions															

Mode	Mode Variables: Totsl TIM (hr)	Fuel Flow Rate, lbs/hr	Emission Indices, lbs/1000 lbs fuel: CO	NOx	VOC	SOx	PM10	Total Emissions, lbs/year: CO	NOx	VOC	SOx	PM10
Idle	219.4	1,084	35.30	4.61	7.94	1.20	2.06	16792.56	2193.02	3777.14	570.85	979.96
Approach	45.5	3,837	1.92	12.53	5.12	1.20	2.63	670.38	4374.92	1787.68	418.99	918.28
Intermediate	9.6	5,770	0.86	22.18	2.89	1.20	2.06	95.65	2466.86	321.43	133.46	229.11
Military	13.3	9,679	0.86	29.32	1.79	1.20	1.33	222.07	7571.15	462.22	309.87	343.44
AB-5	4.9	41,682	11.99	8.37	1.53	1.20	1.15	4894.86	3417.01	624.62	489.89	469.48

Total Aircraft Emissions

Total Emissions (lbs/yr) =	**22675.52**	**20022.97**	**6973.08**	**1923.07**	**2940.28**
Total Emissions (tons/yr) =	**11.34**	**10.01**	**3.49**	**0.96**	**1.47**

Total fuel transferred, l 1039133
Total fuel transferred, (153717.9
Refueling emissions, lb 6.314745

NOTES: Emission Indices from *Air Emissions Factor Guide to Air Force Mobile Sources* , Air Force Center for Engineering and the Environment, December 2003.
Flight Profiles from B. Wear, from noise analysis
Refueling emissions from total fuel used, calculation from *Air Emissions Inventory Guidance Document for Stationary Sources at Air Force Installations* , December 2003.

Table 10. Annual Baseline Emissions from Engine Runups

Baseline Runup Emissions - F100-PW-220				Emission Indices, lbs/1000 lbs fuel					Emissions, lbs/year				
Total Minutes of Testing	Power Setting	Total TIM per setting, hours	Fuel Flow, lbs/hr	CO	NOx	VOC	SOx	PM	CO	NOx	VOC	SOx	PM
5280	Idle	88	1,084	35.30	4.61	7.94	1.20	2.06	3367.34	439.76	757.41	114.47	196.51
Total Aircraft Emissions								**Total Emissions (lbs/yr) =**	**3367.34**	**439.76**	**757.41**	**114.47**	**196.51**
								Total Emissions (tons/yr) =	**1.68**	**0.22**	**0.38**	**0.06**	**0.10**

Table 11. Annual Preferred Alternative (1) and Alternative 2 Emissions from Engine Runups

Runup Emissions - F100-PW-220				Emission Indices, lbs/1000 lbs fuel					Emissions, lbs/year				
Number of Engines Tested	Power Setting	Total TIM per setting, hours	Fuel Flow, lbs/hr	CO	NOx	VOC	SOx	PM	CO	NOx	VOC	SOx	PM
10560	Idle	176	1,084	35.30	4.61	7.94	1.20	2.06	6734.68	879.51	1514.82	228.94	393.02
Total Aircraft Emissions								**Total Emissions (lbs/yr) =**	**6734.68**	**879.51**	**1514.82**	**228.94**	**393.02**
								Total Emissions (tons/yr) =	**3.37**	**0.44**	**0.76**	**0.11**	**0.20**

NOTES: Emission Indices from *Air Emissions Factor Guide to Air Force Mobile Sources*, Air Force Center for Engineering and the Environment, December 2003
Number of engine tests assumed to be the same for baseline and proposed action. 34 uninstalled engine tests and 4 installed engine tests total.

Table 12. Annual Aerospace Ground Equipment Emissions - 144th Fighter Wing, Fresno-Yosemite International Airport

NOTE: Assumed that during combustion, all sulfur in the fuel reacts to form SOx or sulfates. Therefore, for JP-8 at 0.06wt%:

EF(SOx) = wt% x (1/100) x Fuel FLow x 7 lb/gal x 2 mol SOx/1mol S

Fuel Flow = hp x 7000 Btu/hp-hr x 1 gal/124000 Btu

Baseline AGE

							Emission Factors, lbs/hr						Total Annual Emissions (lbs/yr)					
AGE Type	Model	Operating Time/LTO, hrs	LTOs	Fuel Flow, gal/hr	hp	lbs/hp-hr	VOC	NOx	CO	SOx	PM10	PM2.5	CO	NOx	VOC	SOx	PM10	PM2.5
Generator	A/M32A-86D	0.33	2,198	6.47	N/A		0.2	7.97	1.52	0.05	0.091	0.088	1102.52	5780.96	145.07	39.42	66.01	63.83
Start Cart	A/M32A-60A	0.33	2,198	10.161	180		0.27	1.82	5.48	0.09	0.211	0.205	3974.86	1320.12	195.84	61.91	153.05	148.69
Heater/AC	H1	0.5	2,198	0.39	6.5		0.1	0.16	0.18	0.00	0.006	0.0058	197.82	175.84	109.90	3.60	6.59	6.37
Hydraulic Test Stand	MJ-2A	0.5	2,198	11.008	195		0.19	3.85	2.46	0.09	0.083	0.076	2703.54	4231.15	208.81	101.62	91.22	83.52
Light Cart	NF-2	1	2,198	1.016	18		0.01	0.11	0.08	0.01	0.01	0.0097	175.84	241.78	21.98	18.76	21.98	21.32
Air Compressor	MC-7	0.25	2,198	3.3	52		0.06	1.29	0.64	0.03	0.145	0.141	351.68	708.86	32.97	15.23	79.68	77.48
Bomb Lift	MJ-1B	1	2,198	1.637	29		3.04	4.78	3.04	0.01	0.8	0.776	6681.92	10506.44	6681.92	30.23	1758.40	1705.65
Total											**Total**		**15188.18**	**22965.14**	**7396.49**	**270.77**	**2176.92**	**2106.87**
Total, tpy											Total tpy		7.59	11.48	3.70	0.14	1.09	1.05

