Final

SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT

of Proposed Actions by the 58th Special Operations Wing, Kirtland Air Force Base, New Mexico

June 2008

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14. ABSTRACT
The mission of the CV-22 aircraft is similar to that of the MH-53 helicopters that were flown at Kirtland AFB through June 2007, but the CV-22 has several major advantages over the older helicopters. The CV-22 aircraft can cruise twice as fast and over twice as far as the MH-53 helicopter without refueling, and it is capable of flying at altitudes of 25,000 feet, which is twice the maximum ceiling of the MH-53 helicopter. These improvements result in an aircraft that can be used to fight and survive in a wider variety of environments. A cost and operational analysis conducted in 1993 by the Center for Naval Analyses determined that the combat survivability of the CV-22 aircraft was 3.5 times greater than that of the MH-53 series helicopter. Beddown of the CV-22 aircraft consists of adding a total of seven CV-22 aircraft to the inventory at Kirtland AFB beginning with three aircraft in FY 2006, one in FY 2007, one in FY 2010, and the final two in FY 2011. After the first four aircraft are delivered to Kirtland AFB, one additional aircraft might be acquired to help train aircrew on a temporary basis. When that aircraft is no longer needed, it would be delivered to Hurlburt Field in Florida to be permanently bedded down there. The need for one additional aircraft might continue for up to three years. Implementation of the Proposed Action would involve: the beddown of seven CV-22 aircraft; decreases in the overall number of hours and sorties flown and decreases in overall operations. The total number of aircraft operated by the 58 SOW would change over time as the CV-22 aircraft beddown and the drawdown of the MH-53 helicopters occurs. The proposed beddown action would result in an overall decrease in training, maintenance, and support personnel because the MH-53 helicopters were fully removed from the USAF inventory in June 2007 while the full inventory of seven CV-22 aircraft is not expected until FY 2011. Additionally, there would be fewer sorties and hours flown by the CV-22 aircraft than were flown for the MH-53 helicopter. A new parking lot is also part of the Proposed Action analyzed in this SEA.

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ABBREVIATIONS AND ACRONYMS

58 SOW	58th Special Operations Wing
512 SOS	512th Special Operations Squadron
550 SOS	550th Special Operations Squadron
551 SOS	551th Special Operations Squadron
ADNL	day-night average A-weighted sound level
AEHD	Albuquerque Environmental Health Department
AETC	Air Education and Training Command
AFB	Air Force Base
AFSOC	Air Force Special Operations Command
APU	Auxiliary Power Units
AQD	Air Quality Division
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO	carbon monoxide
dB	decibel
dBA	A-weighted sound level measurement
dBC	C-weighted sound level measurement
DNL	Day-night Average A-weighted Sound Level
DOD	Department of Defense
EA	Environmental Assessment
EDMS	Emissions and Dispersion Modeling System
EIAP	Environmental Impact Analysis Process
FAA	Federal Aviation Administration
FY	fiscal year
GSE	Ground Support Equipment
HAP	Hazardous Air Pollutant
HLZ	Helicopter Landing Zone
HUD	U.S. Department of Housing and Urban Development
IICEP	Interagency Intergovernmental Coordination for Environmental Planning
INM	Integrated Noise Model
L_{dnmr}	rate adjusted monthly day-night sound level
MIST	Mobile Inventory Source Calculation Tool
MOA	Military Operating Areas
mph	miles per hour
MSL	mean sea level
MTR	Military Training Routes
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NMAC	New Mexico Administrative Code
NOA	Notice of Availability
NO_2	nitrogen dioxide
NO_x	oxides of nitrogen
O_3	ozone
Pb	lead
PM_{10}	particulate matter less than or equal to 10 microns in diameter
$PM_{2.5}$	particulate matter equal to or less than 2.5 microns in diameter
ROI	Region of Influence
RNM	Rotocraft Noise Model
SEA	Supplemental Environmental Assessment
SEL	Sound Exposure Level
SIP	State Implementation Plan
SO_2	sulfur dioxide
SO_x	oxides of sulfur
tpy	tons per year
USAF	U.S. Air Force
USEPA	U.S. Environmental Protection Agency
UTM	Universal Transverse Mercator
VOC	volatile organic compound

FINDING OF NO SIGNIFICANT IMPACT

FINAL SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT OF PROPOSED ACTIONS BY THE 58TH SPECIAL OPERATIONS WING AT KIRTLAND AIR FORCE BASE, NEW MEXICO

The Department of the Air Force has completed a Supplemental Environmental Assessment (SEA) of the potential environmental consequences from the proposed beddown of seven CV-22 tilt-rotor aircraft at Kirtland Air Force Base (AFB). An Environmental Assessment (EA) was prepared for the beddown of the CV-22 aircraft by the 58th Special Operations Wing (58 SOW) at Kirtland AFB in 2000[1], but that action was delayed because of funding and schedule changes associated with the CV-22 acquisition program. The EA prepared in 2000, referred to as the 58 SOW EA, is incorporated by reference into this SEA. This SEA only addresses those portions of the proposed action or resource areas that have changed since the 58 SOW EA was prepared in 2000.

Description of the Proposed Action and Alternative

Proposed Action. Beddown of the CV-22 aircraft would consist of adding a total of seven CV-22 aircraft to the inventory at Kirtland AFB beginning with three aircraft in fiscal year (FY) 2006, one in FY 2007, one in FY 2010, and the final two in FY 2011. After the first three aircraft are delivered to Kirtland AFB, one additional aircraft might be acquired to help train aircrew on a temporary basis. When the one additional aircraft is no longer needed, it would be delivered to Hurlburt Field in Florida to be permanently bedded down there. The need for one additional aircraft might continue for up to three years. The proposed beddown action would include increases in training, maintenance and support personnel until FY 2007 when the existing H-53 helicopters at Kirtland AFB would be removed from the Air Force inventory and a decrease in aircraft and personnel would occur.

A parking lot is proposed as part of the CV-22 aircraft beddown to accommodate additional numbers of personnel. The parking lot would accommodate 67 parking spaces and would be located near Hangar 1000. This parking is necessary to support additional personnel who would be assigned to Hangar 1000 in conjunction with CV-22 aircraft maintenance and operations.

No-Action Alternative. The No-Action Alternative represents a continuation of existing conditions at Kirtland AFB. No changes in aircraft or personnel, or construction of the parking lot would occur under this alternative, and no impacts would be expected.

Anticipated Environmental Impacts

Air Quality

The Proposed Action would not significantly increase air emissions in the Albuquerque-Bernalillo County area. The potential exists for short-term impacts to local air quality from fugitive dust created during construction and carbon monoxide (CO) from construction equipment. Dust would be controlled by the application of water. The results of the emission

[1] *Environmental Assessment of Proposed Actions by the 58th Special Operations Wing at Kirtland Air Force Base,* Air Education and Training Command and Air Force Materiel Command, August 2000.

estimates indicate that there would be no significant impact to the air basin, and that most of the pollutant emissions levels would decrease in FY 2010 compared to FY 2005.

Noise

Aircraft Operations. The highest total number of sorties flown by the 58 SOW occurred in FY 2005 and FY 2006 instead of FY 2003 as projected and analyzed in the 58 SOW EA. The proposed number of sorties and corresponding aircraft are less than those projected in the 58 SOW EA. Therefore, under the Proposed Action fewer acres would be impacted than previously projected in the 58 SOW EA.

Construction. Implementation of the Proposed Action would have short-term minor adverse effects on the noise environment from the use of heavy equipment during construction of the parking lot. Noise generation would last only for the duration of construction activities and would be isolated to normal working hours (i.e., between 7:00 a.m. and 5:00 p.m.). Noise impacts from increased traffic due to construction vehicles would also be temporary in nature.

Conclusion

Based on my review of the facts and analysis as summarized above and detailed in the attached SEA, I find that the Proposed Action would not have a significant impact on the human environment, either by itself or in consideration with the cumulative impacts of other actions. The requirements of the National Environmental Policy Act, the President's Council on Environmental Quality regulations, and the Air Force Environmental Impact Analysis Process have been fulfilled and the issuance of a Finding of No Significant Impact is warranted. An Environmental Impact Statement is not required and will not be prepared. A Notice of Availability for public review was published in the *Albuquerque Journal* on January 28, 2008. The SEA is available upon request through the National Environmental Policy Act Program Manager's office at 377 MSG/CEANQ, 2050 Wyoming Blvd. S.E., Suite 125, Kirtland AFB, NM, 87117-5270.

Accepted By: D Brent Wilson Date: JUL 22 2008

D. BRENT WILSON, P.E.
Base Civil Engineer
Kirtland Air Force Base

COVER SHEET

FINAL SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT OF PROPOSED ACTIONS BY THE 58TH SPECIAL OPERATIONS WING AT KIRTLAND AIR FORCE BASE, NEW MEXICO

Responsible Agencies: United States Air Force (USAF), Air Education and Training Command, Air Force Materiel Command, 58th Special Operations Wing (58 SOW), Kirtland Air Force Base (AFB), New Mexico.

Affected Location: Kirtland Air Force Base, New Mexico.

Proposed Action: In 2000, the 58 SOW completed the *Environmental Assessment (EA) of Proposed Actions by the 58th Special Operations Wing at Kirtland Air Force Base*, hereafter referred to as the 58 SOW EA. The purpose of the 58 SOW EA was to assess the potential environmental impacts from two separate actions: replacement of MH-53 helicopters with CV-22 tilt-rotor aircraft and an increase in the number of UH-1N and HH-60G helicopters and HC-130P fixed-wing aircraft. It was predicted at the time that there would be both CV-22 and MH-53 aircraft overlapping at Kirtland AFB during fiscal year (FY) 2003 and FY 2004. However, because the beddown of the CV-22 aircraft was affected by funding and schedule changes in the acquisition program, the number of aircraft, operations, and personnel predicted for each year was also affected. In addition, the aging MH-53 helicopters are being reduced as they are taken out of USAF service. Therefore, this Supplemental Environmental Assessment (SEA) is being prepared. The 58 SOW at Kirtland AFB, New Mexico, a unit of Air Education and Training Command (AETC), is proposing to beddown seven new CV-22 tilt-rotor aircraft at the base based on an updated timetable. The Proposed Action also consists of identifying three new helicopter landing zones (HLZs) to be used by the CV-22 aircraft and paving an existing unimproved parking area adjacent to the operations facility to provide all-weather parking for personnel at the facility.

Report Designation: Final Supplemental Environmental Assessment (SEA).

Abstract: The mission of the CV-22 aircraft is similar to that of the MH-53 helicopters that were flown at Kirtland AFB through June 2007, but the CV-22 has several major advantages over the older helicopters. The CV-22 aircraft can cruise twice as fast and over twice as far as the MH-53 helicopter without refueling, and it is capable of flying at altitudes of 25,000 feet, which is twice the maximum ceiling of the MH-53 helicopter. These improvements result in an aircraft that can be used to fight and survive in a wider variety of environments. A cost and operational analysis conducted in 1993 by the Center for Naval Analyses determined that the combat survivability of the CV-22 aircraft was 3.5 times greater than that of the MH-53 series helicopter.

Beddown of the CV-22 aircraft consists of adding a total of seven CV-22 aircraft to the inventory at Kirtland AFB beginning with three aircraft in FY 2006, one in FY 2007, one in FY 2010, and the final two in FY 2011. After the first four aircraft are delivered to Kirtland AFB, one additional aircraft might be acquired to help train aircrew on a temporary basis. When that aircraft is no longer needed, it would be delivered to Hurlburt Field in Florida to be permanently bedded down there. The need for one additional aircraft might continue for up to three years. Implementation of the Proposed Action would involve: the beddown of seven CV-22 aircraft; decreases in the overall number of hours and sorties flown; and decreases in overall operations. The total number of aircraft operated by the 58 SOW would change over time as the CV-22 aircraft beddown and the drawdown of the MH-53 helicopters occurs. The proposed beddown action would result in an overall decrease in training, maintenance, and support personnel because the MH-53 helicopters were fully removed from the USAF inventory in June 2007, while the full inventory of seven CV-22 aircraft is not expected until FY 2011. Additionally, there would

be fewer sorties and hours flown by the CV-22 aircraft than were flown for the MH-53 helicopter. A new parking lot is also part of the Proposed Action analyzed in this SEA.

Written inquiries regarding this document should be directed to the NEPA Program Manager, Kirtland Air Force Base, 2050 Wyoming Blvd. S.E., Kirtland Air Force Base, New Mexico 87117-5270.

PRIVACY NOTICE

Letters or other written comments provided on this SEA might be made available to the public. Private addresses will be compiled to develop a mailing list. However, only the names of the individuals making comments and specific comments will be disclosed; personal home addresses and phone numbers will not be published in the SEA.

FINAL

SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT

OF

PROPOSED ACTIONS BY THE 58TH SPECIAL OPERATIONS WING, KIRTLAND AIR FORCE BASE, NEW MEXICO

58TH SPECIAL OPERATIONS WING
KIRTLAND AIR FORCE BASE
NEW MEXICO

JUNE 2008

**FINAL SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT
OF PROPOSED ACTIONS BY THE 58TH SPECIAL OPERATIONS WING,
KIRTLAND AIR FORCE BASE, NEW MEXICO**

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1. PURPOSE OF AND NEED FOR THE ACTION

This Supplemental Environmental Assessment (SEA) discusses the Proposed Action consisting of the change in schedule of the beddown of seven CV-22 tilt-rotor aircraft and the paving of a small parking lot adjacent to Hangar 1000 at Kirtland Air Force Base (AFB), Albuquerque, New Mexico. 58th Special Operations Wing (58 SOW), a unit of the Air Education and Training Command (AETC) is the proponent of these actions. This SEA is part of the Environmental Impact Analysis Process (EIAP) set forth in Title 32 Code of Federal Regulations (CFR) 989, as amended, which incorporates Air Force Regulation 32-7061 and implements the National Environmental Policy Act (NEPA). The regulations implementing NEPA are promulgated by the President's Council on Environmental Quality (CEQ) as 40 CFR Parts 1500-1508.

1.1 Background

Kirtland AFB is located just southeast of Albuquerque, New Mexico, in Bernalillo County at the foot of the Manzanita Mountains (**Figure 1-1**). Kirtland AFB encompasses over 52,000 acres of East Mesa with elevations ranging from 5,200 feet to almost 8,000 feet above mean sea level (MSL).

The mission of the 58 SOW is "to train mission-ready special operations and rescue aircrews for the world's best Air Force." Once trained, students go on to serve with Air Force Special Operations Command (AFSOC), Air Mobility Command (AMC), Air Combat Command (ACC), Pacific Air Forces (PACAF), U.S. Air Force (USAF) in Europe, Air Force Space Command, and Air Force Reserve and Air National Guard components. The 58 SOW maintains three operational squadrons at Kirtland AFB: the 512th Special Operations Squadron (512 SOS), which flies UH-1N and HH-60G helicopters; the 551 SOS, which flew MH-53 helicopters; and the 550 SOS, which flies MC-130H and H/MC-130P fixed-wing aircraft. The 58 SOW conducts advanced training for aircrews that are tasked with special operations and rescue missions. The unit also provides personnel and aircraft needed to respond to crises around the world and assist civilian authorities in regional rescues.

1.2 Purpose and Scope of the SEA

In 2000, the 58 SOW completed the *Environmental Assessment (EA) of Proposed Actions by the 58th Special Operations Wing at Kirtland Air Force Base*, hereafter referred to as the 58 SOW EA (AETC 2000). The purpose of the 58 SOW EA was to assess the potential environmental impacts from two separate actions. One of the Proposed Actions assessed was the replacement of eleven MH-53 helicopters with seven new CV-22 tilt-rotor aircraft. The assessment included initial operational test and evaluation flights and beddown of the CV-22 aircraft, with associated increases in aircraft operations, personnel, and minor renovation activities. Increases in aircraft, training, and personnel associated with the CV-22 aircraft beddown were to be offset by the departure of 11 MH-53 helicopters and the associated decrease in MH-53 personnel and training flights. It was predicted at the time that there would be both CV-22 aircraft and MH-53 helicopters overlapping at Kirtland AFB during 2003 and 2004. However, because the beddown schedule of the CV-22 aircraft was affected by funding and schedule changes associated with the acquisition program, the number of aircraft, operations, and personnel predicted for each year was also affected.

In addition to the schedule changes in the beddown of the CV-22 aircraft as assessed in the 58 SOW EA, it was also determined that three of the proposed Helicopter Landing Zones (HLZs) within the proposed CV-22 aircraft training area were misidentified. This resulted in incorrect surveys of the three misidentified HLZs. Therefore, this SEA includes the proper identification of the three HLZs in question and carries them through EIAP.

