Environmental Assessment

Change in C-17 Flight Training Operations at Grant County International Airport, Washington by Joint Base Lewis-McChord, Washington

Department of the Air Force
Headquarters Air Mobility Command

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Environmental Assessment

Change in C-17 Flight Training Operations at Grant County International Airport, Washington by Joint Base Lewis-McChord, Washington

Department of the Air Force
Headquarters Air Mobility Command
HQ AMC/A7PI
507 Symington Drive
Scott Air Force Base, Illinois 62225-5022

U.S. AIR FORCE

October 2011

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FINDING OF NO SIGNIFICANT IMPACT
CHANGE IN C-17 FLIGHT TRAINING OPERATIONS
AT GRANT COUNTY INTERNATIONAL AIRPORT, WASHINGTON
BY JOINT BASE LEWIS-MCCHORD, WASHINGTON

AGENCY

Department of the Air Force, Air Mobility Command (AMC), 62nd Airlift Wing (62 AW), Joint Base Lewis-McChord (JBLM), Washington

BACKGROUND

The 62 AW of the U.S. Air Force, under command of Headquarters AMC, proposes to change its C-17 aircraft training operations accomplished by aircrews stationed at JBLM. These and other C-17 aircrews currently conduct low altitude/low airspeed tactical training at the Grant County International Airport (Grant County Airport) in Moses Lake, Washington. The purpose of the Proposed Action is to enable C-17 crews to accomplish high airspeed tactical training events at the Grant Count Airport at airspeeds greater than 250 knots indicated airspeed (KIAS), which is approximately 287 miles per hour. Current restrictions prohibit speeds in excess of 250 knots while below 10,000 ft above mean sea level (MSL). The Air Force Flight Standards Agency recently approved a waiver from Federal Aviation Regulation (FAR) 91.117 to allow AMC owned aircraft flown by AMC pilots to exceed 250 KIAS when flying at an altitude of less than 10,000 ft MSL in visual meteorological conditions (VMC) on a "one day a week" basis to conduct tactical training. Because of the C-17's tactical mission, C-17 aircrews from the 62 and 446 AWs at JBLM have a need for a realistic training program to accomplish tactical training maneuvers in conditions that replicate combat conditions to the maximum extent practicable. The proposed high airspeed tactical arrivals would occur with a floor of 1,000 ft above ground level (AGL). The Proposed Action would occur in the existing maneuver areas surrounding the airport that are currently used for C-17 tactical training.

Pursuant to National Environmental Policy Act (NEPA) guidance, 32 Code of Federal Regulations (CFR) 989 (*Air Force Environmental Impact Analysis Process*), and other applicable regulations, the Air Force completed an EA of the potential environmental consequences of proposed changes to C-17 flight training operations at the Grant County Airport. The attached EA, which is incorporated herein by reference and supports this Finding of No Significant Impact, evaluated the No Action Alternative and the Proposed Action.

NO ACTION ALTERNATIVE

C-17 aircrews based at JBLM and other bases would continue to use Grant County Airport for tactical arrival and departure training, but not at airspeeds that exceed 250 KIAS below 10,000 ft MSL.

PROPOSED ACTION

Under the Proposed Action, high altitude/high airspeed and low altitude/high airspeed tactical arrivals and departures will be accomplished one day per week at the Grant County Airport. This training will be accomplished only in VMC and when it does not conflict with other air traffic. The 62nd Operations Group will track usage and will not allow the number of training days to exceed 52 days in any given year. The high airspeed tactical training will occur between 9:00 a.m. and 2:00 a.m. (actual use times may vary with the seasons). High altitude/high

airspeed and low altitude/high airspeed approaches will be accomplished within the defined tactical corridors and over unpopulated areas.

C-17 and other military and civil aircraft will continue to accomplish operations on currently used flight tracks. Flight tracks/profiles will be added for the high altitude/high airspeed or low altitude/high airspeed C-17 tactical arrivals. C-17 aircrews will continue to accomplish low altitude/low airspeed tactical arrivals. There will be no change in the overall number of operations or aircraft types currently flown. A total of 3.26 average busy day high altitude/high airspeed or low altitude/high airspeed arrivals will be accomplished, which will be approximately 17 percent of the total C-17 arrivals at the airport. None of the departure or closed pattern operations will be high altitude/high airspeed or low altitude/high airspeed. No personnel will be based at JBLM or the Grant County Airport; and, no construction activities will occur at the Grant County Airport as a result of the Proposed Action.