Preferred Alternative AGE

			Total Fuel Used				Emission Factors, lbs/hr						Total Annual Emissions (lbs/yr)					
AGE Type	Model	Operating Time/LTO, hrs	LTOs	Fuel Flow, gal/hr	hp	lbs/hp-hr	VOC	NOx	CO	SOx	PM10	PM2.5	CO	NOx	VOC	SOx	PM10	PM2.5
Generator	A/M32A-86D	0.33	2,198	6.47	N/A		0.2	7.97	1.52	0.05	0.091	0.088	1102.52	5780.96	145.07	39.42	66.01	63.83
Start Cart	A/M32A-60A	0.33	2,198	10.161	180		0.27	1.82	5.48	0.09	0.211	0.205	3974.86	1320.12	195.84	61.91	153.05	148.69
Heater/AC	H1	0.5	2,198	0.39	6.5		0.1	0.16	0.18	0.00	0.006	0.0058	197.82	175.84	109.90	3.60	6.59	6.37
Hydraulic Test Stand	MJ-2A	0.5	2,198	11.008	195		0.19	3.85	2.46	0.09	0.083	0.076	2703.54	4231.15	208.81	101.62	91.22	83.52
Light Cart	NF-2	1	2,198	1.016	18		0.01	0.11	0.08	0.01	0.01	0.0097	175.84	241.78	21.98	18.76	21.98	21.32
Air Compressor	MC-7	0.25	2,198	3.3	52		0.06	1.29	0.64	0.03	0.145	0.141	351.68	708.86	32.97	15.23	79.68	77.48
Bomb Lift	MJ-1B	1	2,198	1.637	29		3.04	4.78	3.04	0.01	0.8	0.776	6681.92	10506.44	6681.92	30.23	1758.40	1705.65
Total											**Total**		**15188.18**	**22965.14**	**7396.49**	**270.77**	**2176.92**	**2106.87**
Total, tpy											Total tpy		7.59	11.48	3.70	0.14	1.09	1.05

Assume AGE for Preferred Alternative is proportional to the number of flight operations

Alternative 2 AGE

			Total Fuel Used				Emission Factors, lbs/hr						Total Annual Emissions (lbs/yr)					
AGE Type	Model	Operating Time/LTO, hrs	LTOs	Fuel Flow, gal/hr	hp	lbs/hp-hr	VOC	NOx	CO	SOx	PM10	PM2.5	CO	NOx	VOC	SOx	PM10	PM2.5
Generator	A/M32A-86D	0.33	2,856	6.47	N/A		0.2	7.97	1.52	0.05	0.091	0.088	1432.57	7511.57	188.50	51.22	85.77	82.94
Start Cart	A/M32A-60A	0.33	2,856	10.161	180		0.27	1.82	5.48	0.09	0.211	0.205	5164.79	1715.31	254.47	80.45	198.86	193.21
Heater/AC	H1	0.5	2,856	0.39	6.5		0.1	0.16	0.18	0.00	0.006	0.0058	257.04	228.48	142.80	4.68	8.57	8.28
Hydraulic Test Stand	MJ-2A	0.5	2,856	11.008	195		0.19	3.85	2.46	0.09	0.083	0.076	3512.88	5497.80	271.32	132.04	118.52	108.53
Light Cart	NF-2	1	2,856	1.016	18		0.01	0.11	0.08	0.01	0.01	0.0097	228.48	314.16	28.56	24.38	28.56	27.70
Air Compressor	MC-7	0.25	2,856	3.3	52		0.06	1.29	0.64	0.03	0.145	0.141	456.96	921.06	42.84	19.79	103.53	100.67
Bomb Lift	MJ-1B	1	2,856	1.637	29		3.04	4.78	3.04	0.01	0.8	0.776	8682.24	13651.68	8682.24	39.27	2284.80	2216.26
Total											**Total**		**19734.96**	**29840.06**	**9610.73**	**351.83**	**2828.61**	**2737.59**
Total, tpy											Total tpy		9.87	14.92	4.81	0.18	1.41	1.37

Assume AGE for Alternative 2 is proportional to the number of flight operations

Table 13. Annual Aerospace Ground Equipment Emissions - 144th Fighter Wing, March Air Reserve Base

Baseline AGE

			Total Fuel Used				Emission Factors, lbs/hr						Total Annual Emissions (lbs/yr)					
AGE Type	Model	Operating Time/LTO, hrs	LTOs	Fuel Flow, gal/hr	hp	lbs/hp-hr	VOC	NOx	CO	SOx	PM10	PM2.5	CO	NOx	VOC	SOx	PM10	PM2.5
Generator	A/M32A-86D	0.33	437	6.47	N/A		0.2	7.97	1.52	0.05	0.091	0.088	219.20	1149.35	28.84	7.84	13.12	12.69
Start Cart	A/M32A-60A	0.33	437	10.161	180		0.27	1.82	5.48	0.09	0.211	0.205	790.27	262.46	38.94	12.31	30.43	29.56
Heater/AC	H1	0.5	437	0.39	6.5		0.1	0.16	0.18	0.00	0.006	0.0058	39.33	34.96	21.85	0.72	1.31	1.27
Hydraulic Test Stand	MJ-2A	0.5	437	11.008	195		0.19	3.85	2.46	0.09	0.083	0.076	537.51	841.23	41.52	20.20	18.14	16.61
Light Cart	NF-2	1	437	1.016	18		0.01	0.11	0.08	0.01	0.01	0.0097	34.96	48.07	4.37	3.73	4.37	4.24
Air Compressor	MC-7	0.25	437	3.3	52		0.06	1.29	0.64	0.03	0.145	0.141	69.92	140.93	6.56	3.03	15.84	15.40
Bomb Lift	MJ-1B	1	437	1.637	29		3.04	4.78	3.04	0.01	0.8	0.776	1328.48	2088.86	1328.48	6.01	349.60	339.11
Total											**Total**		**1048.80**	**1446.78**	**89.63**	**20.86**	**44.86**	**43.52**
Total, tpy											Total tpy		0.52	0.72	0.04	0.01	0.02	0.02