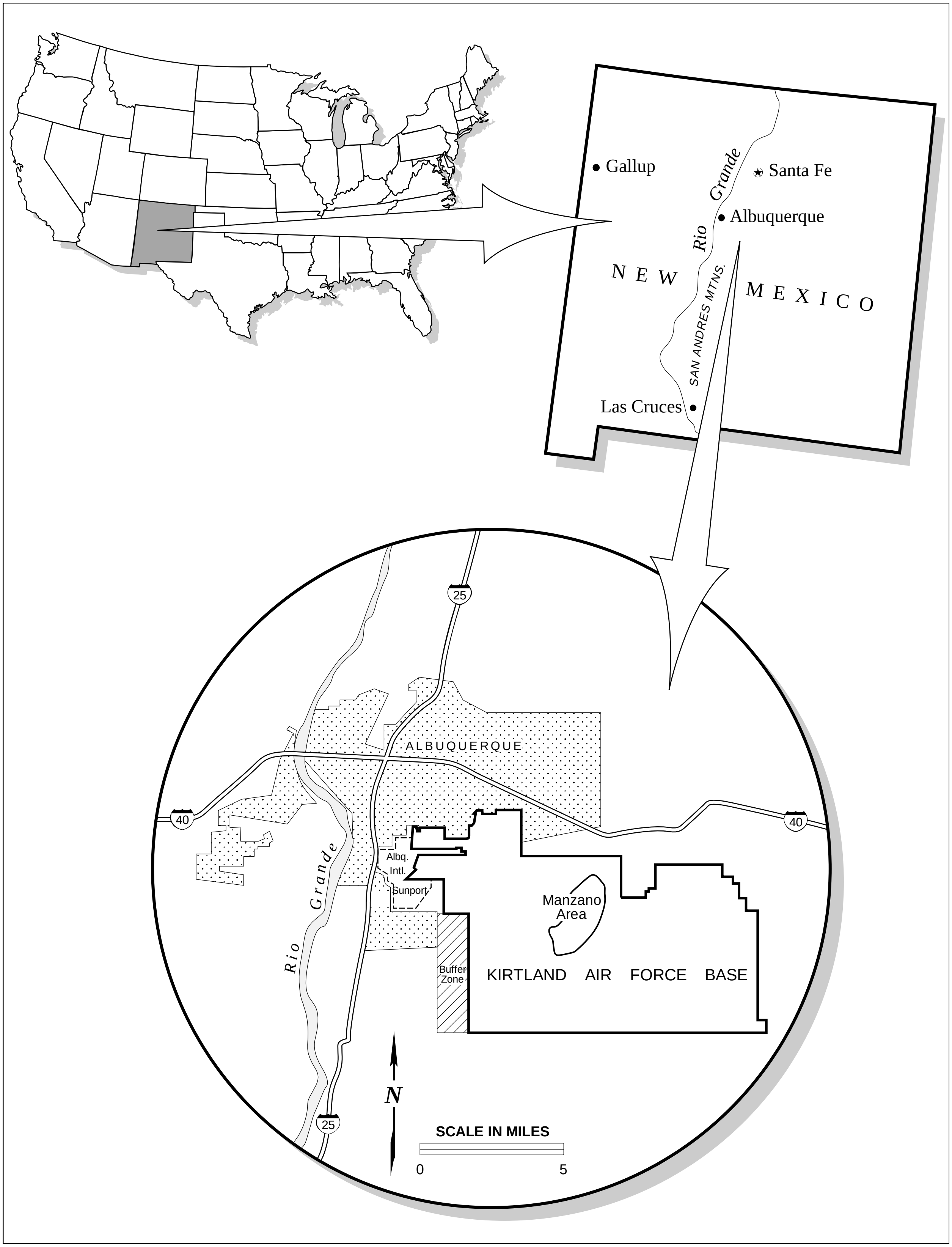

Figure 1-1. Kirtland Air Force Base Location

Since completion of the 58 SOW EA, 58 SOW has determined the need for additional paved parking for personnel associated with the CV-22 aircraft program at Kirtland AFB. This is a new component of the Proposed Action that was not assessed in the 58 SOW EA, and is considered within the scope of this SEA.

1.3 Purpose and Need for the Proposed Action

The purpose of the Proposed Action assessed in this document is to provide advanced training in the CV-22 aircraft to USAF special operations aircrews. The CV-22 aircraft is being acquired by the USAF to replace aging MH-53 helicopters. The CV-22 aircraft will be used by USAF special operations forces worldwide.

The new CV-22 tilt-rotor aircraft are being purchased by the USAF to fulfill a special operations role for AFSOC. The 58 SOW, which currently conducts advanced special operations aircrew training in a variety of aircraft, is the advanced training unit for aircrews of the CV-22 aircraft. These aircrews would receive initial training in the MV-22 aircraft at Marine Corps Air Station New River in North Carolina. However, they will be required to complete specific mission training to be qualified in the CV-22 version before they can fly in another active duty USAF, Air Force Reserve, or Air National Guard unit.

The Proposed Action includes a change in the beddown schedule of the CV-22 aircraft from what was analyzed in the 58 SOW EA, and the paving of a new parking lot. In addition, three proposed HLZs that were misidentified in the 58 SOW EA are now correctly identified in this SEA, and will be carried through the EIAP. The purpose of the aircraft beddown is to provide a place where student aircrews would complete the USAF specific training in the CV-22 aircraft. The purpose of paving the existing gravel and dirt parking area is to provide all-weather parking for personnel working in Hangar 1000.

1.4 Organization of this Document

The purpose of this SEA is to assess the changes in the Proposed Action that have occurred from the scope presented in the 58 SOW EA. This supplement to the 58 SOW EA addresses only those portions of the Proposed Action that have changed. Analysis of the impacts on the natural and human environment is only presented for those resource areas where changes in impacts from the 58 SOW EA have potential to occur. The description of the affected environment remains unchanged from the detailed description provided in the 58 SOW EA and, therefore, is not repeated in this document. This SEA is organized into the following sections:

Section 1 contains background information, a statement of the purpose and need for the proposed action, and a statement of the scope of the SEA.

Section 2 contains a description of the Proposed Action and alternatives.

Section 3 provides the analysis of the resource areas potentially affected by the Proposed Action.

Section 4 contains an evaluation of cumulative impacts.

Section 5 contains a list of preparers.

Section 6 is a list of references cited in the SEA.

Section 7 contains a distribution list for the Draft SEA.

Appendix A contains material related to public involvement, including the Notice of Availability (NOA), interagency intergovernmental coordination and environmental planning (IICEP) letter, and comments received on the Draft SEA.

Appendix B contains an explanation of the noise analysis methodology and terminology.

Appendix C contains photos of the three corrected HLZs discussed in this SEA.

1.5 Resource Areas Eliminated from Detailed Analysis

The following resources areas are dismissed from detailed analysis in this SEA. The basis for their dismissal is also provided. Air Quality and Noise are the only two resources areas that are carried forward through the analysis process in this SEA.

Airspace. Airspace was fully analyzed in the 58 SOW EA. There would be no changes to airspace use or management as a result of the Proposed Action. Therefore, airspace was dismissed from detailed analysis.

Biological Resources. Biological resources were fully analyzed for all 42 of the 58 SOW helicopter HLZs in the 58 SOW EA. However, three of the 42 HLZs were incorrectly identified in the 58 SOW EA. These three HLZs are taken into consideration in the analysis in this SEA. Due to the proximity of the three correct HLZ locations to the previously assessed incorrect HLZ locations, and the virtually identical environmental setting, impacts to biological resources at the three corrected HLZs are virtually the same as the assessment in the 58 SOW EA. Therefore, biological resources are not analyzed in detail in this SEA. Photos of the three correct HLZ locations are contained in **Appendix C**.

Land Management/Land Use. Land management and land use were fully analyzed in the 58 SOW EA. The Proposed Action in this SEA would not lead to any changes in land management or use. For the three HLZs identified in this SEA, their correct locations are still within the same land use designation as analyzed in the 58 SOW EA. Therefore, land management and land are not analyzed in detail in the SEA.

Socioeconomics. Effects on socioeconomics were fully analyzed in the 58 SOW EA. Except for negligible contributions to local socioeconomics from the construction of a proposed parking lot, the socioeconomic environment would remain unchanged as a result of the Proposed Action. Therefore, effects on socioeconomics are not analyzed in detail in this SEA.

Cultural Resources. Effects on cultural resources were fully analyzed in the 58 SOW EA. Proposed HLZs were surveyed and, in one case, one HLZ was relocated to avoid the potential for effects on cultural resources. However, it was determined that three HLZs assessed in the 58 SOW EA were incorrectly identified and, therefore, not properly surveyed for cultural resources. Since 2000, the three HLZs in question (see **Table 2-5** and **Figure 2-1**) were correctly identified. The Kirtland AFB cultural resource staff has resurveyed the three HLZs following the requirements of Section 106 of the National Historic Preservation Act, and a survey report was submitted to the Bureau of Land Management (BLM) for the two HLZs on BLM land. No resources were discovered within the three HLZs. Therefore, the Proposed Action would have no effect on cultural resources.

Water Resources. Water resources were fully analyzed in the 58 SOW EA. The only potential for impacts to water resources would be those associated with construction of the proposed parking lot. However, this area is already used as a temporary unimproved parking area on base, and is highly compacted and disturbed. Therefore, improving this area would not lead to additional impacts to water resources, which are not analyzed in detail in this SEA. Construction of the parking lot would need to be in compliance with the general storm water permit for construction activities if it disturbs at least one acre.

Geological Resources. Geological resources and soils were fully analyzed in the 58 SOW EA. There would be no additional impacts on geological resources or soils as a result of the Proposed Action because there would not be an increase in operations that affect these resources. Therefore, geological resources are not analyzed in detail in this SEA.

Hazardous Materials and Waste. Hazardous materials and waste were fully analyzed in the 58 SOW EA. Implementation of the Proposed Action is not expected alter the use or disposal of hazardous materials or waste. Therefore, hazardous materials and waste are not analyzed in detail in this SEA.

Aircraft Safety. Aircraft safety was analyzed in the 58 SOW EA. The Proposed Action would not result in changes in aircraft safety. Therefore, this topic is not analyzed in detail in this SEA.

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2. DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

This section provides detailed information on the alternatives, including the Proposed Action, which are considered in this SEA.

2.1 Description of the Proposed Action

The 58 SOW at Kirtland AFB, New Mexico, a unit of Air Education and Training Command (AETC), is proposing to beddown seven new CV-22 tilt-rotor aircraft at the base. Aging MH-53 helicopters have been drawn down from the base as they are taken out of USAF service. As of the summer of fiscal year (FY) 2007, all MH-53 helicopters have been removed from Kirtland AFB. The Proposed Action also consists of identifying three new HLZs to be used by the CV-22 aircraft. These three HLZs were misidentified in the 58 SOW EA and the correction is being addressed in this SEA. The 58 SOW also proposes to pave an existing unimproved parking area adjacent to the operations facility to provide all-weather parking for personnel at the facility. The parking lot would be approximately 21 to 30,000 square feet, which is less than three-quarters of an acre.

2.1.1 CV-22 Beddown Schedule Change

The CV-22 tilt-rotor aircraft, referred to as the Osprey, entered the Department of Defense (DOD) inventory in May 1999 when the first CV-22 was delivered to the United States Marine Corps. The CV-22 aircraft is being purchased by the USAF to enhance special operations capabilities. The mission of the CV-22 aircraft would be similar to that of the MH-53 helicopters that were flown at Kirtland AFB through June 2007, but the CV-22 aircraft has several major advantages over the older helicopters. The CV-22 aircraft can cruise twice as fast and over twice as far as the MH-53 helicopter without refueling, and it is capable of flying at altitudes of 25,000 feet, which is twice the maximum ceiling of the MH-53 helicopter. These improvements result in an aircraft that can be used to fight and survive in a wider variety of environments. A cost and operational analysis conducted in 1993 by the Center for Naval Analyses determined that the combat survivability of the CV-22 aircraft was 3.5 times greater than that of the MH-53 series helicopter.

Beddown of the CV-22 aircraft would consist of adding a total of seven CV-22 aircraft to the inventory at Kirtland AFB beginning with three aircraft in FY 2006, one in FY 2007, one in FY 2010, and the final two in FY 2011. After the first four aircraft are delivered to Kirtland AFB, one additional aircraft might be acquired to help train aircrew on a temporary basis. When that aircraft is no longer needed, it would be delivered to Hurlburt Field in Florida to be permanently bedded down there. The need for one additional aircraft might continue for up to three years. **Table 2-1** shows the existing and proposed aircraft numbers associated with the beddown of the CV-22 aircraft. The proposed beddown action would result in an overall decrease in training, maintenance, and support personnel because the MH-53 helicopters were fully removed from the inventory at Kirtland AFB in June 2007, while the full inventory of seven CV-22 aircraft is not expected until FY 2011.

Implementation of the Proposed Action would involve: the beddown of seven CV-22 aircraft; decreases in the overall number of hours and sorties flown; and decreases in overall operations. The total number of aircraft operated by the 58 SOW would change over time as the CV-22 aircraft beddown occurs.

Table 2-1. Number of MH-53 and CV-22 Aircraft (FY 2005 to FY 2012)

Aircraft	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012
MH-53	7	6	0	0	0	0	0	0
CV-22	0	3	4	4	4	5	7	7
TOTAL	**7**	**9**	**4**	**4**	**4**	**5**	**7**	**7**

Source: AETC 2000; Medley 2007

The 58 SOW EA projected that the first CV-22 aircraft would arrive at Kirtland AFB in March 2003, and the last CV-22 aircraft would arrive in December 2006. However, due to delays in the CV-22 aircraft acquisition process, the first CV-22 aircraft did not arrive at Kirtland AFB until FY 2006. This delayed the proposed arrival of the final CV-22 aircraft until FY 2011.

The 58 SOW EA projected that the drawdown of the MH-53 helicopters was to begin in FY 2002 and end in FY 2005. As a result in the acquisition delay of the CV-22 aircraft, the MH-53 helicopter drawdown was also delayed. Therefore, this SEA evaluated the impacts of fewer aircraft compared to the 58 SOW EA because the projected number of overlapping aircraft decreased from 13 to 9.

2.1.2 CV-22 Operations

Under the Proposed Action assessed in this SEA, all CV-22 aircraft training routes and operations proposed in the 58 SOW EA would remain the same. The 58 SOW conducts advanced training for aircrews that will be tasked with special operations and rescue missions. Aircraft flown by 58 SOW aircrews at Kirtland AFB currently include the CV-22, HH-60G, and UH-1N helicopters and MC-130H and H/MC-130P fixed-wing aircraft.

An estimated 945 CV-22 aircraft sorties would be flown annually under the Proposed Action. This would equate to approximately 2,361 hours per year of CV-22 aircraft operations. All airspace areas analyzed in the 58 SOW EA would remain the same. CV-22 aircraft pilot training would occur at the same airfields and in the same airspace currently used for fixed-wing and helicopter aircrew training by the 58 SOW. Furthermore, it is anticipated that these airspace areas would continue to be utilized as proposed under the 58 SOW EA. **Table 2-2** compares the existing operation with the proposed operations.

Under the Proposed Action, Kirtland AFB would be the site for advanced aircrew training for the CV-22 aircraft. Training in the CV-22 aircraft would include: transition from helicopter mode to forward flight mode and back; instrument operation; aerial refueling; remote operations; low-level terrain following and terrain avoidance; use of night vision goggles; formation flight; threat evasive maneuvers and countermeasures; water operations; hoist and external load operations, and hot refueling. **Table 2-3** compares manpower levels for both aircraft.

The 58 SOW EA analyzed the potential impacts of the CV-22 aircraft use of a total of 39 active HLZs. **Table 2-4** presents a list of the HLZs analyzed in the 58 SOW EA. However, the locations of three of the 39 HLZs were misidentified in the 58 SOW EA. The locations of the three HLZs have since been correctly identified. Since the three HLZs were not properly analyzed in the 58 SOW EA, they are carried forward for analysis in this SEA as new HLZs. The corrected locations of the three HLZs are identified in **Table 2-5** and **Figure 2-1**.