EVALUATION OF THE NO ACTION ALTERNATIVE

Aircraft Operations, Aircraft Safety and Bird/Wildlife-Aircraft Strike Hazard. The airfield would continue to operate at about 18 percent of the annual capacity and 15 percent of the hourly capacity. The air traffic control procedures, to include JBLM C-17 operations when the air traffic control tower is closed and which accommodate the current level of activity, would continue to be used to control and accommodate aircraft operations. The potential for aircraft accidents or bird/wildlife-aircraft strikes would remain at baseline conditions at the Grant County Airport. The risk that an aircraft involved in an accident at or around the airfield would strike a person or structure on the ground would continue to be low. Likewise, it would continue to be unlikely that a bird/wildlife-aircraft strike incident at or around the airfield would involve injury either to aircrews or to the public, or damage to property (other than the aircraft).

Noise. A total of seven off-airport residences in rural land use are currently exposed to a Day-Night Average Sound Level (DNL) 65 decibel (dBA) and greater, with one of the residences in the DNL 70-75 dBA noise zone. Disruptions to speech would last only as long as noise from the overflying aircraft remains at 66 dB or greater. No structural damage would occur from aircraft noise at or around the airfield. Neither noise induced hearing damage nor nonauditory health effects would occur.

Land Use. Activities associated with continuation of current aircraft operations would not conflict with current land use in the Grant County Comprehensive Plan, zoning in the Comprehensive Plan of the City of Moses Lake, or the Airport Master Plan.

Air Quality. Emissions from aircraft operations at the Grant County Airport will continue at the current rates and will not exceed air quality standards. Existing emissions are less than 10 percent of the overall emissions in the Air Quality Control Region (AQCR) and are not considered significant.

Biological Resources. No changes to existing biological resources would occur at the Grant County Airport. Current C-17 aircraft operations do not affect threatened or endangered species of wildlife of plants. Aircraft operations at the airport do not result in adverse effects on nesting long-billed curlew (no Federal status, a species monitored by the State of Washington) or wintering bald eagles.

Cultural Resources. There are no National Register of Historic Places (NRHP) listed archaeological sites or historic properties within one mile of the Area of Potential Effects (APE), an area within five miles of the Grant County Airport. While the occurrence of aircraft accidents is statistically low, impacts from C-17 flying operations on historic cultural resources would

remain low due to routine airfield maintenance and aircraft operations activities. The Air Force would continue to have no management responsibility for cultural resources within the APE.

EVALUATION OF THE PROPOSED ACTION

Aircraft Operations and Safety and Bird/Wildlife-Aircraft Strike Hazard. The airfield will continue to operate at about 18 percent of the annual capacity and 15 percent of the hourly capacity. C-17 high altitude/high airspeed and low altitude/high airspeed tactical arrivals will be accomplished in the same maneuver area in which the current high altitude/low airspeed and low altitude/low airspeed tactical arrivals to Runway 09/27, as well as other C-17 operations at the airport, are accomplished. No additional airspace will be needed for the high altitude/high airspeed and low altitude/high airspeed tactical arrivals. The high airspeed tactical training will be accomplished under concurrence from Air Traffic Control (ATC) when the air traffic control tower is open. Additionally, C-17s will not have priority in the pattern for high airspeed training and this training will be allowed only when air traffic conditions allow. The risk is low that an aircraft involved in an accident or a bird/wildlife aircraft strike at or around the airport will strike a person or structure on the ground.

Noise. The Proposed Action will result in the addition of one residence (total of eight) in the DNL 65 dBA and greater noise zone, with one of the residences continuing to be in the DNL 70-75 dBA noise zone. The one additional residence would experience an increase of DNL 0.5 dBA when compared to the No Action Alternative. To minimize the potential for noise impacts, tactical maneuvers such as high altitude/high airspeed and low altitude/high airspeed arrivals, as well as other C-17 operations at the airport, will be accomplished over unpopulated areas. Disruptions to speech will last only as long as noise from the overflying aircraft remains at 66 dB or greater. No structural damage will occur from aircraft noise at or around the airfield. Neither noise induced hearing damage nor nonauditory health effects will occur.