Preferred Alternative AGE

			Total Fuel Used				Emission Factors, lbs/hr						Total Annual Emissions (lbs/yr)					
AGE Type	Model	Operating Time/LTO, hrs	LTOs	Fuel Flow, gal/hr	hp	lbs/hp-hr	VOC	NOx	CO	SOx	PM10	PM2.5	CO	NOx	VOC	SOx	PM10	PM2.5
Generator	A/M32A-86D	0.33	437	6.47	N/A		0.2	7.97	1.52	0.05	0.091	0.088	219.20	1149.35	28.84	7.84	13.12	12.69
Start Cart	A/M32A-60A	0.33	437	10.161	180		0.27	1.82	5.48	0.09	0.211	0.205	790.27	262.46	38.94	12.31	30.43	29.56
Heater/AC	H1	0.5	437	0.39	6.5		0.1	0.16	0.18	0.00	0.006	0.0058	39.33	34.96	21.85	0.72	1.31	1.27
Hydraulic Test Stand	MJ-2A	0.5	437	11.008	195		0.19	3.85	2.46	0.09	0.083	0.076	537.51	841.23	41.52	20.20	18.14	16.61
Light Cart	NF-2	1	437	1.016	18		0.01	0.11	0.08	0.01	0.01	0.0097	34.96	48.07	4.37	3.73	4.37	4.24
Air Compressor	MC-7	0.25	437	3.3	52		0.06	1.29	0.64	0.03	0.145	0.141	69.92	140.93	6.56	3.03	15.84	15.40
Bomb Lift	MJ-1B	1	437	1.637	29		3.04	4.78	3.04	0.01	0.8	0.776	1328.48	2088.86	1328.48	6.01	349.60	339.11
Total											**Total**		**1048.80**	**1446.78**	**89.63**	**20.86**	**44.86**	**43.52**
Total, tpy											Total tpy		0.52	0.72	0.04	0.01	0.02	0.02

Alternative 2 AGE

			Total Fuel Used				Emission Factors, lbs/hr						Total Annual Emissions (lbs/yr)					
AGE Type	Model	Operating Time/LTO, hrs	LTOs	Fuel Flow, gal/hr	hp	lbs/hp-hr	VOC	NOx	CO	SOx	PM10	PM2.5	CO	NOx	VOC	SOx	PM10	PM2.5
Generator	A/M32A-86D	0.33	437	6.47	N/A		0.2	7.97	1.52	0.05	0.091	0.088	219.20	1149.35	28.84	7.84	13.12	12.69
Start Cart	A/M32A-60A	0.33	437	10.161	180		0.27	1.82	5.48	0.09	0.211	0.205	790.27	262.46	38.94	12.31	30.43	29.56
Heater/AC	H1	0.5	437	0.39	6.5		0.1	0.16	0.18	0.00	0.006	0.0058	39.33	34.96	21.85	0.72	1.31	1.27
Hydraulic Test Stand	MJ-2A	0.5	437	11.008	195		0.19	3.85	2.46	0.09	0.083	0.076	537.51	841.23	41.52	20.20	18.14	16.61
Light Cart	NF-2	1	437	1.016	18		0.01	0.11	0.08	0.01	0.01	0.0097	34.96	48.07	4.37	3.73	4.37	4.24
Air Compressor	MC-7	0.25	437	3.3	52		0.06	1.29	0.64	0.03	0.145	0.141	69.92	140.93	6.56	3.03	15.84	15.40
Bomb Lift	MJ-1B	1	437	1.637	29		3.04	4.78	3.04	0.01	0.8	0.776	1328.48	2088.86	1328.48	6.01	349.60	339.11
Total											**Total**		**1048.80**	**1446.78**	**89.63**	**20.86**	**44.86**	**43.52**
Total, tpy											Total tpy		0.52	0.72	0.04	0.01	0.02	0.02

Assume AGE for Alternative 2 is proportional to the number of flight operations

Table 14. Annual Ground Vehicle Baseline Emissions - 144th Fighter Wing, Fresno

Vehicle Category	Fraction of Trips	Personnel	VMT	CO		NO_x		VOCs						SO_2		PM10				PM2.5				CO2		CH4		N2O	
			(mi/year)	Running Exhaust (g/mi)	Start-Up (g/start)*	Running Exhaust (g/mi)	Start-Up (g/start)*	Running Exhaust (g/mi)	Start-Up (g/start)*	Hot-Soak (g/trip)	Resting Loss (g/hr)	Running Evaporative (g/mi)	Diurnal Evaporative (g/hr)	Running Exhaust (g/mi)	Start-Up (g/start)*	Running Exhaust (g/mi)	Start-Up (g/start)*	Tire Wear (g/mi)	Brake Wear (g/mi)	Running Exhaust (g/mi)	Start-Up (g/start)*	Tire Wear (g/mi)	Brake Wear (g/mi)	Running Exhaust (g/mi)	Start-Up (g/start)*	Running Exhaust (g/mi)	Start-Up (g/start)*	Running Exhaust (g/mi)	Start-Up (g/start)*
POVs (Daily Employees)		**327**	**Per trip: 0.2 on-base; 9.57 off base**																										
LDGV	0.8083	264	2582	2.072	8.006	0.184	0.414	0.058	0.694	0.232	0.035	0.039	0.084	0.003	0.002	0.011	0.015	0.008	0.013	0.011	0.014	0.002	0.005	338.923	163.505	0.021	0.04	0.01748	0.03933
LDGT12	0.1917	63	612	2.924	9.266	0.292	0.398	0.109	0.702	0.25	0.04	0.054	0.089	0.004	0.002	0.014	0.015	0.008	0.013	0.013	0.014	0.002	0.005	420.633	194.855	0.025	0.041	0.02774	0.03781
POVs (Weekend Employees)		**718**																						319.478	162.144	0.016	0.034	0	0
LDGV	0.8083	580	5670	2.072	8.006	0.184	0.414	0.058	0.694	0.232	0.035	0.039	0.084	0.003	0.002	0.011	0.015	0.008	0.013	0.011	0.014	0.002	0.005	338.923	163.505	0.021	0.04	0.01748	0.03933
LDGT12	0.1917	138	1345	2.924	9.266	0.292	0.398	0.109	0.702	0.25	0.04	0.054	0.089	0.004	0.002	0.014	0.015	0.008	0.013	0.013	0.014	0.002	0.005	420.633	194.855	0.025	0.041	0.02774	0.03781