Table 2-2. MH-53 and CV-22 Aircraft Operations (FY 2005 to FY 2012)

Aircraft	FY 2005	FY 2006	FY 2007 Expected	FY 2008 Proposed	FY 2009 Proposed	FY 2010 Proposed	FY 2011 Proposed	FY 2012 Proposed
MH-53 sorties	1886	1038	1038	0	0	0	0	0
CV-22 sorties	0	62	534	700	832	945	945	945
Total Sorties	**1886**	**1100**	**1572**	**700**	**832**	**945**	**945**	**945**
MH-53 hours	3960	1913	1913	0	0	0	0	0
CV-22 hours	0	165	1335	1749	2078	2361	2361	2361
Total Hours	**3960**	**2078**	**3248**	**1749**	**2078**	**2361**	**2361**	**2361**

Source: AETC 2000; Medley 2007

Table 2-3. Manpower Associated with MH-53 and CV-22 Aircraft (FY 2005 to FY 2012)

Category	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012
CV-22 Plus-Up								
Officer	9	22	29	29	31	36	36	36
Enlisted	25	130	156	156	182	234	234	234
Civilian	3	6	7	7	7	7	7	7
Subtotal	37	158	192	192	220	277	277	277
MH-53 Drawdown								
Officer	15	15	15	0	0	0	0	0
Enlisted	193	193	193	0	0	0	0	0
Civilian	0	0	0	0	0	0	0	0
Subtotal	208	208	208	0	0	0	0	0
Total	245	366	400	192	220	277	277	277

Source: Adlawan 2007

Table 2-4. 58 SOW Helicopter Landing Zones; Location and Ownership

HLZ	UTM (Zone 13)		US Geological Survey					
	East	North	1:100000	1:24000	T	R	S	¼ Sections
Bureau of Land Management (Rio Puerco & Socorro)								
04	311899	3839982	Acoma Pueblo	Mesas Mojinas	T05N	R02W	4	SE1/4 NE1/4 SW1/4
05	285680	3835550	Acoma Pueblo	Chicken Mt.	T05N	R05W	23	NW1/4 SE1/4 SW1/4
06	286844	3846668	Acoma Pueblo	Chicken Mt.	T06N	R05W	23	NW1/4 SE1/4 SE1/4
07	282717	3848428	Acoma Pueblo	Cerro Verde	T06N	R05W	9	NE1/4 SW1/4 SW1/4
08	279100	3825550	Acoma Pueblo	Field Ranch	T04N	R05W	30	NW1/4 NW1/4 NW1/4
09	305255	3819000	Magdelana	Ladron Peak	T03N	R03W	11	SE1/4 NE1/4 SW1/4
12	302800	3833200	Acoma Pueblo	Mesa Sarca	T05N	R03W	28	SE1/4 SE1/4 SE1/4
13	318330	3848300	Belen	Rio Puerco	T06N	R02W	12	NW1/4 NE1/4 SE1/4
15	316467	3847656	Acoma Pueblo	South Garcia SE	T06N	R02W	12	NE1/4 SW1/4 SW1/4
16	316334	3848658	Acoma Pueblo	South Garcia SE	T06N	R02W	12	SW1/4 NW1/4 NW1/4
17	284935	3843383	Acoma Pueblo	Chicken Mt.	T06N	R05W	34	SE1/4 SW1/4 SE1/4
18	301898	3860054	Acoma Pueblo	White Ridge	T07N	R03W	4	NW1/4 SW1/4 NW1/4
19	308788	3846870	Acoma Pueblo	Mesas Mojinas	T06N	R02W	18	SE1/4 SE1/4 NW1/4
20	308862	3850437	Acoma Pueblo	South Garcia SE	T06N	R02W	6	SE1/4 NW1/4 NE1/4
21	299498	3859737	Acoma Pueblo	White Ridge	T07N	R03W	6	NW1/4 NW1/4 SE1/4
22A	295860	3853493	Acoma Pueblo	White Ridge	T07N	R04W	26	SW1/4 SE1/4 NW1/4
22B	295563	3853554	Acoma Pueblo	White Ridge	T07N	R04W	26	SE1/4 SW1/4 NW1/4
23	298350	3846353	Acoma Pueblo	Mesa Gallina	T06N	R03W	18	NW1/4 SW1/4 NW1/4
24	299558	3846546	Acoma Pueblo	Mesa Gallina	T06N	R03W	18	NW1/4 SE1/4 SE1/4
27	284700	3845737	Acoma Pueblo	Chicken Mt.	T06N	R05W	22	SE1/4 SE1/4 NW1/4
28	286100	3833880	Acoma Pueblo	Chicken Mt.	T05N	R05W	26	NW1/4 SW1/4 SE1/4
29	287570	3835300	Acoma Pueblo	Chicken Mt.	T05N	R05W	24	SE1/4 SE1/4 SW1/4
30	311543	3903109	Grants	Puerco Dam	T12N	R02W	20	SE1/4 SE1/4 NW1/4
31	311960	3910874	Grants	Puerco Dam	T13N	R02W	29	SE1/4 NE1/4 SW1/4
32	298940	3922341	Grants	Cerro Tinaja	T14N	R04W	24	SE1/4 SW1/4 NW1/4
33	300208	3922867	Grants	Cerro Tinaja	T14N	R04W	24	NE1/4 NE1/4 NE1/4
34	309557	3925383	Grants	Casa Salazar	T14N	R03W	12	SE1/4 SE1/4 NE1/4
36	298719	3859680	Acoma Pueblo	White Ridge	T07N	R03W	6	NW1/4 NW1/4 SW1/4
37	291279	3855666	Acoma Pueblo	Cerro Verde	T07N	R04W	20	SE1/4 NE1/4 NW1/4
38	291284	3845845	Acoma Pueblo	Chicken Mt.	T06N	R04W	20	NW1/4 SW1/4 NE1/4
US Forest Service (Cibola National Forest)								
01	369938	3868042	Belen	Mt. Washington	T08N	R05E	4	NE1/4 NW1/4 SW1/4
02	370828	3870673	Belen	Mt. Washington	T09N	R05E	28	NE1/4 SW1/4 SW1/4
03	373828	3873035	Belen	Mt. Washington	T09N	R05E	23	SW1/4 NW1/4 NW1/4
10	362120	3833780	Belen	Tome NE	USFS	CNF	NS	
26	295104	3796361	Magdelana	Carbon Springs	T01N	R04W	23	SW1/4 NE1/4 NW1/4
US Army White Sands Missile Range								
39	394192	3691583	Tularosa	Three Rivers SW	T11S	R08E	13	SW1/4 NE1/4 SE1/4
41	380832	3742935	Oscura Mountains	Gardern Spring Canyon	T06S	R06E	2	SE1/4 SE1/4 SE1/4
Bureau of Reclamation (Albuquerque)								
11	300910	3683320	T or C	Black Bluffs	T12S	R03W	15	SW1/4 NE1/4 NW1/4
Private Land								
42	287411	3838146	Acoma Pueblo	Chicken Mt.	T05N	R05W	12	SW1/4 NE1/4 NW1/4

Source: 58 SOW EA
Notes:
HLZs 1, 4, 39, and 42 have been closed and 5, 8, 9, 14, 25, and 40 are no longer used by the 58 SOW since the 58 SOW EA was published.
Shaded rows indicate three HLZs identified in this SEA.
R = Range
S = Section
T = Township
UTM = Universal Transverse Mercator

Table 2-5. Comparison of Corrected Helicopter Landing Zones

	UTM (Zone 13)		US Geological Survey Information					
HLZ	**East**	**North**	**1:100000**	**1:24000**	**T**	**R**	**S**	**¼ Sections**
06 Corrected	286521	3845855	Acoma Pueblo	Chicken Mt.	T06N	R05W	23	NW1/4 SE1/4 SE1/4
06 Incorrect	286844	3846668	Acoma Pueblo	Chicken Mt.	T06N	R05W	14	NW1/4 SE1/4 SE1/4
17 Corrected	285045	3843466	Acoma Pueblo	Chicken Mt.	T06N	R05W	34	SE1/4SW1/4 SE1/4
17 Incorrect	284935	3843383	Acoma Pueblo	Chicken Mt.	T06N	R05W	27	SE1/4SW1/4 SE1/4
42 Corrected	287518	3839432	Acoma Pueblo	Chicken Mt.	T05N	R05W	12	SW1/4 NE1/4 NW1/4
42 Incorrect	287411	3838146	Acoma Pueblo	Chicken Mt.	T05N	R05W	13	SW1/4 NE1/4 NW1/4

Source: AETC 2000
UTM = Universal Transverse Mercator

2.1.3 Parking Lot Addition

Since the 58 SOW EA, Kirtland AFB has proposed that a parking lot be paved as part of the CV-22 aircraft beddown to accommodate additional numbers of personnel. The parking lot would accommodate spots for 67 vehicles, be less than three-quarters of an acre in area, and be located immediately west of Building 994 (see **Figure 2-2**) in an existing gravel and dirt parking area. This parking is necessary to support additional personnel who would be assigned to Hangar 1000 in conjunction with CV-22 aircraft maintenance and operations. This is the only area available near the hangar. The proposed parking lot would make it easier and safer for 58 SOW personnel assigned to Hangar 1000 to access the facility. This action would relieve illegal parking and provide the necessary support for the number of personnel assigned to the facility. The additional parking area would also accommodate parking during elevated security conditions.

2.2 Alternatives to the Proposed Action

2.2.1 No Action Alternative

For the purposes of this SEA, the No-Action Alternative is the same as the Proposed Action described in the 58 SOW EA as it relates to the CV-22 aircraft beddown. This includes the following:

- Adding seven CV-22 aircraft to the inventory at Kirtland AFB beginning in FY 2003, with the seventh aircraft arriving in FY 2005.
- Removal of the 11 MH-53 helicopters from the inventory at Kirtland AFB beginning in FY 2002, with the last MH-53 helicopter departing in FY 2004.
- Under the No Action Alternative, only 36 of the 39 active HLZs could be used by 58 SOW aircrews because HLZ 06, HLZ 17, and HLZ 42 were incorrectly identified in the 58 SOW EA. Therefore, impacts of CV-22 aircraft training on these three sites would not be assessed.

- Under the No Action Alternative, no new parking lot would be constructed for personnel associated with the CV-22 aircraft.
- The No Action Alternative would not be a viable alternative because the proposed beddown schedule for the CV-22 aircraft has already changed to match the description of the current Proposed Action assessed in this SEA. However, inclusion of the No-Action Alternative is prescribed by the CEQ regulations and, therefore, will be carried forward for further analysis.

2.2.2 Alternatives Considered but Not Carried Forward

Basing the CV-22 aircraft at another base was considered, but not carried forward. Prior to implementation of the 58 SOW EA, Kirtland AFB was the site for advanced training in the MH-53, as well as all other USAF helicopters used for special operations missions. There are no other sites where advanced special operations aircrew training occurs in a school-house setting in the United States. As a result, this alternative is not analyzed further in this document.

2.2.3 Permitting and Licensing

Mobile sources such as aircraft, aerospace ground equipment, construction equipment, and personal vehicles are not required to be permitted under the Clean Air Act (CAA). Construction of the parking lot would require a Fugitive Dust Control Permit from the City of Albuquerque Environmental Health Department Air Quality Division if the parking lot will be greater than three-quarters of an acre in size. Permit applications are required to be submitted at least 10 working days prior to start date of construction.

Although the size of the parking lot is not estimated to exceed three-quarters of an acre, the overall footprint of construction area disturbance could. If the parking lot construction disturbance area exceeds one acre of disturbance, a National Pollutant Discharge Elimination System General Permit for Storm Water Discharges from Construction Activities (Federal Register 2003) would be required prior to the start of construction activities.

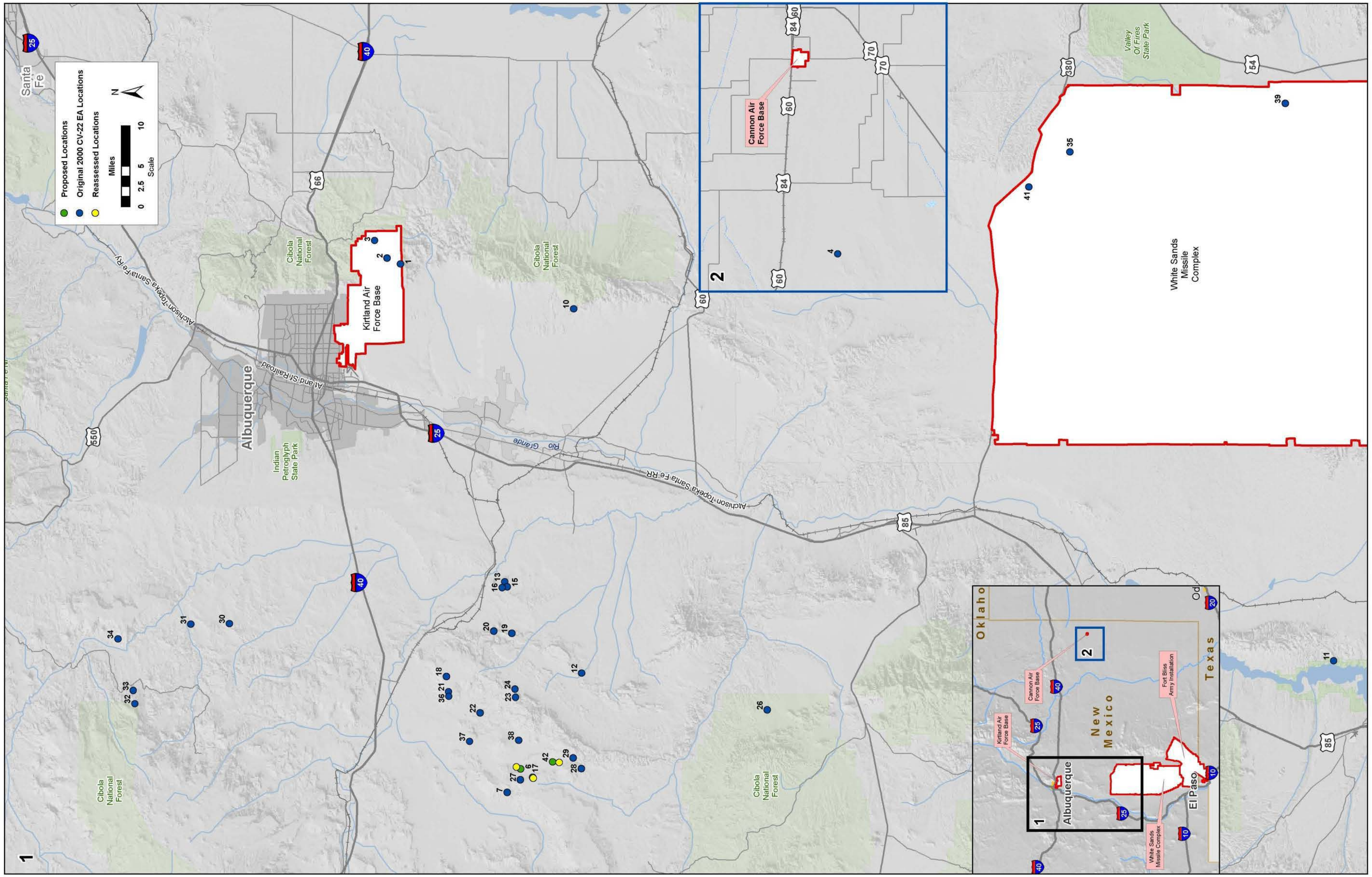


Figure 2-1. Corrected Locations of Three Proposed Helicopter Landing Zones

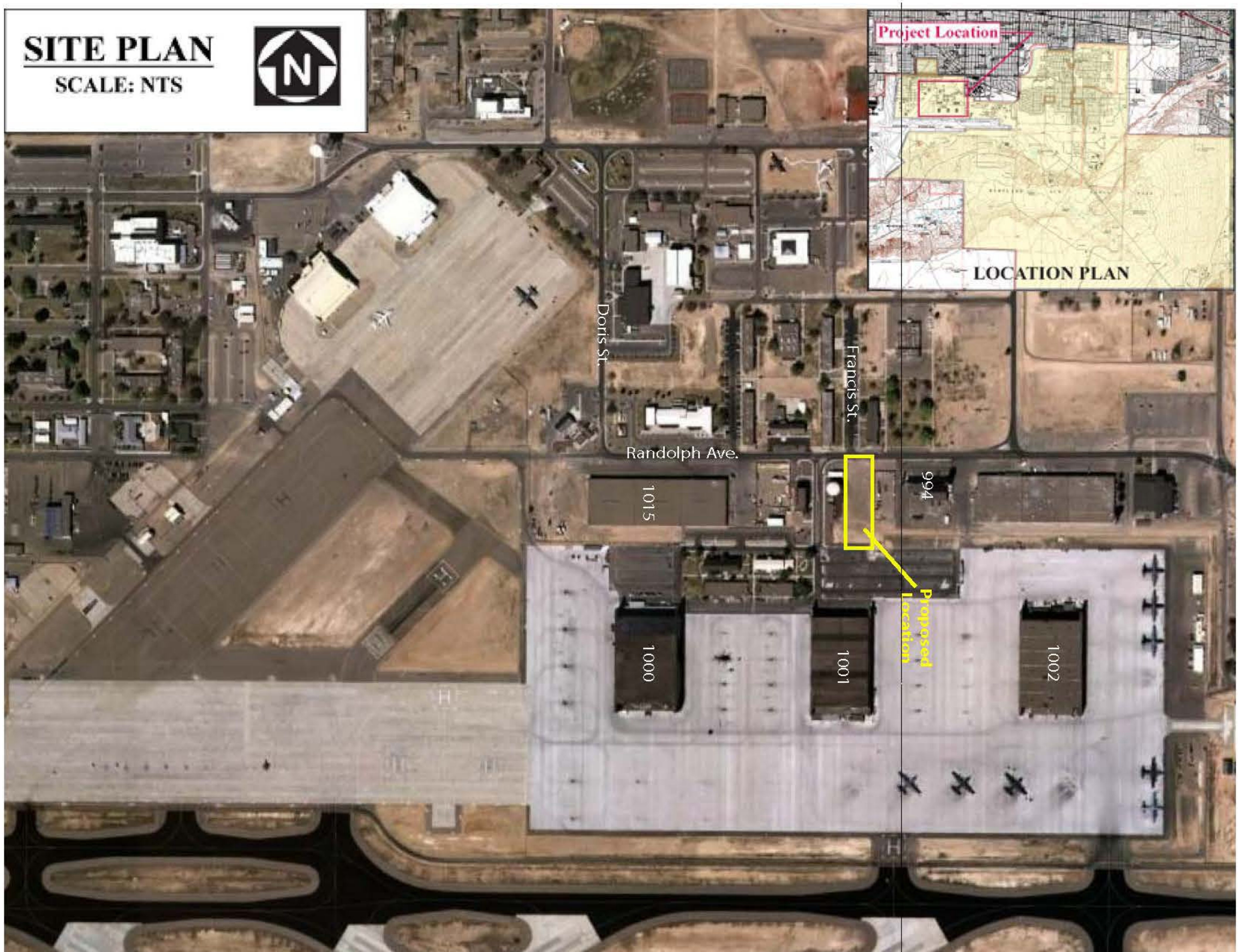


Figure 2-2. Proposed Location of the CV-22 Parking Lot

3. EVALUATION OF IMPACTS

This section describes the natural and human environment that exists at Kirtland AFB and the potential impacts the Proposed Action could have on that environment. This document is a supplement to the 58 SOW EA and will address only those portions of the Proposed Action or resource areas that have changed since 2000, which are air quality, and noise.

3.1 Impacts of the No Action Alternative

For the purposes of this SEA, the No Action Alternative is the same as the Proposed Action as analyzed in the 58 SOW EA. Due to the timing of the current Proposed Action and the No Action Alternative, the No Action Alternative is a hypothetical scenario used to compare baseline conditions with the current Proposed Action. Consequently, should the No Action Alternative be implemented, the impacts expected would be those of the Proposed Action in the 58 SOW EA. The following summary contains the impacts of the No Action Alternative. The complete analysis of the No Action Alternative is contained in the 58 SOW EA under the Proposed Action headings.