Land Use. Aircraft operations and noise resulting from the operations will not conflict with current land use in the Grant County Comprehensive Plan or zoning in the Comprehensive Plan of the City of Moses Lake. Noise from aircraft operations will not preclude adjacent or nearby properties from continuing to be used for existing activities. The Proposed Action will not be inconsistent with the 2005 Airport Master Plan nor would it conflict with the Federal Aviation Regulation Part 77 imaginary surfaces or runway protection zones.

Air Quality. Emissions from the Proposed Action will represent a small percentage of the AQCR's overall area emissions. Nitrogen oxide emissions will increase by 0.0019 percent. Grant County is classified as attainment for all criteria pollutants; therefore, USEPA General Conformity rules do not apply. Because the increase in criteria pollutant emissions from the Proposed Action is less than 10 percent of baseline air quality control region emissions, the Proposed Action will not cause or contribute to new violations of any national ambient air quality standard in the affected area. Greenhouse gas emissions from the Proposed Action will amount to approximately 0.000004 percent of the total greenhouse gas emissions generated by the U.S.; there will be no measurable impacts to global climate change.

Biological Resources. The approximately 2 dBA increase in noise levels will not affect biological resources at the Grant County Airport or surrounding area. The Proposed Action will not adversely affect threatened or endangered species of wildlife of plants. The increased noise level will not affect nesting long-billed curlew (no Federal status, a species monitored by the State of Washington) or wintering bald eagles.

Cultural Resources. Since there are no known archaeological sites near the Grant County Airport, there will be no effect on archaeological resources. There are no NRHP-listed historic resources directly below the C-17 flight tracks that surround the Grant County Airport. The greatest maximum sound level generated by the C-17 would be 106 dBA at 500-ft AGL during takeoff, for which there is no change from the baseline. The maximum noise level from a proposed high airspeed tactical arrival will be 96 dBA. These maximum noise levels will be well below the threshold at which structural damage would occur (*i.e.*, 130 dBA). No structures at the Grant County Airport will be used and the level of noise to which they will be subjected would be well below the 130 dBA threshold for structural damage; thus, there will be no impact to any potentially historic properties at the Grant County Airport. Low altitude/high airspeed C-17 operations will not adversely affect Native American interests in the area.

ENVIRONMENTAL JUSTICE AND PROTECTION OF CHILDREN

Activities associated with the Proposed Action will not result in significant or adverse environmental effects at any location for the following resources: aircraft operations; aircraft safety; bird/wildlife-aircraft strike hazard; noise; land use; air quality; biological resources; and, cultural resources. The Proposed Action will result in an increase of one residence within the DNL 65 - 70 dBA noise zone. Due to the intermittent nature of aircraft noise, non-auditory health effects from chronic noise exposure will not result. While Grant County exhibits a higher minority and low-income population, 27.2 and 18.6 percent, respectively, than the State of Washington, the area that will be affected by the Proposed Action is limited primarily to airport property and approximately eight residences off airport property that will be exposed to noise levels of DNL 65 dBA and greater. Because the Proposed Action will not have any adverse effect, no disproportionately high or adverse impacts upon minority and low-income populations will be anticipated. Therefore, impacts on environmental justice will not occur. The Proposed Action will not cause environmental health or safety risks that may disproportionately affect children.

DECISION

Based on my review of the facts and analyses contained in the attached environmental assessment, I conclude that implementation of the Proposed Action will not have a significant impact either by itself or when considering cumulative impacts. No mitigation measures are required. Accordingly, requirements of the NEPA, regulations promulgated by the Council on Environmental Quality, and 32 CFR 989 are fulfilled and an environmental impact statement is not required.

R. Wyn Elder

OCT 31 2011

R. WYN ELDER, Colonel, USAF
Commander, 62d Airlift Wing

Date

ENVIRONMENTAL ASSESSMENT
CHANGE IN C-17 FLIGHT TRAINING OPERATIONS AT GRANT COUNTY INTERNATIONAL AIRPORT, WASHINGTON BY JOINT BASE LEWIS-MCCHORD, WASHINGTON

Responsible Agency: Department of the Air Force, Air Mobility Command (AMC), 62nd Airlift Wing, Joint Base Lewis-McChord (JBLM), Washington

Proposed Action: Change in C-17 Flight Training Operations at Grant County International Airport

Written comments and inquiries regarding this document should be directed to: Ms. Jean Reynolds, HQ AMC/A7PI, 507 Symington Drive, Scott AFB, Illinois 62225-5022 Phone: (618) 229-0843 email: jean.reynolds@us.af.mil