Vehicle Category	Emissions, lbs/day									Emissions, tons/year								
	CO	NOx	VOCs	SOx	PM10	PM2.5	CO2	CH4	N2O	CO	NOx	VOCs	SOx	PM10	PM2.5	CO2	CH4	N2O
POVs (Daily Employees)																		
LDGV	11.83	1.05	0.34	0.02	0.18	0.10	1930.26	0.12	0.10	1.54	0.14	0.04	0.00	0.02	0.01	250.93	0.02	0.01
LDGT12	3.99	0.40	0.16	0.01	0.05	0.03	568.80	0.03	0.04	0.52	0.05	0.02	0.00	0.01	0.00	73.94	0.00	0.00
POVs (Weekend Employees)																		
LDGV	25.94	2.30	0.73	0.04	0.40	0.23	4237.44	0.26	0.22	1.35	0.12	0.04	0.00	0.02	0.01	220.35	0.01	0.01
LDGT12	8.71	0.87	0.33	0.01	0.10	0.06	1247.90	0.07	0.08	0.45	0.05	0.02	0.00	0.01	0.00	64.89	0.00	0.00
										3.86	**0.35**	**0.12**	**0.01**	**0.06**	**0.03**	**610.11**	**0.04**	**0.03**

NOTES: Emission factors from EMFAC2007 Model, Fresno County, 2012, average speed 30 mph from CalEEMod default.
Trip length assume 0.2 miles on base (from Inventory); 9.57 miles off base (from CalEEMod default, home-work commute).
Assume personal vehicles would include light-duty auto and light-duty truck trips only. Assume 80.83% LDA and 19.17% LDT based on EMFAC2007 Model, Fresno County, 2012
Assume startup after 8 hours, running time 45 minutes.

Table 15. Annual Ground Vehicle Baseline Emissions - 144th Fighter Wing, March ARB

Vehicle Category	Fraction of Trips	Personnel	VMT	CO		NO_x		VOCs						SO_2		PM10				PM2.5				CO2		CH4		N2O	
			(mi/year)	Running Exhaust (g/mi)	Start-Up (g/start)*	Running Exhaust (g/mi)	Start-Up (g/start)*	Running Exhaust (g/mi)	Start-Up (g/start)*	Hot-Soak (g/trip)	Resting Loss (g/hr)	Running Evaporative (g/mi)	Diurnal Evaporative (g/hr)	Running Exhaust (g/mi)	Start-Up (g/start)*	Running Exhaust (g/mi)	Start-Up (g/start)*	Tire Wear (g/mi)	Brake Wear (g/mi)	Running Exhaust (g/mi)	Start-Up (g/start)*	Tire Wear (g/mi)	Brake Wear (g/mi)	Running Exhaust (g/mi)	Start-Up (g/start)*	Running Exhaust (g/mi)	Start-Up (g/start)*	Running Exhaust (g/mi)	Start-Up (g/start)*
POVs (Daily Employees)		**1400**	**Per trip: 2 on-base; 9.57 off base**																										
LDGV	0.8267	1157	11308	1.891	7.358	0.167	0.374	0.047	0.591	0.179	0.029	0.029	0.066	0.003	0.002	0.012	0.016	0.008	0.013	0.011	0.015	0.002	0.005	337.885	162.08	0.019	0.034	0.015865	0.03553
LDGT12	0.1733	243	2370	2.574	8.407	0.27	0.376	0.086	0.596	0.192	0.031	0.038	0.066	0.004	0.002	0.015	0.017	0.008	0.013	0.014	0.016	0.002	0.005	420.302	192.959	0.023	0.034	0.02565	0.03572

Vehicle Category	Emissions, lbs/day									Emissions, tons/year								
	CO	NOx	VOCs	SOx	PM10	PM2.5	CO2	CH4	N2O	CO	NOx	VOCs	SOx	PM10		CO2	CH4	N2O
POVs (Daily Employees)																		
LDGV	47.17	4.16	1.18	0.07	0.82	0.45	8423.89	0.47	0.40	6.13	0.54	0.15	0.01	0.11	0.06	1095.11	0.06	0.05
LDGT12	13.49	1.41	0.46	0.02	0.19	0.11	2197.29	0.12	0.13	1.75	0.18	0.06	0.00	0.02	0.01	285.65	0.02	0.02
										7.89	**0.73**	**0.21**	**0.01**	**0.13**	**0.07**	**1380.75**	**0.08**	**0.07**

NOTES: Emission factors from EMFAC2007 Model, SCAB-Riverside County, 2012, average speed 30 mph from CalEEMod default.
Trip length assume 0.2 miles on base (from Inventory); 9.57 miles off base (from CalEEMod default, home-work commute).
Assume personal vehicles would include light-duty auto and light-duty truck trips only. Assume 82.67% LDA and 17.33% LDT based on EMFAC2007 Model, SCAB-Riverside County, 2012
Assume startup after 8 hours, running time 45 minutes.

Table 16. Annual Ground Vehicle Emissions - 144th Fighter Wing, Preferred Alternative, Fresno