Airspace Management. Airspace use would increase to a maximum in FY 2003 as CV-22 aircraft numbers increase and the MH-53 begins to be phased out. This increase would cause minimal impacts to 58 SOW airspace areas. Subsequently, airspace use would decrease through FY 2006 as the remaining MH-53 helicopters are phased out. The overall cumulative impact would then consist of 18 percent fewer sorties and an increase of 16 percent flying hours when compared to current numbers.

Noise. If both the proposed actions were implemented, noise levels would increase slightly in the vicinity of the Albuquerque International Sunport and in areas underlying the airspace used by the 58 SOW. These increases would be very minor. Changes in noise levels in the vicinity of the airport would be virtually indistinguishable from current levels. Minor changes in noise levels in the airspace areas would result in noise levels that would remain well below national standards for residential areas.

Biological Resources. The No Action Alternative would only have the potential to affect biological resources in areas underlying 58 SOW airspace. All proposed renovation and repair activities would occur within existing buildings and no biological resources would be affected. Increase in operations at the Albuquerque International Sunport are not likely to affect biological resources because of the amount of flight activity that already occurs at that airfield and has occurred since the 1940s. It is expected that any species likely to be affected by aircraft activity will have either become habituated to such activity or left the vicinity of the airport.

The No Action Alternative would result in an increase of nearly 5,000 hours per year of flight activity by the 58 SOW in FY 2003. However, by FY 2006, the unit would experience a subsequent decrease of approximately 3,000 hours per year. There is a small potential for loss of vegetative species in the immediate vicinity of the HLZs used by the 58 SOW. These areas are currently used by the 58 SOW and have been used similarly for decades. Any additional loss of vegetation that would result from the No Action Alternative would be minimal and would not affect vegetative communities in the area.

There is a small potential for loss of vegetative species in the immediate vicinity of the HLZs used by the 58 SOW. These areas are currently used by the 58 SOW and have been used similarly for decades. Any additional loss of vegetation that would result from the No Action Alternative would be minimal and would not affect vegetative communities in the area. There is a small potential for disturbance of certain sensitive wildlife species in areas underlying 58 SOW airspace. It is not anticipated that the No Action Alternative would result in any impacts to threatened and endangered species in these areas.

Land Management and Use. The only potential effect of the No Action Alternative on land management and use would occur from elevated noise levels. As described in the discussion of noise impacts above, changes in noise levels resulting from the proposed actions would be negligible. These changes are not anticipated to affect land management or use.

Air Quality. The estimated emissions for all criteria pollutants under the No Action Alternative were found to be below the *de minimis* threshold levels and less than 10 percent of the Albuquerque-Bernalillo County air basin's total emissions inventory. Therefore, the General Conformity Rule is not applicable. The No Action Alternative would not cause or contribute to the violation of an air quality standard nor interfere with the attainment of any standard. This conclusion also applies to the airspace areas and other airports used by the 58 SOW.

Socioeconomics. The No Action Alternative would result in minor beneficial impacts to the local economy without disproportionately affecting local or regional minority or low-income populations.

Cultural Resources. There is a potential for minor impacts to cultural resources from the No Action Alternative. The No Action Alternative would result in an increase in use of the 58 SOW HLZs. The landing zones were surveyed for cultural artifacts and none were discovered with the possible exception of one HLZ. The 58 SOW has relocated the landing site to avoid this potentially sensitive area.

Water Resources. Under the No Action Alternative, the maximum increase of personnel would be an additional 327 (to an overall total of 1,857) in 2002. This addition is small in comparison to the ever-growing population of the Albuquerque area, and would more than likely have a negligible impact on the ground water in the Rio Grande Basin. Therefore, potential impacts to ground water would be negligible under any of the options considered.

Geological Resources. The double rotor of the CV-22 aircraft produces stronger downdrafts when taking off than the MH-53, MH-60G or the UH-1N helicopters that currently fly in the 58 SOW training areas. The CV-22 aircraft would cause a slight increase in soil erosion in comparison to the current helicopters. In addition, flight operations would increase under the No Action Alternative, increasing the amount of downdrafts produced by aircraft. This would cause a slight increase in soil erosion when compared to current use by the 58 SOW.

Hazardous Materials and Wastes. Management of hazardous materials and wastes would not be significantly affected by the No Action Alternative for three reasons: 1) there would be either a slight reduction or slight increase in total aircraft numbers operated by the 58 SOW; 2) the actions would take place at a large international airport where aircraft maintenance and refueling take place on a daily basis and 3) the CV-22 aircraft was designed to reduce hazardous waste streams when compared to current aircraft in the DoD inventory. In addition, replacement of 11 aging MH-53 helicopters with seven CV-22 aircraft would lead to a reduction in hazardous waste streams associated with operation and maintenance of 58 SOW aircraft.

Kirtland AFB is a large quantity generator of hazardous waste and a treatment, storage and disposal facility under a Resource Conservation and Recovery Act Part B permit issued by the state of New Mexico. The Defense Reutilization and Marketing Office operates hazardous waste collection and storage sites on base and arranges for off-site disposal of the wastes. Although the No Action Alternative would result in an increase in hazardous materials and wastes generated by the 58 SOW, this increase would represent a minor change in the quantities of these materials used and generated at the base and there would be no change in types of materials used. All hazardous materials used and hazardous waste generated would continue to be handled in accordance with all applicable federal and state regulations regarding these materials. Therefore, no noticeable impact on hazardous materials and wastes is anticipated from the No Action Alternative.

Aircraft Safety. Under the No Action Alternative, overall flying hours would permanently increase 16 percent in FY 2006 following a peak increase in flying hours of 38 percent in FY 2003 as the 58 SOW transitions from the MH-53 helicopters to the CV-22 aircraft. The increased flying hours for the UH-1, HH-60 and HC-130P aircraft would result in a slight increase in the potential for accidents by those aircraft. The Class A mishap rates for those aircraft are low and the 58 SOW has an excellent safety record. CV-22 aircraft was designed with redundant safety systems on all of its flight control equipment and the operational version is expected to be a very safe aircraft to operate. While three prototype/early production aircraft have crashed (1991, 1992, and 2000) in flight testing, it is not appropriate to use experimental versions' safety data to predict the potential safety parameters of an operational aircraft. The causes of the 1991 and 1992 crashes were ascertained and fixed. It is expected that any aircraft or equipment problems identified as contributing to the 2000 crash would likewise be corrected before operational production of the CV-22 aircraft. Hence, the operational version of the CV-22 aircraft should not experience the same problems as the experimental versions. It is expected that replacement of the aging MH-53 helicopters with newer aircraft would have a slight beneficial impact on safety. For these reasons, the No Action Alternative is not expected to have a significant negative impact on safety at the 58 SOW.

3.2 Air Quality

Potential air quality impacts from the Proposed Action include emissions from the operation and maintenance of the CV-22 aircraft and from construction of a parking lot. Development of a corrosion control facility has started, which will handle composite painting and repairs for the CV-22 aircraft; however, an EA has been prepared for this facility and is not addressed in this SEA.

Existing air quality conditions and potential changes to those conditions will be examined by determining the quantities of six commonly generated air pollutants. These air pollutants, also known as criteria pollutants, include carbon monoxide (CO), nitrogen dioxide (NO_2), particulate matter including particulate matter less than or equal to 10 microns in diameter and particulate matter less than or equal to 2.5 microns in diameter (PM_{10} and $PM_{2.5}$), sulfur dioxide (SO_2), ozone (O_3), and lead (Pb). The U.S. Environmental Protection Agency (USEPA) has established National Ambient Air Quality Standards (NAAQS) for each of the criteria pollutants to protect public health and welfare.

The responsibility for ensuring compliance with the NAAQS has been delegated to the states and local agencies by the USEPA. Each state or local agency will develop a State Implementation Plan (SIP) that details how compliance with the NAAQS will be demonstrated. The SIP may contain a compilation of regulations, strategies, schedules, and enforcement actions. The Albuquerque Environmental Health Department (AEHD) Air Quality Division (AQD) is responsible for maintaining compliance with the NAAQS within Albuquerque and Bernalillo County and has accepted the more stringent state established standards.

3.2.1 Existing Conditions

Bernalillo County is in attainment for all NAAQS. Prior to 1996, the County was in non-attainment of the standard for CO. To assure continued compliance with the NAAQS, CO abatement programs such as vehicle emissions testing, oxygenated fuels, and the No-burn Program have been created. The County will operate under a Limited Maintenance Plan for CO until 2016, when attainment status will be re-evaluated. Under this plan, all federal actions are considered to have met the general conformity provisions under the Clean Air Act and thus a conformity determination is not required.

EPA Air Data for 2006 show that monitored pollutants in Bernalillo County are NO_2, CO, PM_{10} coarse particles, $PM_{2.5}$ fine particles, and O_3.

Kirtland AFB is currently permitted as a major source under the Title V program. A major source is defined as having the *potential* to emit 100 tons per year or more of any criteria pollutant, 10 tons per year or more of any single Hazardous Air Pollutant (HAP), or 25 tons per year or more of all HAPs combined. Actual emissions from activities at Kirtland AFB are much lower than current permitted values. **Table 3-1** contains the Kirtland AFB 2005 emission inventory and illustrates the difference between the actual and permitted allowable emissions.

Table 3-1. 2005 Air Emissions for Kirtland AFB

Pollutant	Emissions	
	Actual (tons per year)	**Allowable (tons per year)**
Criteria Pollutants and Precursors		
CO	17.3	125.0
Oxides of Nitrogen (NO_x)	37.7	200.2
Particulate Matter (PM)	17.0	42.8
PM_{10} [a]	16.8	40.4
$PM_{2.5}$ [a]	16.8	40.4
Oxides of Sulfur (SO_x)	1.8	20.2
Volatile Organic Compounds (VOCs)	57.5	206.0
Total HAPs	3.3	13.5

Source: KAFB 2007a

Notes:

Emissions in this table represent stationary sources at Kirtland AFB. Mobile sources such as aircraft, aerospace ground equipment, and personal vehicles are not required to be permitted and are not represented in either the actual or allowable emissions listed.

[a] Particulate matter ≤ 10 μm and particulate matter ≤ 2.5 μm are subsets of particulate matter.

3.2.2 Impacts

Proposed Action

Air emissions from the proposed project will result from an increase in operation of the CV-22 aircraft (engine emissions), maintenance of the aircraft, an increase in personnel to support the beddown, and construction of the parking area for the facility.

Aircraft Operations. The new CV-22 aircraft will be phased in at Kirtland AFB, and will be replacing the MH-53 helicopters, which were removed from training in FY 2007. The highest total number of sorties (defined as complete missions including take off, entire training flight and landing) by 58 SOW aircraft would occur in FY 2005 and FY 2007. **Table 2-2** shows the numbers of sorties flown from FY 2005 through FY 2012.

In order to facilitate direct comparison of the MH-53 helicopters and the CV-22 aircraft, emissions for both aircraft were calculated using the Kirtland AFB Mobile Inventory Source Calculation Tool (MIST).

This calculation tool was developed using USEPA default time in mode data adjusted to site specific mixing height data (KAFB 2007b). Emission factors and fuel flow data used in the tool were taken from the USAF Institute for Environment, Safety and Occupational Health Risk Analysis Air Emissions Inventory Guidance Document for Mobile Sources at Air Force Installations (USAF 2002).

The Emissions and Dispersion Modeling System (EDMS), is a Federal Aviation Administration (FAA) model that calculates aircraft emissions and has the capability to model Ground Support Equipment (GSE), and Auxiliary Power Units (APUs), as well as estimating emissions from vehicle trips associated with increases/decreases in personnel. EDMS was only used to calculate GSE/APU and personal vehicle emissions.

Emissions from aircraft associated with the CV-22 aircraft beddown will decrease in the years that both the CV-22 aircraft and the MH-53 helicopters operate as well as in the years that just the CV-22 aircraft operate with the exception of NO_x emissions. Emission factors for all pollutants are lower for the CV-22 aircraft than they are for the MH-53 helicopters with the exception of nitrogen oxides (NO_x). Although the total number of sorties is less for the CV-22 aircraft in FY 2010, the higher emission rate of NO_x, causes emissions in FY 2010 to be greater than emissions in previous years (see **Table 3-2**).

Aircraft Maintenance Impacts. Current maintenance operations for the CV-22 aircraft that will generate air emissions include the following operations:

- Rotor blade repair, which involves sanding paint and primer off pockmarks, applying filler to the pockmarks, sanding the filler smooth, and priming and painting the blades. The operation is anticipated to occur approximately once every two weeks, with all 6 blades on an aircraft being repaired.
- Aircraft body repair, which involves sanding the aircraft body, performing composite repair using carbon fiber soaked in resin, sanding to smooth, and priming and painting. It is anticipated that one aircraft per month will need body repair.
- An Authority to Construct air permit has been issued in accordance with the New Mexico Administrative Code Requirements by the AEHD AQD for the construction of the 58 SOW Corrosion Control Facility and construction began in 2007. The composite repairs and painting operations for the CV-22 aircraft will transfer to the new facility, and emissions from these operations were included in requested air permit limits.

Construction Impacts. A 67 vehicle parking facility will be constructed as part of the Proposed Action. During construction of the lot, fugitive dust will be released, both from wind and ground disturbance by construction vehicles. The lot will be less than 0.75 acres in size and is therefore exempt from the requirement to obtain a fugitive dust control permit. Construction of the lot will cause minor, temporary increases in PM_{10} and $PM_{2.5}$ emissions at the base. In addition to particulate matter, criteria pollutant emissions will be generated from construction equipment. The construction equipment will likely be large diesel vehicles used for earth work and pavement installation. Emissions from the equipment would be temporary and insignificant. VOC emissions will be generated during the painting of the parking lot. Since the parking lot is small in size and the painting will be a one time occurrence, emissions of VOCs will be minor and temporary.

Dust control measures will be employed during construction of the parking area regardless of whether or not a fugitive dust control permit is required. These measures could include wetting the ground, use of dust suppressants, and minimizing the amount of time that ground is left bare.

Air quality impacts from the parking lot also include emissions from the increased vehicle traffic within the area of the Proposed Action. Emissions from vehicles utilizing the parking lot were calculated using EDMS default values for 67 vehicles going five miles per hour (mph) in the parking lot. EDMS default values included traveling 820 feet and an idle time of 1.5 minutes. It was assumed that each person would drive his own vehicle. EDMS values used include round trips (20 miles) and speed of 30-35 mph.

Total Air Quality Impacts. Total annual CV-22 aircraft emissions for all of the criteria pollutants are less than the annual emissions from the MH-53 helicopters. The newer, more efficient CV-22 aircraft engines, in combination with a total decrease in sorties and a decrease in emissions from ground support equipment, reduce the total air quality impact from FY 2003 operations. Impacts from construction of the parking lot are temporary and insignificant.

No Action Alternative

If the No Action Alternative were implemented, the total number of sorties would be lower thus resulting in even lower aircraft emissions. The temporary emissions from construction of the parking lot would be completely eliminated. Emissions from the No Action Alternative would not result in any significant affect on the air quality in the area.

3.3 Noise

3.3.1 Methods and Approach

Sound is defined as a particular auditory effect produced by a given source, for example the sound of rain on a rooftop. Sound is measured with instruments that record instantaneous sound levels in decibels (dB). A-weighted sound level measurement (dBA) is used to characterize sound levels (measured in dBA) that can be sensed by the human ear. “A-weighted” denotes the adjustment of the frequency range to what the average human ear can sense when experiencing an audible event. C-weighted sound level measurement (dBC) correlates well with physical vibration response of buildings and other structures to airborne sound. Impulsive noise resulting from armor, artillery, and demolition activities are assessed in terms of dBC. Unless otherwise noted, all sound levels analyzed in this SEA are A-weighted. **Appendix B** provides detailed information regarding noise methodology and terminology utilized in this SEA.

Noise and sound share the same physical aspects, but noise is considered a disturbance while sound is defined as an auditory effect. Noise is defined as any sound that is undesirable because it interferes with communication, is intense enough to damage hearing, or is otherwise annoying. Noise can be intermittent or continuous, steady or impulsive, and can involve any number of sources and frequencies. It can be readily identifiable or generally nondescript. Human response to increased sound levels varies according to the source type, characteristics of the sound source, distance between source and receptor, receptor sensitivity, and time of day. How an individual responds to the sound source will determine if the sound is viewed as music to one’s ears or as annoying noise. Affected receptors are specific (e.g., schools, churches, or hospitals) or broad (e.g., nature preserves or designated districts) areas in which occasional or persistent sensitivity to noise above ambient levels exists.

Table 3-2. Proposed Action Estimated Emissions (CV-22 and MH-53 only)

Emissions Source	Emissions Rates in Tons per Year (tpy)														
	CO			VOC			NO_x			SO_x			PM_{10} and $PM_{2.5}$		
	FY 05	FY 07	FY 10	FY 05	FY 07	FY 10	FY 05	FY 07	FY 10	FY 05	FY 07	FY 10	FY 05	FY 07	FY 10
Aircraft	17.24	10.4	1.62	4.68	2.59	0.02	13.89	16.83	16.25	1.73	1.47	0.92	2.83	2.53	1.73
GSE/APU	15.80	18.60	3.51	1.03	1.16	0.16	3.50	4.23	0.96	0.17	0.21	0.05	0.47	3.86	1.98
Personal Vehicles	0.17	0.22	0.10	0.01	0.02	0.01	0.01	0.02	0.01	0	0	0	0	0.001	0
Total	**33.21**	**29.22**	**5.23**	**5.72**	**3.77**	**0.19**	**17.40**	**21.08**	**17.22**	**1.90**	**1.68**	**0.97**	**3.30**	**6.39**	**3.71**

Source: FAA 2004
APU = Auxiliary Power Unit
GSE = Ground Support Equipment
tpy = tons per year

The Region of Influence (ROI) for the Proposed Action and alternatives includes the base, local environs, and military training airspace. In this SEA, single-event noise such as an overflight is described by the sound exposure level (SEL). Noise levels, resulting from multiple single-events, are used to characterize the airfield environment and are measured in day-night average A-weighted sound level (ADNL). Onset rate adjusted monthly day-night sound level (L_{dnmr}) is used for areas underlying the airspace. Both ADNL and L_{dnmr} noise metrics incorporate a "penalty" for nighttime noise events to account for increased annoyance. A general discussion of these metrics is provided below.