Abstract: The 62nd Airlift Wing is proposing to change its C-17 aircraft training operations carried out by aircrews stationed at JBLM. These and other C-17 aircrews currently conduct tactical training at the Grant County International Airport in Moses Lake, Washington. The purpose of the Proposed Action is to enable C-17 crews to maintain a forward airspeed greater than 250 knots indicated airspeed (KIAS) when entering or departing the Grant County International Airport. Current restrictions prohibit speeds in excess of 250 KIAS while below 10,000 ft above mean sea level (MSL). The Air Mobility Command (AMC) recently obtained a waiver from the Air Force Flight Standards Agency (AFFSA) to allow AMC aircraft to operate between 250 and 330 knots below 10,000 ft MSL one day a week to conduct tactical training. The proposed change in flying maneuvers, at an increased speed, would occur with a floor of 1,000 ft above ground level (AGL). The Proposed Action would result in an increase in airspeed while continuing to operate in maneuver areas surrounding the airport currently used for C-17 training. Use of the landing zone at Grant County International Airport by the Air Force was evaluated in the *Environmental Assessment for C-17 Beddown at McChord Air Force Base* (February 1997) and the *Environmental Assessment for the Interim Western United States C-17 Landing Zone* (February 2008). The Proposed Action to enable changes to C-17 aircraft training operations at Grant County International Airport is being evaluated in this Draft EA. Resources evaluated in the impact analysis were: airspace operations (to include aircraft safety and bird/wildlife aircraft strike hazard); noise; land use; air quality; biological resources; and, cultural resources.

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ACRONYMS AND ABBREVIATIONS

62 AW	62nd Airlift Wing
446 AW	446th Airlift Wing
AAF	Army Air Field
AFB	Air Force Base
AFCEE	Air Force Center for Engineering and the Environment
AFFSA	Air Force Flight Standards Agency
AFI	Air Force Instruction
AGL	above ground level
AHAS	Avian Hazard Advisory System
AICUZ	Air Installation Compatible Use Zone
AMC	Air Mobility Command
AMT	Air Movement Table
ANSI	American National Standards Institute
APCD	air pollution control district
AQCR	air quality control region
ARFF	Aircraft Rescue and Firefighting
ARTCC	Air Route Traffic Control Center
ASOS	Automated Surface Observation System
ATC	Air Traffic Control
B.A.	Bachelor of Arts
BAM	Bird Avoidance Model
BASH	bird/wildlife-aircraft strike hazard
B.S.	Bachelor of Science
BTS	Bureau of Transportation Statistics
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	CO_2 equivalent
CTAF	common traffic advisory frequency
CZ	Clear Zone
DAHP	Washington Department of Archaeology & Historic Preservation
dB	decibel
dBA	A-weighted sound level measured in decibels
D.C.	District of Columbia
DNL	day-night average sound level
DoD	Department of Defense
DoDI	Department of Defense Instruction
DOT	U.S. Department of Transportation
DPS	Distinct Population Segment
EA	environmental assessment
EDC	Economic Development Council
EDMS	Emissions and Dispersion Modeling System
EIAP	environmental impact analysis process
EIS	environmental impact statement
E.O.	Executive Order
EPR	Engine Pressure Ratio
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulation
FICAN	Federal Interagency Committee on Aviation Noise
FICON	Federal Interagency Committee on Noise
FICUN	Federal Interagency Committee on Urban Noise
FL	Flight Level
FONSI	finding of no significant impact
GBAS	Ground-Based Augmentation System