Vehicle Category	Fraction of Trips	Personnel	VMT	CO		NO_x		VOCs						SO_2		PM10				PM2.5				CO2		CH4		N2O	
			(mi/year)	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Hot-Soak (g/trip)	Resting Loss (g/hr)	Running Evaporative (g/mi)	Diurnal Evaporative (g/hr)	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Tire Wear (g/mi)	Brake Wear (g/mi)	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Tire Wear (g/mi)	Brake Wear (g/mi)	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]
POVs (Daily Employees)		**350**	**Per trip: 0.2 on-base; 9.57 off base**																										
LDGV	0.8083	283	2764	2.072	8.006	0.184	0.414	0.058	0.694	0.232	0.035	0.039	0.084	0.003	0.002	0.011	0.015	0.008	0.013	0.011	0.014	0.002	0.005	338.923	163.505	0.021	0.04	0.01748	0.03933
LDGT12	0.1917	67	656	2.924	9.266	0.292	0.398	0.109	0.702	0.25	0.04	0.054	0.089	0.004	0.002	0.014	0.015	0.008	0.013	0.013	0.014	0.002	0.005	420.633	194.855	0.025	0.041	0.02774	0.03781
POVs (Weekend Employees)		**717**																						319.478	162.144	0.016	0.034	0	0
LDGV	0.8083	580	5662	2.072	8.006	0.184	0.414	0.058	0.694	0.232	0.035	0.039	0.084	0.003	0.002	0.011	0.015	0.008	0.013	0.011	0.014	0.002	0.005	338.923	163.505	0.021	0.04	0.01748	0.03933
LDGT12	0.1917	137	1343	2.924	9.266	0.292	0.398	0.109	0.702	0.25	0.04	0.054	0.089	0.004	0.002	0.014	0.015	0.008	0.013	0.013	0.014	0.002	0.005	420.633	194.855	0.025	0.041	0.02774	0.03781

Vehicle Category	Emissions, lbs/day									Emissions, tons/year								
	CO	NOx	VOCs	SOx	PM10	PM2.5	CO2	CH4	N2O	CO	NOx	VOCs	SOx	PM10	PM2.5	CO2	CH4	N2O
POVs (Daily Employees)																		
LDGV	12.66	1.12	0.36	0.02	0.20	0.11	2065.97	0.13	0.11	1.65	0.15	0.05	0.00	0.03	0.01	268.58	0.02	0.01
LDGT12	4.27	0.42	0.17	0.01	0.05	0.03	608.75	0.04	0.04	0.55	0.06	0.02	0.00	0.01	0.00	79.14	0.00	0.01
POVs (Weekend Employees)																		
LDGV	25.90	2.30	0.73	0.04	0.40	0.22	4231.53	0.26	0.22	1.35	0.12	0.04	0.00	0.02	0.01	220.04	0.01	0.01
LDGT12	8.70	0.87	0.33	0.01	0.10	0.06	1246.16	0.07	0.08	0.45	0.05	0.02	0.00	0.01	0.00	64.80	0.00	0.00
										4.00	**0.37**	**0.12**	**0.01**	**0.06**	**0.03**	**632.55**	**0.04**	**0.03**

NOTES: Emission factors from EMFAC2007 Model, Fresno County, 2012, average speed 30 mph from CalEEMod default.
Trip length assume 0.2 miles on base (from Inventory); 9.57 miles off base (from CalEEMod default, home-work commute).
Assume personal vehicles would include light-duty auto and light-duty truck trips only. Assume 80.83% LDA and 19.17% LDT based on EMFAC2007 Model, Fresno County, 2012
Assume startup after 8 hours, running time 45 minutes.

Table 17. Annual Ground Vehicle Emissions - 144th Fighter Wing, Preferred Alternative, March ARB

Vehicle Category	Fraction of Trips	Personnel	VMT	CO		NO_x		VOCs						SO_2		PM10				PM2.5				CO2		CH4		N2O	
			(mi/year)	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Hot-Soak (g/trip)	Resting Loss (g/hr)	Running Evaporative (g/mi)	Diurnal Evaporative (g/hr)	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Tire Wear (g/mi)	Brake Wear (g/mi)	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Tire Wear (g/mi)	Brake Wear (g/mi)	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]
POVs (Daily Employees)		**1400**	**Per trip: 2 on-base; 9.57 off base**																										
LDGV	0.8267	1157	11308	1.891	7.358	0.167	0.374	0.047	0.591	0.179	0.029	0.029	0.066	0.003	0.002	0.012	0.016	0.008	0.013	0.011	0.015	0.002	0.005	337.885	162.08	0.019	0.034	0.015865	0.03553
LDGT12	0.1733	243	2370	2.574	8.407	0.27	0.376	0.086	0.596	0.192	0.031	0.038	0.066	0.004	0.002	0.015	0.017	0.008	0.013	0.014	0.016	0.002	0.005	420.302	192.959	0.023	0.034	0.02565	0.03572

Vehicle Category	Emissions, lbs/day									Emissions, tons/year								
	CO	NOx	VOCs	SOx	PM10	PM2.5	CO2	CH4	N2O	CO	NOx	VOCs	SOx	PM10		CO2	CH4	N2O
POVs (Daily Employees)																		
LDGV	47.17	4.16	1.18	0.07	0.82	0.45	8423.89	0.47	0.40	6.13	0.54	0.15	0.01	0.11	0.06	1095.11	0.06	0.05
LDGT12	13.49	1.41	0.46	0.02	0.19	0.11	2197.29	0.12	0.13	1.75	0.18	0.06	0.00	0.02	0.01	285.65	0.02	0.02
										7.89	**0.73**	**0.21**	**0.01**	**0.13**	**0.07**	**1380.75**	**0.08**	**0.07**

NOTES: Emission factors from EMFAC2007 Model, SCAB-Riverside County, 2012, average speed 30 mph from CalEEMod default.
Trip length assume 0.2 miles on base (from Inventory); 9.57 miles off base (from CalEEMod default, home-work commute).
Assume personal vehicles would include light-duty auto and light-duty truck trips only. Assume 82.67% LDA and 17.33% LDT based on EMFAC2007 Model, SCAB-Riverside County, 2012
Assume startup after 8 hours, running time 45 minutes.