Sound Exposure Level. SEL is a measure of the total sound exposure of an event compressed into a 1-second time interval. Thus, it takes in the sound energy of the event and represents it as a steady noise level that lasts for 1 second. This metric is most often used when comparing single noise events, such as noise from jet departures or noise associated with various construction stages. **Table 3-3** provides SEL values at various altitudes for 58 SOW aircraft operations directly overhead at various speeds and power settings depending on aircraft type (values in the table represent averages).

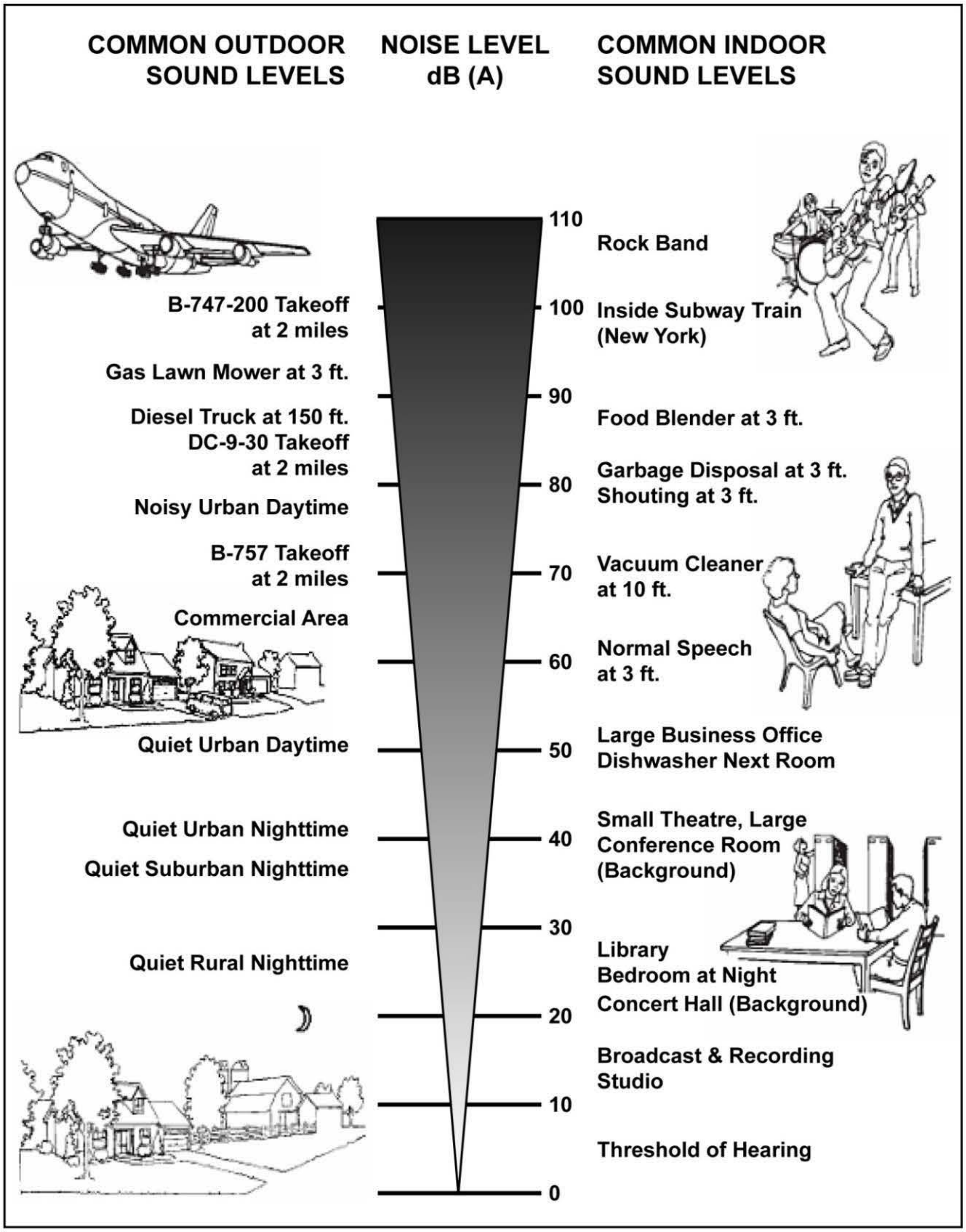
Table 3-3. SEL dBA Values for 58 SOW Aircraft

Altitude	C-130H	CV-22	MH-53	UH-1N	UH-60A
200	102.7	105.2	104.7	101.8	95.8
500	96.5	100.7	100.3	96.0	89.8
1000	91.4	96.9	96.7	91.4	85.0
2000	85.8	92.5	92.5	86.6	79.6
3150	81.7	89.1	89.4	83.1	75.7
5000	77.3	85.2	85.7	79.4	71.2

Note: Based on steady, level flight and using Omega 108 data from actual overflight noise measurements. Based on single flight track analysis using RNM data from actual overflight noise measurements of CMH-53E and MV- 22B.

Day-Night Average A-weighted Sound Level. Sound levels, resulting from multiple single events, are used to characterize community noise effects from aircraft or sustaining road and building construction activity, and are measured in ADNL. The ADNL noise metric incorporates a "penalty" for evening and nighttime noise events to account for increased annoyance. ADNL is the energy-averaged sound level measured over a 24-hour period, with a 10 dBA penalty assigned to noise events occurring between 10:00 p.m. and 7:00 a.m. ADNL values are obtained by averaging sound exposure level values for a given 24-hour period. ADNL is the preferred sound level metric used to characterize noise impacts of FAA, U.S. Department of Housing and Urban Development (HUD), USEPA, and DOD for modeling airport environments.

Most people are exposed to sound levels of 50 to 55 dBA or higher on a daily basis. Studies specifically conducted to determine noise impacts on various human activities show that about 90 percent of the population is not significantly bothered by outdoor sound levels below 65 dBA (USDOT 1984). Studies of community annoyance in response to numerous types of environmental noise show that ADNL correlates well with impact assessments and that there is a consistent relationship between ADNL and the level of annoyance.



Source: Landrum & Brown 2002

Figure 3-1. Comparison of Common Noise Levels

ADNL is the metric recognized by the U.S. government for measuring noise and its impacts on humans. According to the USAF, the FAA, and the HUD criteria, residential units and other noise-sensitive land uses are “clearly unacceptable” in areas where the noise exposure exceeds 75 dBA, “normally unacceptable” in regions exposed to noise between 65 dBA and 75 dBA, and “normally acceptable” in areas exposed to noise of 65 dBA or under. The Federal Interagency Committee on Noise developed land use compatibility guidelines for noise in terms of a Day-night Average A-weighted Sound Level (DNL) sound level (FICON 1992). For outdoor activities, the USEPA recommends a DNL sound level of 55 dBA as the sound level below which there is no reason to suspect that the general population would be at risk from any of the effects of noise (USEPA 1974).

Noise levels in residential areas vary depending on the housing density and location. As shown in **Figure 3-1**, a quiet urban area in the daytime is about 50 dBA and a commercial area is approximately 65 dBA, whereas a noisy urban daytime area is 80 dBA.

3.3.2 Noise Analysis Methodology

Noise impacts in the vicinity of Albuquerque International Sunport were previously analyzed using combined results from FAA and DOD approved noise models. The Integrated Noise Model (INM), developed for the FAA, is best suited for analyzing noise impacts around commercial airports because the acoustical database internal to INM contains very specific acoustical data for many commercial, cargo, and general aviation aircraft. Because INM does not have very specific acoustical data for the specific types of military aircraft, DOD developed NOISEMAP. NOISEMAP has a specific database for military fixed wing aircraft and helicopters, but has a limited database for commercial, cargo, and general aviation aircraft. Since the noise produced by a helicopter is very different from that of a fixed-wing aircraft, the Rotorcraft Noise Model (RNM) was developed for the National Aeronautics and Space Administration to enhance the noise modeling analysis. RNM is the most accurate assessment tool available for analyzing helicopter noise impacts, because it accounts for special noise characteristics of helicopters and tilt rotors, which produce different noise signatures than fixed-wing aircraft. Since RNM is a relatively new product, the acoustical database does not contain all the specific types of helicopters and tilt rotor aircraft. Therefore, only the MH-53 helicopters and the CV-22 aircraft were modeled using RNM.

Noise levels resulting from aircraft operating in the affected Military Operation Areas (MOAs), Military Training Routes (MTRs), and restricted airspace were previously calculated with the USAF noise modeling program Military Operating Area and Range Noise Model. Resultant noise levels were based on the number of sortie-operations, time of day the sortie operations occurred, altitudes of the aircraft during the sortie-operations, engine power setting, and airspeed. A sortie-operation is the use of one airspace area (e.g., MTR, Low Altitude Training Navigation) by one aircraft. During the flying mission of a single sortie, an aircraft may conduct several sortie-operations.

Existing Conditions of Noise

The ambient noise environment around Kirtland AFB is affected mainly by airport and automobile traffic, and military operations. Military operations include aircraft operations from Albuquerque International Sunport and within the airspace training areas utilized by the 58 SOW.

Airfield Environment. The most recent noise analysis released for the Albuquerque International Sunport was an FAA Part 150 study completed in 1996. However, Kirtland AFB has completed two EAs since the release of the 1996 FAA Part 150 study. The most recent was the 58 SOW EA, which was completed in 1999 (AETC 2000). The 58 SOW EA Proposed Action noise contours represent the maximum number of proposed military aircraft operations as a result of the CV-22 beddown and are used as the baseline for this supplemental EA. These Baseline Noise Contours are presented in **Figure 3-2**.

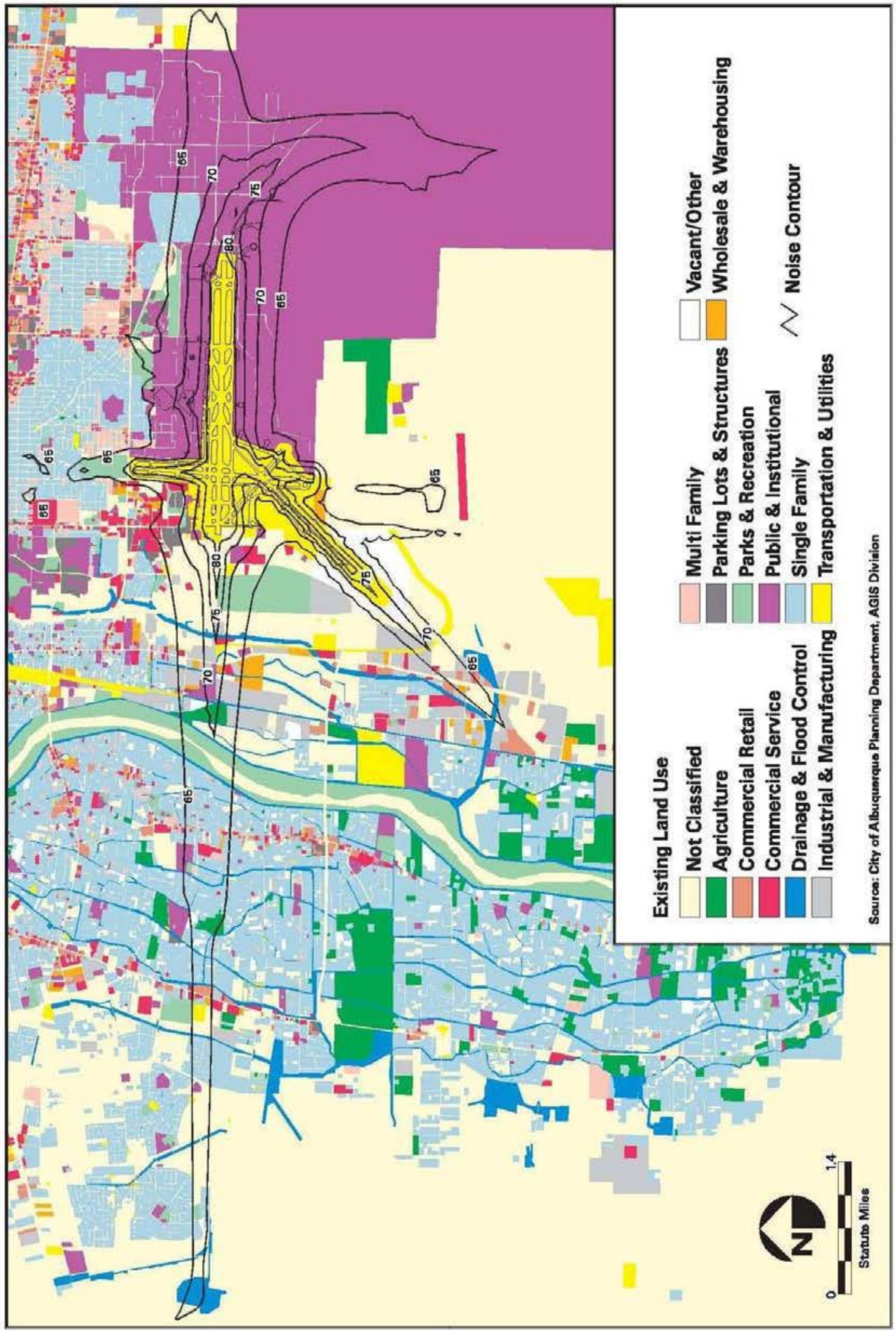


Figure 3-2. Baseline Scenario Noise Contours on Land Use Map

FY 2003 was chosen as the year to model because it was anticipated as the year when the most 58 SOW aircraft would be present and therefore represents a "worst case" for noise impacts. At the time the 58 SOW EA was being developed, it was estimated that the 58 SOW would have a total of 13 aircraft; four CV-22 aircraft and nine MH-53 helicopters stationed at Kirtland AFB in FY 2003. However the beddown of the CV-22 aircraft did not occur as quickly as anticipated and therefore the worst case was never met. In this SEA, the maximum number of 58 SOW aircraft would be nine; three CV-22 aircraft and six MH-53 aircraft in FY 2005.

Airspace. All airspace areas analyzed in the 58 SOW EA would remain the same. It is anticipated that these airspace areas would be utilized as proposed under the 58 SOW EA.

Construction Sound Levels. Building construction, modification, and demolition work can cause an increase in sound that is well above the ambient level. A variety of sounds are emitted from graders, pavers, trucks, welders, and other work activities and processes. **Table 3-4** lists sound levels associated with common types of construction equipment that are likely to be used under the Proposed Action. These sound levels were predicted 50 feet from the source of the noise. Construction equipment usually exceeds the ambient sound levels by 20 to 25 dBA in an urban environment and up to 30 to 35 dBA in a quiet suburban area.

Table 3-4. Predicted Noise Levels for Construction Equipment

Construction Category and Equipment	Predicted Noise Level at 50 feet (in dBA)
Grading	
Bulldozer	87
Grader	85
Water Truck	88
Paving	
Paver	89
Roller	74
Demolition	
Loader	85
Haul Truck	88
Building Construction	
Generator Saw	81
Industrial Saw	83
Welder	74
Truck	80
Forklift	67
Crane	83

Source: COL 2001

3.3.3 Noise Impacts

Proposed Action

A qualitative analysis of the Proposed Action was conducted for the number of aircraft and the corresponding total number of aircraft operations by aircraft type. **Table 2-1** compared the sorties flown by the CV-22 aircraft and the MH-53. The "worst case" scenario (FY 2003) and proposed aircraft numbers associated with the beddown of the CV-22 aircraft were compared.

Aircraft Operation Impacts. The new CV-22 aircraft would be phased in at Kirtland AFB, and would replace the MH-53 helicopter, which was removed from the Kirtland AFB training inventory in FY 2007. If the Proposed Action were implemented, the largest total number of 58 SOW aircraft would be at Kirtland AFB during FY 2005, FY 2006, FY 2011, and FY 2012. The highest total number of sorties (defined as complete missions including take off, entire training flight and landing) by 58 SOW aircraft also would occur in FY 2005 and FY 2006. **Table 2-1** shows the numbers of sorties flown in 2005 and 2006, and those expected to be flown during FY 2010. As a result, the proposed number of aircraft and corresponding sorties and hours are less than those analyzed in FY 2003. The Proposed Action would impact fewer acres than estimated in the 58 SOW EA.

Airspace

Since proposed aircraft operations would not exceed those values analyzed in the 58 SOW EA and that the impacts associated with nine aircraft would be less than the impacts associated with the 13 aircraft evaluated in the 58 SOW EA, no further analysis is required within the airspace areas. As a result, minor increases in some areas and decreases in other areas are still anticipated, yet these impacts would be minimal since all of these areas would be below 51.1 dBA.

Construction Impacts

As discussed in **Section 2.1**, construction activities under the Proposed Action would involve paving a parking lot. Noise from construction activities varies depending on the type of construction equipment being used, the area that the project would occur in, and the distance from the noise source. To predict how the paving activities would impact adjacent populations, noise from the probable construction was estimated. For example, as shown on **Table 3-4**, building construction usually involves several pieces of equipment (e.g., saws and haul trucks) that can be used simultaneously. Under the Proposed Action, the noise from all construction equipment in use on the busiest day was estimated to determine the total impact of noise from building activities at a given distance. Examples of expected construction noise during daytime hours are as follows:

- Building 1000 on the northeast corner of the Albuquerque International Sunport is approximately 200 feet away from the proposed parking area. Military employees could experience noise levels from parking lot construction of approximately 77 dBA.
- Employees working approximately 600 feet away from parking lot construction could experience noise levels of approximately 67 dBA.
- General populations approximately 50 feet from parking lot construction could experience noise levels of approximately 89 dBA.

Implementation of the Proposed Action would have short-term minor adverse effects on the noise environment from the use of heavy equipment during construction activities. Noise generation would last only for the duration of construction activities and would be isolated to normal working hours (i.e., between 7:00 a.m. and 5:00 p.m.). Noise impacts from increased traffic due to construction vehicles would also be temporary in nature.

No Action Alternative

If the No Action Alternative were implemented existing conditions would remain the same at Kirtland AFB with no change in MH-53 or CV-22 aircraft or associated sorties, hours, or noise impacts.

4. CUMULATIVE EFFECTS

4.1 Definition

The CEQ regulations, as set in 40 CFR 1508.7, stipulate that cumulative effects analysis should consider the potential environmental impacts resulting from "the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions." Recent CEQ guidance (CEQ 1997) in considering cumulative effects affirms this requirement, stating that the first steps in assessing cumulative effects involves defining the scope of other actions and their interrelationship with the Proposed Action. The scope must consider other projects that coincide with the location and timetable of the Proposed Action and other actions. Cumulative effects analysis must also evaluate the nature of interactions among these actions.

In this SEA, an effort has been made to identify all actions that are being considered and are in the planning phase at this time at Kirtland AFB. To the extent that details regarding such actions exist and the actions have a potential to interact with the Proposed Action in this SEA, these actions are included in this cumulative analysis. This approach enables decision-makers to have the most complete information available so that they can evaluate the environmental consequences of a proposed action in relation to other projects that may affect the same region of influence.

4.2 Past, Present, and Future Actions Relevant to the Proposed Actions and Alternative

This group of actions includes USAF actions that have a potential to partially coincide, either in time or geographic extent, with the Proposed Action. Information on these actions is included to determine whether they would, if implemented, incrementally affect environmental resources. Past actions are also considered. These recently proposed or currently planned actions include:

- Relocation of Truman Gate was completed in 2006
- Proposed construction of a campus for pararescue/parajumper training by the 58 SOW of AETC in 2007. Construction is proposed in an area previously occupied by aging military housing. This former housing was demolished in 2006.
- Proposed construction of the Battlespace Environment Laboratory in 2008
- Proposed construction and operation of an HC-130P Flight Simulator Facility and a Corrosion Control Facility by the 58 Special Operations Wing in 2008.
- Construction and operation of Phase I of the Kirtland Technology Park 2008 and Phase II is scheduled to begin in the next 5 years.
- Planned remediation activities in the Bulk Fuels Area are on-going. The replacement of fuel storage tanks and off-loading dock is planned for 2009-2011.
- Relocation of three to six F-16 aircraft from Cannon AFB, NM by 2011. An average of 20 sorties per day are anticipated, with no new facilities needed
- HC/MC-130 Recapitalization project involving replacement of 8 MC-130P Combat Shadow aircraft with 5 new MC-130 aircraft, beginning in 2010. Anticipated associated requirements are additional personnel, training devices, composite repair, storage space, building expansions, modifications to hangars, etc.

- Replacement of HH-60 Pave Hawks with CSAR-X helicopters for combat search and rescue; This beddown is anticipated to occur during the same time as the HC/MC-130 Recapitalization Project. Depending on the airframe selected, this also could require considerable building modifications.

These actions, by their nature and timing, involve activities that could have similar impacts to those addressed in this SEA.

4.3 Analysis of Cumulative Effects

An analysis was done of the potential for cumulative impacts resulting from the actions described above when combined with the Proposed Action in this SEA. The scope of this cumulative effects analysis was limited to the resources analyzed in Sections 3 and 4 of this SEA (air quality and noise).

4.3.1 Air Quality

Although the beddown of the CV-22 aircraft would have a temporary negative impact on air quality due to a temporary increase in aircraft numbers at the base, that impact would be offset by the end of 2007 with the departure of all MH-53 helicopters from the base. The drawdown of the MH-53 helicopters would result in an overall decrease in total aircraft at the base and a resultant decrease in air emissions. Emissions resulting from the construction of the parking lot will be temporary and insignificant and will not contribute to any long term cumulative impacts. The impact of the F-16 aircraft and CSAR-X aircraft that are proposed to be arriving at Kirtland AFB around FY 2010 have an unknown impact at this time. There is currently not enough information to estimate emissions from these aircraft. However, the addition of the F-16 aircraft would have a negative cumulative affect because emissions would increase but the CSAR-X is replacing the HH-60 helicopters and similar to the CV-22 aircraft replacing the MH-53 helicopters, a newer more fuel efficient aircraft could reduce emissions. The combined emissions from the Proposed Actions in this document, when considered with potential emissions from the other actions considered, are not expected to have any significant cumulative impacts on air quality.

Table 4-1 shows cumulative Proposed Aircraft Operations associated with the Proposed Action. The results of the emission estimates indicate that there would be no significant impact to the air quality in the area, and that most of the pollutant emissions levels would be lower in FY 2010 compared to FY 2005.

Table 4-1. Cumulative Proposed Aircraft Operations Associated with CV-22 Beddown

Aircraft	Current FY 2005	FY 2007 Proposed	FY 2010 Proposed
CV-22 sorties	0	534	945
MH-53 sorties	1886	1038	0
HH-60G sorties	1584	1584	1584
H/MC-130P sorties	1134	1134	1134
MC-130H sorties	472	472	472
UH-1N sorties	1200	1200	1200
TOTAL sorties	6276	5962	5335

Source: AETC 2000

4.3.2 Noise

Aircraft noise for all future foreseeable actions at Kirtland AFB has been analyzed in this EA. The 65 dBA ADNL noise contour line, as presented in **Figure 3-2** is not expected to expand with implementation of the Proposed Action. Since aircraft noise is consistent with the intended use for the installation, and overall military activity is less than historic activity, the overall cumulative impact to the ROI at most can only be considered a long term beneficial cumulative impact.

In addition to the activity related to these Proposed Action, Kirtland AFB will continue with an ongoing long-term military construction schedule. This construction will be a mix of new construction, renovation, and demolition accompanied by reconstruction. Although there are a number of construction projects proposed on and off base including the Proposed Action, they would all be temporally and spatially separate entities resulting in short term direct minor adverse cumulative impacts on noise.

4.4 Irreversible and Irretrievable Commitment of Resources

Irreversible commitment generally means material, non-material, and financial resources consumed that cannot be replaced. An irretrievable commitment of resources refers to the loss of production, harvest, or use of natural resources that occur over the life of the Proposed Action. For purposes of this SEA, impacts are considered irreversible and irretrievable where: uses of nonrenewable resources by implementing the Proposed Action are of sufficient magnitude that removal or nonuse thereafter is unlikely; and primary and secondary impacts generally commit future generations to similar uses. On this basis, the Proposed Action would result in the irreversible and irretrievable commitment of resources needed for construction of new facilities, and for maintenance, repair, and operation of existing facilities. These resources would include fuel, electricity, construction materials, and water.

Degradation to air quality that would result from construction activities would be reversible upon completion of project construction. Air quality effects from aircraft operations would be reversible if aircraft operations would cease. Although Best Management Practices have been incorporated into the Proposed Action to reduce soil erosion, the minor loss of soil during construction activities represents an irretrievable and irreversible commitment of resources. Construction and operation of the proposed projects would require an irretrievable commitment of labor resources. Construction materials and fuels used by construction vehicles and equipment would represent an irreversible commitment of these resources. The No-Action Alternative would not create any additional irreversible or irretrievable commitment of resources.

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5. LIST OF PREPARERS

This EA was prepared by engineering-environmental Management, Inc. (e²M), Albuquerque, New Mexico, San Antonio, Texas, and Fairfax, Virginia, under the direction of the USAF at Kirtland AFB, New Mexico.

5.1 Preparers

The e²M personnel that contributed to the preparation of this document are listed below.

Louise Baxter
M.P.A. Public Administration
B.S. Political Science
Years of Experience: 6

Gustin Hare
B.S. Environmental Science
Registered Environmental Professional
Years of Experience: 12

Brian Hoppy
B.S. Biology
Certificate Environmental Management
Years of Experience: 15

Daniel Koenig
B.S. Environmental Policy and Planning
Years of Experience: 2

Michael Moran, Ph.D.
Ph.D. Biochemistry
B.S. Chemistry
Registered Environmental Manager
Years of Experience: 23

Cheryl Myers
A.A.S. Nursing
Years of Experience: 17

Stephen Pyle
J.D. Environmental Law Certificate
B.S. Natural Resource Management
Licensed to practice law in Texas
Years of Experience: 10

Heather Seus
B.S. Environmental Engineering
Years of Experience: 7

Jeffrey Weiler
M.S. Resource Economics/Environmental Management
B.A. Political Science
Years of Experience: 32

5.2 Reviewers

The following U.S. Army and USAF personnel have reviewed and/or provided information and assistance to the development of this EA:

Dr. Evelyn Watkins, NEPA Program Manager 377 MSG/CEANQ

Jennifer Dann, Chief Compliance Section

Regina Vandzura, Environmental Support PMA 275

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7. DRAFT SUPPLEMENTAL EA DISTRIBUTION LIST

The Draft SEA was transmitted electronically to the following for review:

Draft Supplemental EA Recipient	Organization
Hein, Eric Terrestrial Ecosystems	U.S. Fish and Wildlife Service, New Mexico Ecological Services Field Station
Cibas, Gedi PhD Environmental Impact Review Coordinator	State of New Mexico, NM Environment Department Secretary's Office
Cottrell, Sarah Energy and Environmental Policy Advisor	State of New Mexico, Office of Governor Bill Richardson
Slick, Katherine State Historic Preservation Officer	State of New Mexico, Historic Preservation Division, Department of Cultural Affairs
Obenauf, Gretchen Archaeologist, Rio Puerco Field Office	Bureau of Land Management, Rio Puerco Field Office
Kelley, Thomas NAVAIR LKE V-22 Environmental Coordinator	Naval Air Systems Command
Hotaling, Jim R USAF AFSOC/A5RX CV-22 Logistics	Air Force Special Operations Command/Plans and Programs
Vandzura, Regina TITAN V-22 Environmental Support PMA 275	L-3 Titan Corporation
Medley, Ronald S LtCol USAF AETC Commander, 58 Operations Support Squadron	58th Special Operations Wing, Air Education & Training Command/58th Special Operations Wing
Leonard, Freddie L USAF AETC 58 SOW/CE	Air Education & Training Command/58th Special Operations Wing/Civil Engineering
Stock, Michael J USAF AETC AETC/A4MSE	HQ Air Education & Training Command/Logistics and Sustainment
Kelley, Thomas NAVAIR LKE	Naval Air Systems Command
Herold, Pamela NAVAIR PMA-275 Assist V-22 Deputy PM Environ Acq Rqmts	Naval Air Systems Command PMA-275
Purvis, Donald C USAF AFSOC/A5RX Hurlburt Field, FL	Air Force Special Operations Command/Plans and Programs
Nevins, Joe J USAF AETC 58 MXG/DD	Air Education & Training Command/58th Maintenance Group
Broyles, Philip N Capt OC-ALC/CS Logistics, Tinker AFB, OK	Nuclear Weapons Support, Logistics
Cupach, Paul V SMSgt USAF AETC 58 AMXS/MXMP	Air Education & Training Command/58th Aircraft Maintenance Squadron
Maffucci, Richard A CMSgt USAF AETC 58 AMXS/MXA	Air Education & Training Command/58th Aircraft Maintenance Squadron
Ledet, Randal MSgt USAF AETC AETC/A4MAH	HQ Air Education & Training Command/Logistics and Sustainment
O'Brien, Steven D CMSgt USAF AETC AETC/A4MAH	Air Education & Training Command/Logistics and Sustainment

Draft Supplemental EA Recipient	Organization
Schumacher, Gregory LtCol 3 MDOS/SGOPO	3rd Medical Operations Squadron
Adkins, Joshua S USAF AFMC 377 MSG/CEANQ NEPA Technician	Air Force Materiel Command/377th Mission Support Group/Civil Engineering
Alexander, Edward J CTR USAF AFMC AFRL/RVOI Safety/Environmental/Facilities Support	Air Force Materiel Command/Air Force Research Lab/Space Vehicles Directorate
Baker, Karen S USAF AFMC 377 MSG/CEANC Hazardous Waste Program Manager	Air Force Materiel Command/377 Mission Support Group/Civil Engineering
Beggs, Terry J USAF AFMC 377 ABW/SEW Weapons/Explosives/Nuclear Surety	Air Force Materiel Command/377th Air Base Wing/Safety
Bitner Jr., Ludie W USAF AFMC 377 MSG/CEANR Environmental Engineer - Restoration	Air Force Materiel Command/377th Mission Support Group/Civil Engineering
Blickem, Bonnie Realty Specialist	Department of Energy, Sandia Site Office
Bonaguidi, Joe SNL NEPA Specialist	Sandia National Laboratories
Carnes, Jackie J USAF AETC 58 MXG/MXE Environmental Specialist	Air Education & Training Command/58th Maintenance Group
Catechis Chris SNL NEPA Specialist	Sandia National Laboratories
Clark, Scott C USAF AFMC 377 MSG/CEANC EOCAMP/Air Support/Asbestos	Air Force Materiel Command/377th Mission Support Group/Civil Engineering
Crosgrove, Cole G USAF AFMC 377 MSG/CEANC Water Program Support	Air Force Materiel Command/377th Mission Support Group/Civil Engineering
Crutchfield, Charles D USAF AFMC 377 ABW/SEW Weapons/Explosives/Nuclear Surety	Air Force Materiel Command/377th Air Base Wing/Safety
Dann, Jennifer L USAF AFMC 377 MSG/CEANC Chief, Environmental Compliance	Air Force Materiel Command/377th Mission Support Group/Civil Engineering
DiGesu, Deana C CTR USAF AFMC 377 MSG/CEPE Programming Specialist	Air Force Materiel Command/377th Mission Support Group/Civil Engineering
Doyle, James R CTR USAF AFMC 377 MSG/CEP Engineering Director	Air Force Materiel Command/377th Mission Support Group/Civil Engineering
Dunn, Donna K CTR USAF AFMC 377 MSG/CEPE Base Community Planner	Air Force Materiel Command/377th Mission Support Group/Civil Engineering
Esterl John DTRA Safety & Environmental Compliance	Defense Threat Reduction Agency
Finley, Carol A USAF AFMC 377 MSG/CEANQ Natural Resources Program Manager	Air Force Materiel Command/377th Mission Support Group/Civil Engineering
Fraher Jeff DTRA/CXTS Environmental Engineer	Defense Threat Reduction Agency
Friedrichsen, Kent M USAF AFMC AFRL/RVOI Safety, Environmental, and Facilities Engineer	Air Force Materiel Command/Air Force Research Lab/Space Vehicles Directorate
Gould John DOE/NNSA	Department of Energy, National Nuclear Security Administration/Sandia Site Office
Hedrick, Michelle L USAF AFMC AFRL/RDOS Chief Test and Environmental Engineer	Air Force Materiel Command/Air Force Research Lab/Directed Energy Directorate

Draft Supplemental EA Recipient	Organization
Howell, Michael W USAF AFMC AFRL/RVOI Infrastructure Management	Air Force Materiel Command/Air Force Research Lab/Space Vehicles Directorate
Hunter, Charles R MSgt USAF AETC 58 MXS/MXE	Air Education & Training Command/58th Maintenance Group
Julian, Marsha Lt Col ANG MSG/EM Environmental Management	New Mexico Air National Guard/150th Fighter Wing Support Group/Environmental
Kitt, Steven C USAF AFMC 377 MSG/CEANC Hazardous Materials Program Manager	Air Force Materiel Command/377th Mission Support Group/Civil Engineering
Krieg, Sheryl W CTR USAF AFMC 377 MSG/CEPR Real Estate Assistant - Lead	Air Force Materiel Command/377th Mission Support Group/Civil Engineering
Lacy Susan DOE/NNSA/SSO Chemical Engineer, Environmental Team Leader	Department of Energy/National Nuclear Security Administration/Sandia Site Office
Lanz, Carl J USAF AFMC 377 MSG/CEANR Chief, Environmental Restoration	Air Force Materiel Command/377th Mission Support Group/Civil Engineering
Martinez, Victoria R USAF AFMC 377 AMDS/SGPB Industrial Hygienist	Air Force Materiel Command/377th Aerospace Medicine Squadron/Bioenvironmental Engineering
Montano, Patrick A USAF AFMC 377 MSG/CEANC Water Program Manager	Air Force Materiel Command/377th Mission Support Squadron/Civil Engineering
Morgan, Cid USFS District Ranger	US Forest Service/Cibola National Forest/Sandia Ranger District
Otero, Joseph C USAF AFMC 377 ABW/XP	Air Force Materiel Command/377th Air Base Wing/Plans and Programs
Parhizkar, Mohsen Col USAF AFMC 377 ABW/CV Chair, Environmental, Safety, Occupational Health Council (ESOH); Vice Commander	Air Force Materiel Command/377th Air Base Wing/Vice Commander
Pike, John S USAF AFMC 377 MSG/CEAN Chief, Natural Resources Management Branch	Air Force Materiel Command/377th Mission Support Group/Civil Engineering
Ragan, Elmer W USAF AFMC 377 ABW/SE Chief, Safety	Air Force Materiel Command/377th Air Base Wing/Safety
Reese, Ian E USAF AETC 58 OSS/DOO 58th SOW Airspace Management	Air Education & Training Command/58th Operations Support Squadron
Renner, Valerie A USAF AFMC 377 MSG/CEANQ Cultural Resources Program Manager	Air Force Materiel Command/377th Mission Support Group/Civil Engineering
Ringham-Chavez Cassie AFRL/VSOI Environmental	Air Force Research Laboratory/Space Vehicles Directorate
Robbins Jeff DOE/NNSA/Svc Ctr NEPA Compliance Officer	Department of Energy/National Nuclear Security Administration/Service Center
Roshau, Janet L USAF AFMC AFRL/RDOS Environmental	Air Force Materiel Command/Air Force Research Lab/Directed Energy Directorate
Sala Delores DOE/SSO/AMFPM Real Estate	Department of Energy/Sandia Site Office
Salas, Juan E USAF AFMC 377 MSG/CEF Fire Protection Branch	Air Force Materiel Command/377th Mission Support Group/Civil Engineering
Sanchez Dianne SNL MS0902 Real Estate	Sandia National Laboratories