Table 18. Annual Ground Vehicle Emissions - 144th Fighter Wing, Alternative 2, Fresno

Vehicle Category	Fraction of Trips	Personnel	VMT	CO		NO_x		VOCs						SO_2		PM10				PM2.5				CO2		CH4		N2O	
			(mi/year)	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Hot-Soak (g/trip)	Resting Loss (g/hr)	Running Evaporative (g/mi)	Diurnal Evaporative (g/hr)	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Tire Wear (g/mi)	Brake Wear (g/mi)	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Tire Wear (g/mi)	Brake Wear (g/mi)	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]
POVs (Daily Employees)		**350**	**Per trip: 0.2 on-base; 9.57 off base**																										
LDGV	0.8083	283	2764	2.072	8.006	0.184	0.414	0.058	0.694	0.232	0.035	0.039	0.084	0.003	0.002	0.011	0.015	0.008	0.013	0.011	0.014	0.002	0.005	338.923	163.505	0.021	0.04	0.01748	0.03933
LDGT12	0.1917	67	656	2.924	9.266	0.292	0.398	0.109	0.702	0.25	0.04	0.054	0.089	0.004	0.002	0.014	0.015	0.008	0.013	0.013	0.014	0.002	0.005	420.633	194.855	0.025	0.041	0.02774	0.03781
POVs (Weekend Employees)		**717**																						319.478	162.144	0.016	0.034	0	0
LDGV	0.8083	580	5662	2.072	8.006	0.184	0.414	0.058	0.694	0.232	0.035	0.039	0.084	0.003	0.002	0.011	0.015	0.008	0.013	0.011	0.014	0.002	0.005	338.923	163.505	0.021	0.04	0.01748	0.03933
LDGT12	0.1917	137	1343	2.924	9.266	0.292	0.398	0.109	0.702	0.25	0.04	0.054	0.089	0.004	0.002	0.014	0.015	0.008	0.013	0.013	0.014	0.002	0.005	420.633	194.855	0.025	0.041	0.02774	0.03781

Vehicle Category	Emissions, lbs/day									Emissions, tons/year								
	CO	NOx	VOCs	SOx	PM10	PM2.5	CO2	CH4	N2O	CO	NOx	VOCs	SOx	PM10	PM2.5	CO2	CH4	N2O
POVs (Daily Employees)																		
LDGV	12.66	1.12	0.36	0.02	0.20	0.11	2065.97	0.13	0.11	1.65	0.15	0.05	0.00	0.03	0.01	268.58	0.02	0.01
LDGT12	4.27	0.42	0.17	0.01	0.05	0.03	608.75	0.04	0.04	0.55	0.06	0.02	0.00	0.01	0.00	79.14	0.00	0.01
POVs (Weekend Employees)																		
LDGV	25.90	2.30	0.73	0.04	0.40	0.22	4231.53	0.26	0.22	1.35	0.12	0.04	0.00	0.02	0.01	220.04	0.01	0.01
LDGT12	8.70	0.87	0.33	0.01	0.10	0.06	1246.16	0.07	0.08	0.45	0.05	0.02	0.00	0.01	0.00	64.80	0.00	0.00
										4.00	**0.37**	**0.12**	**0.01**	**0.06**	**0.03**	**632.55**	**0.04**	**0.03**

NOTES: Emission factors from EMFAC2007 Model, Fresno County, 2012, average speed 30 mph from CalEEMod default.
Trip length assume 0.2 miles on base (from Inventory); 9.57 miles off base (from CalEEMod default, home-work commute).
Assume personal vehicles would include light-duty auto and light-duty truck trips only. Assume 80.83% LDA and 19.17% LDT based on EMFAC2007 Model, Fresno County, 2012
Assume startup after 8 hours, running time 45 minutes.

Table 19. Annual Ground Vehicle Emissions - 144th Fighter Wing, Alternative 2, March ARB

Vehicle Category	Fraction of Trips	Personnel	VMT	CO		NO_x		VOCs						SO_2		PM10				PM2.5				CO2		CH4		N2O	
			(mi/year)	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Hot-Soak (g/trip)	Resting Loss (g/hr)	Running Evaporative (g/mi)	Diurnal Evaporative (g/hr)	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Tire Wear (g/mi)	Brake Wear (g/mi)	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Tire Wear (g/mi)	Brake Wear (g/mi)	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]	Running Exhaust (g/mi)	Start-Up (g/start)[a]
POVs (Daily Employees)		**1400**	**Per trip: 2 on-base; 9.57 off base**																										
LDGV	0.8267	1157	11308	1.891	7.358	0.167	0.374	0.047	0.591	0.179	0.029	0.029	0.066	0.003	0.002	0.012	0.016	0.008	0.013	0.011	0.015	0.002	0.005	337.885	162.08	0.019	0.034	0.015865	0.03553
LDGT12	0.1733	243	2370	2.574	8.407	0.27	0.376	0.086	0.596	0.192	0.031	0.038	0.066	0.004	0.002	0.015	0.017	0.008	0.013	0.014	0.016	0.002	0.005	420.302	192.959	0.023	0.034	0.02565	0.03572

Vehicle Category	Emissions, lbs/day									Emissions, tons/year								
	CO	NOx	VOCs	SOx	PM10	PM2.5	CO2	CH4	N2O	CO	NOx	VOCs	SOx	PM10		CO2	CH4	N2O
POVs (Daily Employees)																		
LDGV	47.17	4.16	1.18	0.07	0.82	0.45	8423.89	0.47	0.40	6.13	0.54	0.15	0.01	0.11	0.06	1095.11	0.06	0.05
LDGT12	13.49	1.41	0.46	0.02	0.19	0.11	2197.29	0.12	0.13	1.75	0.18	0.06	0.00	0.02	0.01	285.65	0.02	0.02
										7.89	**0.73**	**0.21**	**0.01**	**0.13**	**0.07**	**1380.75**	**0.08**	**0.07**

NOTES: Emission factors from EMFAC2007 Model, SCAB-Riverside County, 2012, average speed 30 mph from CalEEMod default.
Trip length assume 0.2 miles on base (from Inventory); 9.57 miles off base (from CalEEMod default, home-work commute).
Assume personal vehicles would include light-duty auto and light-duty truck trips only. Assume 82.67% LDA and 17.33% LDT based on EMFAC2007 Model, SCAB-Riverside County, 2012
Assume startup after 8 hours, running time 45 minutes.