Draft Supplemental EA Recipient	Organization
Sayner, William V CTR USAF AFMC 377 MSG/CEPE MILCON Project Engineer	Air Force Materiel Command/377th Mission Support Group/Civil Engineering
Scott, Ernest L Capt USAF AFMC 377 AMDS/SGPB	Air Force Materiel Command/377th Aerospace Medicine Squadron/Bioenvironmental Engineering
Scussel, CJ USACE Real Estate Specialist	US Army Corps of Engineers
Shupe, Barry 377 ABW/JAV Environmental/Real Property Attorney	377th Air Base Wing/Judge Advocate
Simnacher, Gerald H Ctr HQ AFOTEC/SEV Safety and Environmental	Headquarters, Air Force Operational Test and Evaluation Center
Speake, Jillian K USAF AFMC 377 ABW/PA Director, Public Affairs	Air Force Materiel Command/377th Air Base Wing/Public Affairs
Stark, Jean CTR USAF AFMC 377 MSG/CEPR Real Estate Manager	Air Force Materiel Command/377th Mission Support Group/Civil Engineering
Taylor, Daniel K MSgt USAF AETC 373 TRS DET 16/DET 16	Air Education & Training Command/373rd Training Squadron
Willett, David DTRA	Defense Threat Reduction Agency
Wilson, Brent USAF AFMC 377 MSG/CE Base Civil Engineer	Air Force Materiel Command/377th Mission Support Squadron/Civil Engineering
Withers Elizabeth NNSA	National Nuclear Security Administration
Wooten, David 2dLt USAF AFMC 377 AMDS/SGPB	Air Force Materiel Command/377th Aerospace Medicine Squadron/Bioenvironmental Engineering
Yan, Stephen USAF AFMC AFRL/RDOS	Air Force Materiel Command/Air Force Research Lab/Directed Energy Directorate

APPENDIX A

PUBLIC INVOLVEMENT

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lion in capital and state grants unspent. The new team was using the money for a roofing project at the West Side shelter and other needs.

▪ The new team was making

that's not noticed until later.

The previous managers, she said, had created isolation

minimum requirements of what the council was asking for," he said.

PUBLIC NOTICE

NOTICE OF AVAILABILITY
SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT OF PROPOSED ACTIONS BY THE 58TH SPECIAL OPERATIONS WING AT KIRTLAND AIR FORCE BASE, NM

An Environmental Assessment (EA) was prepared for the beddown of the CV-22 Osprey tilt-rotor aircraft at Kirtland AFB in 2000, but that action was delayed because of funding and schedule changes associated with the CV-22 acquisition. As a result, the Department of the Air Force has prepared a Supplemental EA (SEA) to assess the potential impacts from those portions of the Proposed Action that have changed since 2000. The results in the SEA indicate that the Proposed Action would not have a significant impact on the environment.

The SEA and draft Finding of No Significant Impact (FONSI) are available for public review at Central New Mexico Community College Montoya Campus Library, 4700 Morris NE and on-line at http://www.kirtland.af.mil under 'Our Environment.' For additional information or to make comments, contact: National Environmental Policy Act Program Manager, 377 MSG/CEVQ, 2050 Wyoming Blvd SE, Kirtland AFB, NM 87117-5270 or NEPA@kirtland.af.mil. Comments are due by February 27, 2008.

Comments on the Draft Supplemental EA

Commenter	Comment Received	Response
Mr. Scott Hoffman, CV-22 Sustainment	Throughout it talks about the MH-53s going away—they are all gone and have been.	The Proposed Action assumes a timeframe of FY2005 through FY2012. Therefore, although components of the Proposed Action have already been implemented due to timing issues, the analysis addresses all impacts in future terms. Text revised to clarify that H-53 helicopters have already left the inventory at Kirtland AFB.
Mr. Scott Hoffman, CV-22 Sustainment	The CV-22 is now (or will soon be) flight testing a belly mounted weapon system and I would imagine that once flight testing is done at Hurlburt that these weapons will be in use at Kirtland as well but this is considered a "Interim" weapon system.	The interim weapon system which is currently being tested on the CV-22 uses 7.62 mm ammunition, the same as is on the H-60. Crews also trained on weapons on the MH-53 at Kirtland AFB, and they will do so on the CV-22 as well. Therefore, there will be no change in impacts.
Mr. Scott Hoffman, CV-22 Sustainment	Aircraft 7 and 9 were delivered to Kirtland from Edwards to be modified and used as ground trainers.	Comment noted. No impacts would be expected due to the use as ground trainers.
Mr. Scott Hoffman, CV-22 Sustainment	The Passenger Oxygen System (POS) will likely be used on 58 SOW CV-22s in the near future. Each POS has a 25 liter LOX converter in it so must be serviced with LOX. Use of these units will place a bigger demand on the LOX plant and need for additional non-powered SE (LOX carts, purge/fill kits).	The POS will be added to the CV-22s as soon as they are in production. The POS will be a portable LOX (liquid oxygen) unit bolted to the floor of the CV-22 for passenger use. Other aircraft on the base already use LOX, and there is not expected to be significant increase in the use of the POS on the CV-22. Therefore, although there will be some potential increase in use, no significant increase in LOX carts or other related equipment is anticipated. Kirtland AFB currently does not use enough LOX to require a LOX plant, and LOX carts are filled from a tank which is periodically filled by a supplier. LOX use by the CV-22 would not change this scenario.

APPENDIX B

NOISE METHODOLOGY AND TERMINOLOGY

Appendix B
Noise Methodology and Terminology

This appendix presents a detailed discussion of noise and its effects on people and the environment. An assessment of aircraft noise requires a general understanding of how sound is measured and how it affects people in the natural environment. The purpose of this appendix is to address public concerns regarding aircraft noise impacts.

Section B.1 is a general discussion on the properties of noise. **Section B.2** summarizes the noise metrics discussed throughout this Supplemental Environmental Assessment (SEA). **Section B.3** provides Federal land use compatibility guidelines that are used in applying aircraft noise impacts to land use planning in the airport environment.

B.1 GENERAL

Noise, often defined as unwanted sound, is one of the most common environmental issues associated with aircraft operations. Of course, aircraft are not the only source of noise in an urban or suburban surrounding, where interstate and local roadway traffic, rail, industrial, and neighborhood sources also intrude on the everyday quality of life. Nevertheless, aircraft are readily identifiable to those affected by their noise, and typically are singled out for special attention and criticism. Consequently, aircraft noise problems often dominate analyses of environmental impacts.

Sound is a physical phenomenon, and consists of minute vibrations that travel through a medium, such as air, and are sensed by the human ear. Whether that sound is interpreted as pleasant or unpleasant depends largely on the listener's current activity, past experience, and attitude toward the source of that sound. It is often true that one person's music is another person's noise.

The measurement and human perception of sound involves two basic physical characteristics, intensity and frequency. The intensity is a measure of the strength or amplitude of the sound vibrations and is expressed in terms of sound pressure. The higher the sound pressure, the more energy carried by the sound and the louder is the perception of that sound. The second important physical characteristic is sound frequency which is the number of times per second the air vibrates or oscillates. Low-frequency sounds are characterized as rumbles or roars, while high-frequency sounds are typified by sirens or screeches.

The loudest sounds which can be detected comfortably by the human ear have intensities which are one trillion times larger than those of sounds which can just be detected. Because of this vast range, any attempt to represent the intensity of sound using a linear scale becomes very unwieldy. As a result, a logarithmic unit known as the decibel (dB) is used to represent the intensity of a sound. Such a representation is called a sound level.

Because of the logarithmic nature of the decibel unit, sound levels cannot be added or subtracted directly and are somewhat cumbersome to handle mathematically. However, some simple rules of thumb are useful in dealing with sound levels. First, if a sound's intensity is doubled, the sound level increases by 3 dB, regardless of the initial sound level. For example:

60 dB + 60 dB = 63 dB, and

80 dB + 80 dB = 83 dB

The total sound level produced by two sounds of different levels is usually only slightly more than the higher of the two. For example:

$$60.0 \text{ dB} + 70.0 \text{ dB} = 70.4 \text{ dB}$$

Because the addition of sound levels behaves differently than that of ordinary numbers, such addition is often referred to as “decibel addition” or “energy addition.” The latter term arises from the fact that what we are really doing when we add decibel values is first converting each decibel value to its corresponding acoustic energy, then adding the energies using the normal rules of addition, and finally converting the total energy back to its decibel equivalent.

An important facet of decibel addition arises later when the concept of time-average sound levels is introduced to explain Day-Night Average A-weighted Sound Level (DNL). Because of the logarithmic units, the time-average sound level is dominated by the louder levels that occur during the averaging period. As a simple example, consider a sound level which is 100 dB and lasts for 30 seconds, followed by a sound level of 50 dB which also lasts for 30 seconds. The time-average sound level over the total 60-second period is 97 dB, not 75 dB.

A sound level of 0 dB is approximately the threshold of human hearing and is barely audible under extremely quiet listening conditions. Normal speech has a sound level of approximately 60 dB. Sound levels above about 120 dB begin to be felt inside the human ear as discomfort and eventually pain at still higher levels.

The minimum change in the time-average sound level of individual events which an average human ear can detect is about 3 dB. A change in sound level of about 10 dB is usually perceived by the average person as a doubling (or halving) of the sound’s loudness, and this relation holds true for loud sounds and for quieter sounds.

Sound frequency is pitch measured in terms of hertz (Hz). The normal human ear can detect sounds which range in frequency from about 20 Hz to about 15,000 Hz. All sounds in this wide range of frequencies, however, are not heard equally well by the human ear, which is most sensitive to frequencies in the 1,000 to 4,000 Hz range. To account for the varied frequency sensitivity of people, we use the A-weighted scale that approximates the average, healthy human ear. The A-weighting de-emphasizes the low and high frequency portion of the noise signal and emphasizes the mid-frequency portion. Sound levels measured using A-weighting are most properly called A-weighted sound levels while sound levels measured without any frequency weighting are most properly called sound levels. However, since most environmental impact analysis documents deal only with A-weighted sound levels, the adjective “A-weighted” is often omitted, and A-weighted sound levels are referred to simply as sound levels. In some instances, the author will indicate that the levels have been A-weighted by using the abbreviation dB or dBA. As long as the use of A-weighting is understood to be used, there is no difference implied by the terms “sound level” and “A-weighted sound level” or by the units dB and dBA. The A-weighting function de-emphasizes higher and especially lower frequencies to which humans are less sensitive. Because the A-weighting is closely related to human hearing characteristics, it is appropriate to use A-weighted sound levels when assessing potential noise effects on humans and many terrestrial wildlife species. In this document, all sound levels are A-weighted and are reported in dB.

Sound levels do not represent instantaneous measurements but rather averages over short periods of time. Two measurement time periods are most common: 1 second and 1/8 of a second. A measured sound level averaged over 1 second is called a slow response sound level; one averaged over 1/8 of a second is called a fast response sound level. Most environmental noise studies use slow response measurements, and the adjective “slow response” is usually omitted. It is easy to understand why the proper descriptor “slow response A-weighted sound level" is usually shortened to "sound level" in environmental impact analysis documents.

B.2 NOISE METRICS

A "metric" is defined as something "of, involving, or used in measurement." As used in environmental noise analyses, a metric refers to the unit or quantity that measures or represents the effect of noise on people. Noise measurements typically have involved a confusing proliferation of noise metrics as individual researchers have attempted to understand and represent the effects of noise. As a result, past literature describing environmental noise or environmental noise abatement has included many different metrics. Recently, however, various Federal agencies involved in environmental noise mitigation have agreed on common metrics for environmental impact analyses documents, and both the Department of Defense (DOD) and the Federal Aviation Administration (FAA) have specified those which should be used for Federal aviation noise assessments. These metrics are as follows.

B.2.1 MAXIMUM SOUND LEVEL

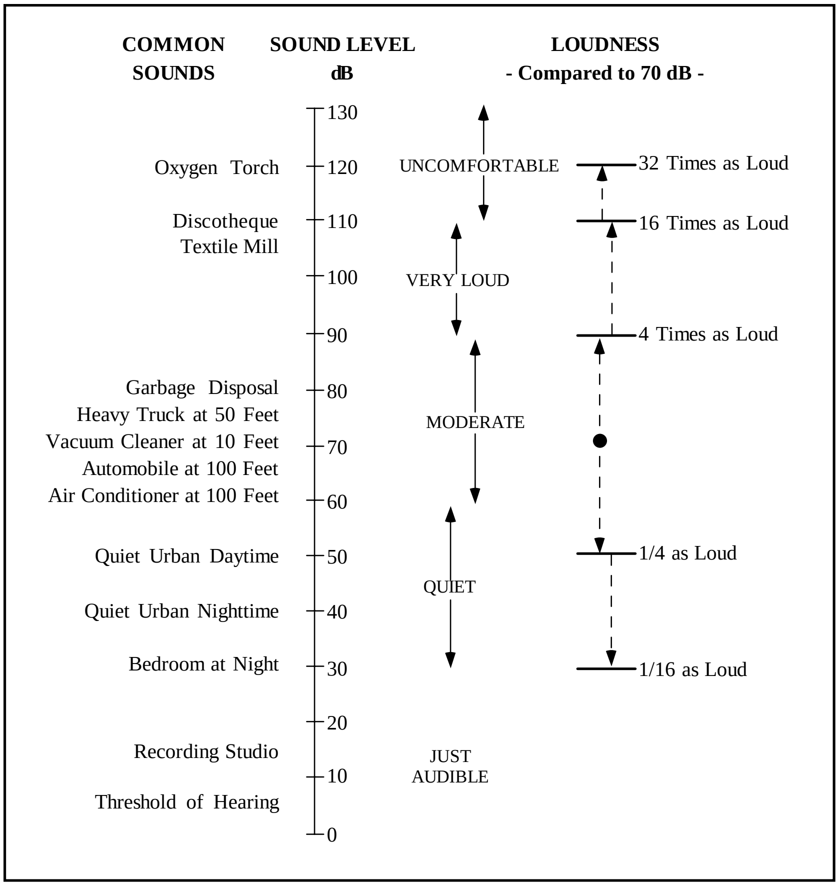
The highest A-weighted sound level measured during a single event in which the sound level changes value as time goes on (e.g., an aircraft overflight) is called the maximum A-weighted sound level or maximum sound level, for short. It is usually abbreviated by ALM, L_{max}, or LA_{max}. The typical A-weighted levels of common sounds are shown in **Figure B-1**. The maximum sound level is important in judging the interference caused by a noise event with conversation, TV or radio listening, sleep, or other common activities.

B.2.2 SOUND EXPOSURE LEVEL

Individual time-varying noise events have two main characteristics: (1) a sound level which changes throughout the event, and (2) a period of time during which the event is heard. Although the maximum sound level, described above, provides some measure of the intrusiveness of the event, it alone does not completely describe the total event. The period of time during which the sound is heard is also significant. The sound exposure level (abbreviated SEL or LAE) combines both of these characteristics into a single metric).

Sound exposure level is a logarithmic measure of the total acoustic energy transmitted to the listener during the event. Mathematically, it represents the sound level of the constant sound that would, in one second, generate the same acoustic energy as did the actual time-varying noise event. Since aircraft overflights usually last longer than one second, the SEL of an overflight is usually greater than the maximum sound level of the overflight.

Sound exposure level is a composite metric which represents both the intensity of a sound and its duration. It does not directly represent the sound level heard at any given time, but rather provides a measure of the net impact of the entire acoustic event. It has been well established in the scientific community that SEL measures this impact much more reliably than just the maximum sound level. Because the SEL and the maximum sound level are both A-weighted sound levels expressed in dBs, there is sometimes confusion between the two, so the specific metric used should be clearly stated.



Source: Harris 1979

Figure B-1. Typical A-Weighted Sound Levels of Common Sounds

B.2.3 DAY-NIGHT AVERAGE SOUND LEVEL

Time-average sound levels are the measurements of sound levels which are averaged over a specified length of time. These levels provide a measure of the average sound energy during the measurement period.