Table 20. Annual Baseline Emissions - 144th Fighter Wing, Fresno-Yosemite Airport

	Emissions, tons/year					
Source Type	*CO*	*NOx*	*VOC*	*SOx*	*PM10*	*PM2.5*
Aircraft	23.631	10.401	6.500	1.364	2.271	2.248
Refueling			0.007			
Engine Runups	1.684	0.220	0.379	0.057	0.098	0.097
Aerospace Ground Equipment	7.594	11.483	3.698	0.135	1.088	1.078
Personal-Owned Vehicles	3.858	0.353	0.120	0.005	0.056	0.032
Total Emissions Baseline	**36.77**	**22.46**	**10.704**	**1.56**	**3.514**	**3.45**

Table 21. Annual Preferred Alternative Emissions - 144th Fighter Wing, Preferred Alternative, Fresno-Yosemite Airport

	Emissions, tons/year					
Source Type	*CO*	*NOx*	*VOC*	*SOx*	*PM10*	*PM2.5*
Aircraft	47.293	21.094	13.118	2.755	4.604	4.558
Refueling			0.011			
Engine Runups	3.367	0.440	0.757	0.114	0.197	0.195
Aerospace Ground Equipment	7.594	11.483	3.698	0.135	1.088	1.078
Personal-Owned Vehicles	4.000	0.366	0.125	0.006	0.058	0.033
Total Emissions Preferred Alternative	**62.25**	**33.38**	**17.709**	**3.01**	**5.947**	**5.86**
Net Increase	**25.49**	**10.93**	**7.005**	**1.45**	**2.433**	**2.41**

Table 22. Annual Alternative 2 Emissions - 144th Fighter Wing, Alternative 2, Fresno-Yosemite Airport

	Emissions, tons/year					
Source Type	*CO*	*NOx*	*VOC*	*SOx*	*PM10*	*PM2.5*
Aircraft	61.451	27.408	17.045	3.580	5.982	5.922
Refueling			0.014			
Engine Runups	3.367	0.440	0.757	0.114	0.197	0.195
Aerospace Ground Equipment	9.867	14.920	4.805	0.176	1.414	1.400
Personal-Owned Vehicles	4.000	0.366	0.125	0.006	0.058	0.033
Total Emissions Alternative 2	**78.69**	**43.13**	**22.75**	**3.88**	**7.65**	**7.55**
Net Increase	**41.92**	**20.68**	**12.04**	**2.31**	**4.14**	**4.09**

Table 23. Annual Baseline Emissions - 144th Fighter Wing, March ARB

	Emissions, tons/year					
Source Type	*CO*	*NOx*	*VOC*	*SOx*	*PM10*	*PM2.5*
Aircraft	5.669	5.006	1.743	0.481	0.735	0.728
Refueling			0.002			
Aerospace Ground Equipment	0.524	0.723	0.045	0.010	0.022	0.022
Personal-Owned Vehicles	7.886	0.725	0.213	0.012	0.131	0.073
Total Emissions Baseline	**14.08**	**6.45**	**2.003**	**0.50**	**0.889**	**0.82**

Table 24. Annual Preferred Alternative Emissions - 144th Fighter Wing, Preferred Alternative, March ARB

	Emissions, tons/year					
Source Type	*CO*	*NOx*	*VOC*	*SOx*	*PM10*	*PM2.5*
Aircraft	11.338	10.011	3.487	0.962	1.470	1.455
Refueling			0.003			
Aerospace Ground Equipment	0.524	0.723	0.045	0.010	0.022	0.022
Personal-Owned Vehicles	7.886	0.725	0.213	0.012	0.131	0.073
Total Emissions Preferred Alternative	**19.75**	**11.46**	**3.747**	**0.98**	**1.624**	**1.55**
Net Increase	**5.67**	**5.01**	**1.744**	**0.48**	**0.735**	**0.73**

Table 25. Annual Alternative 2 Emissions - 144th Fighter Wing, Alternative 2, March ARB

	Emissions, tons/year					
Source Type	*CO*	*NOx*	*VOC*	*SOx*	*PM10*	*PM2.5*
Aircraft	11.338	10.011	3.487	0.962	1.470	1.455
Refueling			0.003			
Aerospace Ground Equipment	0.524	0.723	0.045	0.010	0.022	0.022
Personal-Owned Vehicles	7.886	0.725	0.213	0.012	0.131	0.073
Total Emissions Alternative 2	**19.75**	**11.46**	**3.75**	**0.98**	**1.62**	**1.55**
Net Increase	**5.67**	**5.01**	**1.74**	**0.48**	**0.74**	**0.73**

Table 26. Annual Baseline Emissions - 144th Fighter Wing, Fresno-Yosemite Airport

	Emissions, tons/year					
Source Type	*CO*	*NOx*	*VOC*	*SOx*	*PM10*	*PM2.5*
Aircraft	23.631	10.401	6.500	1.364	2.271	2.248
Refueling			0.007			
Engine Runups	1.684	0.220	0.379	0.057	0.098	0.097
Aerospace Ground Equipment	7.594	11.483	3.698	0.135	1.088	1.078
Personal-Owned Vehicles	3.858	0.353	0.120	0.005	0.056	0.032
Total Emissions Baseline	**36.77**	**22.46**	**10.70**	**1.56**	**3.51**	**3.45**

Table 27. Annual Preferred Alternative Emissions - 144th Fighter Wing, Preferred Alternative, Fresno-Yosemite Airport, 2012

	Emissions, tons/year					
Source Type	*CO*	*NOx*	*VOC*	*SOx*	*PM10*	*PM2.5*
F-16 Aircraft Operations	15.871	6.987	4.366	0.916	1.526	1.510
F-15 Aircraft Operations	1.205	0.537	0.334	0.070	0.117	0.116
Refueling			0.005			
Engine Runups	3.367	0.440	0.757	0.114	0.197	0.195
Aerospace Ground Equipment	7.594	11.483	3.698	0.135	1.088	1.078
Personal-Owned Vehicles	4.000	0.366	0.125	0.006	0.058	0.033
Total Operations Emissions Preferred Alternative	**32.04**	**19.81**	**9.29**	**1.24**	**2.99**	**2.93**
Construction Emissions	0.64	1.11	0.14	0	0.09	0.05
Total Emissions Preferred Alternative	**32.68**	**20.92**	**9.43**	**1.24**	**3.08**	**2.98**
Net Increase	**-4.09**	**-1.53**	**-1.28**	**-0.32**	**-0.44**	**-0.47**

Table 28. Annual Preferred Alternative Emissions - 144th Fighter Wing, Preferred Alternative, Fresno-Yosemite Airport, 2013