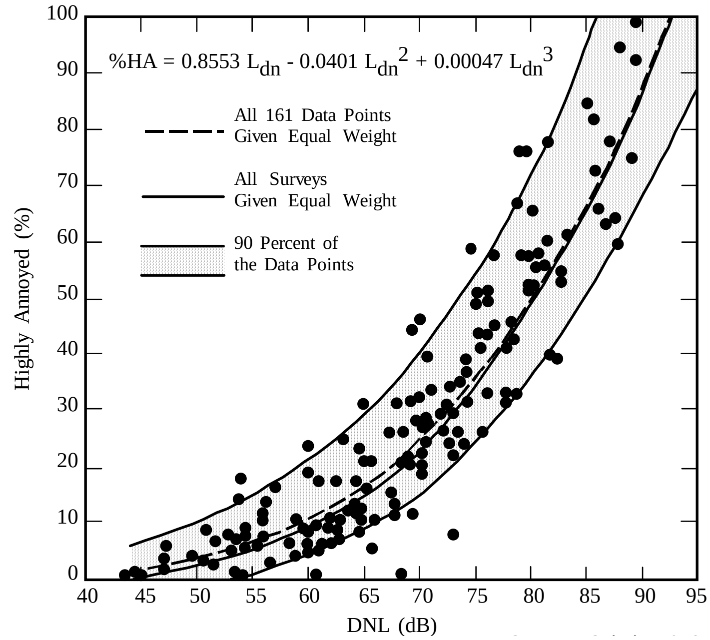
For the evaluation of community noise effects, and particularly aircraft noise effects, the Day-Night Average sound level (abbreviated DNL or L_{dn}) is used. Day-night average sound level averages aircraft sound levels at a location over a complete 24-hour period, with a 10-dB adjustment added to those noise events which take place between 10:00 p.m. and 7:00 a.m. (local time) the following morning. This 10-dB "penalty" represents the added intrusiveness of sounds which occur during normal sleeping hours, both because of the increased sensitivity to noise during those hours and because ambient sound levels during nighttime are typically about 10 dB lower than during daytime hours.

Ignoring the 10-dB nighttime adjustment for the moment, DNL can be thought of as the continuous A-weighted sound level which would be present if all of the variations in sound level which occur over a 24-hour period were smoothed out so as to contain the same total sound energy.

Day-night average sound level provides a single measure of overall noise impact, but does not provide specific information on the number of noise events or the individual sound levels which occur during the day. For example, a DNL of 65 dB could result from a very few noisy events, or a large number of quieter events.

As noted earlier for SEL, DNL does not represent the sound level heard at any particular time, but rather represents the total sound exposure. Scientific studies and social surveys which have been conducted to appraise community annoyance to all types of environmental noise have found the DNL to be the best measure of that annoyance. Its use is endorsed by the scientific community (American National Standards Institute [ANSI] 1980, 1988; U.S. Environmental Protection Agency [USEPA] 1974; Federal Interagency Committee on Urban Noise [FICUN] 1980; Federal Interagency Committee on Noise [FICON] 1992).

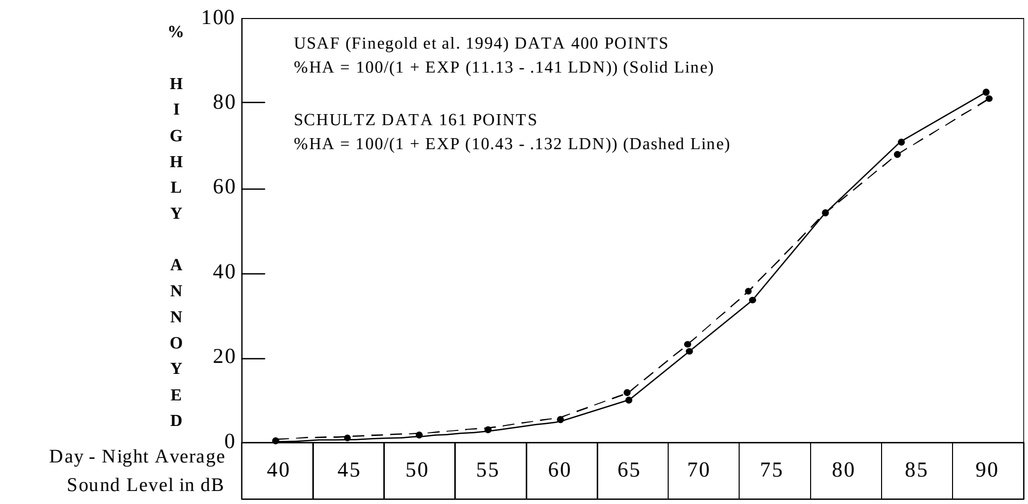
There is, in fact, a remarkable consistency in the results of attitudinal surveys about aircraft noise conducted in different countries to find the percentages of groups of people who express various degrees of annoyance when exposed to different levels of DNL. This is illustrated in **Figure B-2**, which summarizes the results of a large number of social surveys relating community responses to various types of noises, measured in DNL.



Source: Schultz 1978

Figure B-2. Community Surveys of Noise Annoyance

Figure B-2 is taken from Schultz (1978) and shows the original curve fit. A more recent study has reaffirmed this relationship (Fidell *et al.* 1991). **Figure B-3** shows an updated form of the curve fit (Finegold *et al.* 1994) in comparison with the original. The updated fit, which does not differ substantially from the original, is the current preferred form. In general, correlation coefficients of 0.85 to 0.95 are found between the percentages of groups of people highly annoyed and the level of average noise exposure. The correlation coefficients for the annoyance of individuals are relatively low, however, on the order of 0.5 or less. This is not surprising, considering the varying personal factors which influence the manner in which individuals react to noise. Nevertheless, findings substantiate that community annoyance to aircraft noise is represented quite reliably using DNL.



Calculated %HA Points	40	45	50	55	60	65	70	75	80	85	90
USAF	0.41	0.831	1.66	3.31	6.48	12.29	22.1	36.47	53.74	70.16	82.64
SCHULTZ	0.576	1.11	2.12	4.03	7.52	13.59	23.32	37.05	53.25	68.78	81

Sources: Schultz 1978 and Finegold *et al.* 1994

Figure B-3. Response of Communities to Noise and Comparison of Original Schultz 1978 and Current AF Curve Fits

This relation between community annoyance and time-average sound level has been confirmed, even for infrequent aircraft noise events. A National Aeronautics and Space Administration study (Fields and Powell 1985) reported the reactions of individuals in a community to daily helicopter overflights, ranging from 1 to 32 per day. The stated reactions to infrequent helicopter overflights correlated quite well with the daily time-average sound levels over this range of numbers of daily noise events.

The use of DNL has been criticized recently as not accurately representing community annoyance and land use compatibility with aircraft noise. Much of that criticism stems from a lack of understanding of the basis for the measurement or calculation of DNL. One frequent criticism is based on the inherent feeling that people react more to single noise events and not as much to “meaningless” time-average sound levels.

Time-average noise metric, such as DNL, takes into account both the noise levels of all individual events which occur during a 24-hour period and the number of times those events occur. As described briefly, the logarithmic nature of the decibel unit causes the noise levels of the loudest events to control the 24-hour average.

As a simple example of this characteristic, consider a case in which only one aircraft overflight occurs in daytime during a 24-hour period, creating a sound level of 100 dB for 30 seconds. During the remaining 23 hours, 59 minutes, and 30 seconds of the day, the ambient sound level is 50 dB. The DNL for this 24-hour period is 65.5 dB. Assume, as a second example, that 10 such 30-second overflights occur in daytime hours during the next 24-hour period, with the same ambient sound level of 50 dB during the remaining 23 hours and 55 minutes of the day. The DNL for this 24-hour period is 75.4 dB. Clearly, the averaging of noise over a 24-hour period does not ignore the louder single events and tends to emphasize both the sound levels and number of events. This is the basic concept of a time-average sound metric, and specifically the DNL.

B.3 LAND USE COMPATIBILITY

As noted above, the inherent variability between individuals makes it impossible to predict accurately how any individual will react to a given noise event. Nevertheless, when a community is considered as a whole, its overall reaction to noise can be represented with a high degree of confidence. As described, the best noise exposure metric for this correlation is the DNL. In June 1980, an *ad hoc* FICUN published guidelines for considering noise in land use planning (FICUN 1980). These guidelines related DNL to compatible land uses in urban areas. The committee was composed of representatives from the DOD, Department of Transportation, Department of Housing and Urban Development, the USEPA, and the Veterans Administration. Since the issuance of these guidelines, Federal agencies have generally adopted these guidelines to make recommendations to the local communities on land use compatibilities.

The FAA included the committee's guidelines in the Federal Aviation Regulations. These guidelines are reprinted in **Table B-1**, along with the explanatory notes included in the regulation. Although these guidelines are not mandatory (see Notes in **Table B-1**), they provide the best means for evaluating noise impacts in airport communities. In general, residential land uses normally are not compatible with outdoor DNL (L_{dn} values) above 65 dB, and the extent of land areas and populations exposed to DNL of 65 dB and higher provides the best means for assessing the noise impacts of alternative aircraft actions.

In 1990, the FICON was formed to review the manner in which aviation noise effects are assessed and presented. This group released its report in 1992 and reaffirmed the use of DNL as the best metric for this purpose (FICON 1992).

Analyses of aircraft noise impacts and compatible land uses around DOD facilities are normally made using NOISEMAP. This computer-based program calculates DNL at many points on the ground around an airfield and draws contours of equal levels for overlay onto land-use maps of the same scale. The program mathematically calculates the DNL of all aircraft operations for a 24-hour period, taking into consideration the number and types of aircraft, their flight paths and engine thrust settings, and the time of day (daytime or nighttime) that each operation occurs.

DNL can also be measured directly around an airfield, rather than calculated with NOISEMAP; however, the direct measurement of annualized DNL is difficult and costly since it requires year-round monitoring or careful seasonal sampling. NOISEMAP provides an accurate projection of aircraft noise around airfields.

NOISEMAP also has the flexibility of calculating sound levels at any specified ground location so that noise levels at representative points under flight paths can be ascertained. NOISEMAP is most accurate for comparing "before and after" noise impacts which would result from proposed airfield changes or alternative noise control actions, as long as the various impacts are calculated in a consistent manner.

Table B-1. Land Use Compatibility Guidelines with Yearly Day-Night Average Sound Levels

LAND USE	YEARLY DAY-NIGHT AVERAGE SOUND LEVELS IN DECIBELS					
	BELOW 65	65-70	70-75	75-80	80-85	OVER 85
Residential						
Residential, other than mobile homes and transient lodgings	Y	N(1)	N(1)	N	N	N
Mobile home parks	Y	N	N	N	N	N
Transient lodgings	Y	N(1)	N(1)	N(1)	N	N
Public Use						
Schools	Y	N(1)	N(1)	N	N	N
Hospitals & nursing homes	Y	25	30	N	N	N
Churches, auditoria, & concert halls	Y	25	30	N	N	N
Government services	Y	Y	25	30	N	N
Transportation	Y	Y	Y(2)	Y(3)	Y(4)	Y(4)
Parking	Y	Y	Y(2)	Y(3)	Y(4)	N
Commercial Use						
Offices, business, & professional	Y	Y	25	30	N	N
Wholesale & retail-building materials, hardware, and farm equipment	Y	Y	Y(2)	Y(3)	Y(4)	N
Retail trade-general	Y	Y	25	30	N	N
Utilities	Y	Y	Y(2)	Y(3)	Y(4)	N
Communication	Y	Y	25	30	N	N
Manufacturing and Production						
Manufacturing, general	Y	Y	Y(2)	Y(3)	Y(4)	N
Photographic & optical	Y	Y	25	30	N	N
Agriculture (except livestock) & forestry	Y	Y(6)	Y(7)	Y(8)	Y(8)	Y(8)
Livestock farming & breeding	Y	Y(6)	Y(7)	N	N	N
Mining & fishing, resource production & extraction	Y	Y	Y	Y	Y	Y
Recreational						
Outdoor sports arenas & spectator sports	Y	Y(5)	Y(5)	N	N	N
Outdoor music shells, amphitheaters	Y	N	N	N	N	N
Nature exhibits & zoos	Y	Y	N	N	N	N
Amusements, parks, resorts, & camps	Y	Y	Y	N	N	N
Golf courses, riding stables, & water recreation	Y	Y	25	30	N	N

Key:
Y (Yes) = Land use and related structures compatible without restrictions.
N (No) = Land use and related structures are not compatible and should be prohibited.
NLR = Noise Level Reduction (outdoor to indoor) to be achieved through incorporation of noise attenuation into the design and construction of the structure.
25 or 30 = Land use and related structures generally compatible; measures to achieve NLR of 25, 30, or 35 dB must be incorporated into design and construction of structures.

Notes:
(1) Where the community determines that residential or school uses must be allowed, measures to achieve outdoor-to-indoor NLR of at least 25 and 30 dB should be incorporated into building codes and be considered in individual approvals. Normal residential construction can be expected to provide an NLR of 20 dB; thus, the reduction requirements often are stated as 5, 10, or 15 dB over standard construction and normally assume mechanical ventilation and closed windows year-round. However, the use of NLR criteria will not eliminate outdoor noise problems.
(2) Measures to achieve NLR of 25 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas, or where the normal noise level is low.
(3) Measures to achieve NLR of 30 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas, or where the normal noise level is low.
(4) Measures to achieve NLR of 35 dB must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise-sensitive areas, or where the normal noise level is low.
(5) Land-use compatible, provided special sound reinforcement systems are installed.
(6) Residential buildings require an NLR of 25 dB.
(7) Residential buildings require an NLR of 30 dB.
(8) Residential buildings not permitted.

Source: U.S. Department of Transportation (USDOT) 1984

Appendix B References

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Fields and Powell 1985	Fields, J. M.; Powell, C. A. 1985. "A community survey of helicopter noise annoyance conducted under controlled noise exposure conditions." Langley Research Center, Report Number: NAS 1.1586400; NASA-TM-86400. 1 March 1985.
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Schultz 1978	Schultz, T.J. 1978. "Synthesis of Social Surveys on Noise Annoyance." *J. Acoust. Soc. Am.*, 64, 377-405.
USDOT 1984	U.S. Department of Transportation (USDOT). 1984. *Airport Noise Compatibility Planning; Development of Submission of Airport Operator's Noise Exposure Map and Noise Compatibility Program; Final Rule and Request for Comments*. 14 CFR Parts 11 and 150, Federal Register 49(244). December 1984.

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APPENDIX C

PHOTOS FOR THREE CORRECTED HLZS

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Appendix C
Photos for Three Corrected HLZs

This appendix presents photographs of the three reassessed HLZs.

Photo of HLZ 6

Photo of HLZ 17

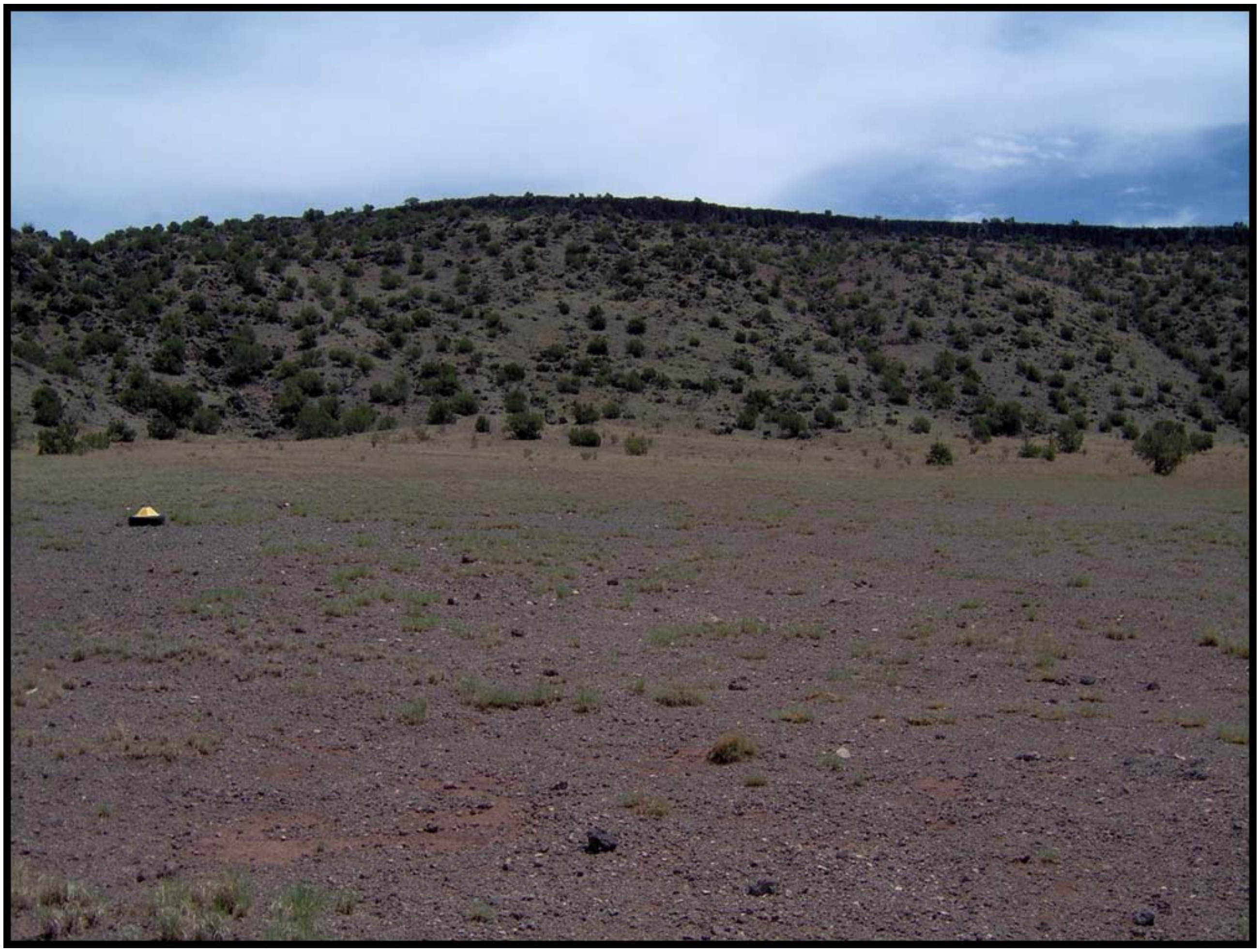

Photo of HLZ 42

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