	Emissions, tons/year					
Source Type	*CO*	*NOx*	*VOC*	*SOx*	*PM10*	*PM2.5*
Aircraft	25.497	11.370	7.072	1.485	2.482	2.457
Refueling			0.006			
Engine Runups	3.367	0.440	0.757	0.114	0.197	0.195
Aerospace Ground Equipment	7.594	11.483	3.698	0.135	1.088	1.078
Personal-Owned Vehicles	4.000	0.366	0.125	0.006	0.058	0.033
Total Operations Emissions Preferred Alternative	**40.46**	**23.66**	**11.66**	**1.74**	**3.82**	**3.76**
Construction Emissions	2.34	4.75	1.65	0	0.39	0.28
Total Emissions Preferred Alternative	**42.80**	**28.41**	**13.31**	**1.74**	**4.21**	**4.04**
Net Increase	**6.03**	**5.95**	**2.60**	**0.18**	**0.70**	**0.59**

APPENDIX B

Agency Coordination

San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT

HEALTHY AIR LIVING™

June 26, 2012

Robert L. Dogan
Community Planner
NGB/A7AM
Shepperd Hall
3501 Fetchet Avenue
Joint Base Andrews MD 20762-5157

RE: General Conformity for the Fresno ANG F-15 Fleet Upgrade Project

Dear Mr. Dogan:

The Fresno Air National Guard (Fresno ANG) has informed the San Joaquin Valley Air Pollution Control District (District) of its plans to upgrade its aircraft fleet from F-16s to F-15s. A federal agency action that takes place in a nonattainment area must comply with general conformity requirements, as contained in Title 40 of the Code of Federal Regulations; Part 51, Subpart W, and Part 93, Subpart B. Based on the emissions estimates and information provided by the Air National Guard in the May 2012 *Draft General Conformity Determination* associated with this project, the District finds that this project has met federal general conformity requirements.

The District's most recent State Implementation Plans (SIPs) are the *2007 Ozone Plan* and the *2008 PM2.5 Plan*. The EPA-approved inventories from these SIPs serve as the primary basis for the District's general conformity evaluation. The conformity determination process is intended to demonstrate that a proposed federal action will not: (1) cause or contribute to new violations of a national ambient air quality standard (NAAQS); (2) interfere with provisions in the applicable SIP for maintenance of any NAAQS; (3) increase the frequency or severity of existing violations of any standard; or (4) delay the timely attainment of any standard.

The San Joaquin Valley is a nonattainment area for the federal PM2.5 (fine particulate matter) standard, and an extreme nonattainment area for ozone. The Valley is also a maintenance area for carbon monoxide (CO) and PM10. The following general conformity de minimis emissions levels apply to federal agency projects in the San Joaquin Valley, per 40 CFR 93.153:

Seyed Sadredin
Executive Director/Air Pollution Control Officer

Northern Region
4800 Enterprise Way
Modesto, CA 95356-8718
Tel: (209) 557-6400 FAX: (209) 557-6475

Central Region (Main Office)
1990 E. Gettysburg Avenue
Fresno, CA 93726-0244
Tel: (559) 230-6000 FAX: (559) 230-6061

Southern Region
34946 Flyover Court
Bakersfield, CA 93308-9725
Tel: 661-392-5500 FAX: 661-392-5585

www.valleyair.org www.healthyairliving.com

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Table 1: Applicable de minimis Thresholds	
Pollutant	**Tons per year (tpy)**
Ozone (VOCs or NOx)	10
CO	100
Directly emitted PM10	100
Directly emitted PM2.5	100
SO2 (as PM2.5 precursor)	100
NOx (as PM2.5 precursor)	100
Ammonia or VOC (as PM2.5 precursor)	NA (determined not significant for *2008 PM2.5 Plan*)

The District has reviewed the emissions impacts associated with the Fresno ABG F-15 project, as those emissions are quantified in the Fresno ANG's *Draft General Conformity Determination*. Based on the information in Table 10, Fresno County's total military aircraft NOx emissions are expected to increase by 10.93 tons per year by 2015 when Fresno ANG transitions from the F-16 to the F-15 aircraft. NOx is the only pollutant that exceeds the applicable general conformity de minimis thresholds, and is therefore the focus of this evaluation.

The District's SIP inventories account for 61 tons per year of NOx from military aircraft in Fresno County for the years 2012 through 2024. Based on information in Table 4-1 in supporting documentation in the Air National Guard's February 2009 *Final 2007 Air Emissions Inventory, 144th Fighter Wing,* the current baseline NOx emissions from military mobile sources in Fresno County are estimated to be 41.3 tons per year. The anticipated NOx emissions increase from the current Fresno ANG project (10.93 tons per year, shown in Table 10 of the Draft *General Conformity Demonstration*), when added to the applicable baseline NOx emissions of 41.3 tons per year, results in total military mobile source emissions of 52.23 tons per year in Fresno County. This is within the attainment plan inventory for this category.

The construction emissions associated with this project are estimated to be a maximum of 3.76 tons per year of NOx for the years 2012 through 2014 (Table 6 in the Draft *General Conformity Demonstration*). Given the relatively small amount of emissions and short-term nature of construction, these emissions are reasonably expected to be included in the SIP as part of the 4,891 to 5,484 tons per year of construction emissions included in the SIP inventories for the years 2012 through 2014. [1]

[1] ARB (April 28, 2011), *Progress Report on Implementation of PM2.5 SIP for the South Coast and San Joaquin Valley Air Basins*, Appendix E, page 4.
http://www.arb.ca.gov/planning/sip/sjvpm25/staff_report_with_appendices.pdf

Therefore, based on the information provided in Fresno ANG's *Draft General Conformity Determination* and the February 2009 *Final 2007 Air Emissions Inventory, 144th Fighter Wing*, the District concludes that the emissions impact associated with this project are reasonably accounted for in the approved SIP inventories, and that a positive general conformity determination can reasonably be made.

Please contact Ms. Jessica Fierro, Supervising Air Quality Specialist, at (559) 230-6100 or jessica.fierro@valleyair.org for any additional information or clarification.

Regards,

for Samir Sheikh
Director of Strategies and Incentives

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