GHG	greenhouse gases
GIS	Geographic Information System
GMA	Growth and Management Act
GPS	Global Positioning System
Grant County Airport	Grant County International Airport
GWP	Global Warming Potential
HQ AMC	Headquarters, Air Mobility Command
HUD	U.S. Department of Housing and Urban Development
IFR	instrument flight rules
IICEP	Interagency and Intergovernmental Coordination for Environmental Planning
JBLM	Joint Base Lewis-McChord
KIAS	knots indicated airspeed
L_{eq}	average noise
L_{max}	maximum sound level
LLC	Limited Liability Company
LZ	landing zone
M.A.	Master of Arts
MBTA	Migratory Bird Treaty Act of 1918
$\mu g/m^3$	micrograms per cubic meter
mg/m^3	milligrams per cubic meter
M.S.	Master of Science
MSL	mean sea level
NAAQS	National Ambient Air Quality Standards
n.d.	(no date)
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NIH	National Institute of Health
N_2O	nitrous oxide
NO_2	nitrogen dioxide
NO_x	nitrogen oxides
NOTAM	Notice to Airmen
NPS	National Park Service
NRHP	National Register of Historic Places
NRIS	National Register Information System
O_3	ozone
Pb	lead
Ph.D.	Doctor of Philosophy
P.L.	Public Law
PM_{10}	particulate matter equal to or less than 10 microns in aerodynamic diameter
$PM_{2.5}$	particulate matter equal to or less than 2.5 microns in aerodynamic diameter
RAIF	Resource Adverse Impact Footprint
ROI	region of influence
RPZ	runway protection zone
SEL	sound exposure level
SEPA	State (of Washington) Environmental Policy Act
SIP	state implementation plan
SO_2	sulfur dioxide
SO_x	sulfur oxides
TCAS	Traffic Collision Avoidance System
TRACON	Terminal Radar Approach Control
TSP	total suspended particulates
TX	Texas
USAF	United States Air Force
USC	United States Code
USEPA	United States Environmental Protection Agency
VFR	visual flight rules
VMC	visual meteorological conditions

VOC	volatile organic compounds
WA	Washington
WDFW	Washington Department of Fish and Wildlife
WWP	Western Watersheds Project

CHAPTER 1
PURPOSE OF AND NEED FOR ACTION

The Department of the Air Force, Air Mobility Command (AMC), 62nd Airlift Wing (62 AW) at Joint Base Lewis-McChord (JBLM), Washington (the Responsible Agency for this EA and the proponent for this action) proposes to accomplish C-17 high altitude/high airspeed and low altitude/high airspeed training events at the Grant County International Airport (Grant County Airport), Moses Lake, Washington.

1.1 Purpose of and Need for Action

The C-17 is a large military transport aircraft used for rapid airlift of troops and cargo to main or forward operating bases throughout the world. The C-17 also performs strategic and tactical airlift, medical evacuation, and airdrop missions delivering military goods and humanitarian aid around the world. Because of the C-17's tactical mission, C-17 aircrews from the 62 AW and 446th Airlift Wing (446 AW) at JBLM have a need for a realistic training program that allows them to train like they would fight. A realistic training program includes the ability to accomplish tactical training maneuvers in conditions that replicate combat conditions to the maximum extent practicable.

In addition to airdrop events and low level navigation, combat tactics training maneuvers include arrivals to and departures from a landing zone (LZ) at an airfield at either high altitude/high airspeed or low altitude/high airspeed. The common factor is airspeed. For realistic combat arrival and departure training, it is important that crews be able to effectively make rapid changes in altitude, airspeed, and heading. Arrivals can be steep or shallow. Steep arrivals use random maneuvering and are flown at a higher than normal descent rate to allow the aircraft to quickly lose altitude and land. Shallow arrivals include maneuvering near or over the runway and then slowing the aircraft and configuring the aircraft to land. Both arrival types require the aircrew to quickly configure and position the aircraft to land on the LZ on the first attempt. A missed approach in a threat area increases the aircraft's exposure to hostile fire and places the aircrew in greater danger. Departures include accelerating to high airspeeds as quickly as possible.

The purpose of the Proposed Action is to provide C-17 aircrews at JBLM the opportunity to accomplish high altitude/high airspeed and low altitude/high airspeed tactical arrival and departure training. Although 62 AW and 446 AW C-17 aircrews currently accomplish low altitude tactical arrival and departure training at the Grant County Airport, the aircrews do not have an airfield where they can practice high altitude/high airspeed or low altitude/high airspeed tactical arrivals and departures. Thus, 62 and 446 AWs C-17 aircrews have a need for an airfield at which tactical high altitude/high airspeed and low altitude/high airspeed tactical arrivals and departures could be accomplished.

1.2 Scope of the Environmental Review

The National Environmental Policy Act (NEPA) of 1969, as amended, requires federal agencies to consider environmental consequences prior to undertaking federal actions that may affect the environment. The President's Council on Environmental Quality (CEQ) issued regulations to implement NEPA. The Air Force Environmental Impact Analysis Process (EIAP) is accomplished through adherence to the procedures set forth in CEQ regulations (40 Code of Federal Regulations [CFR] Parts 1500-1508) and 32 CFR 989, *Air Force Environmental Impact Analysis Process*. These federal regulations establish both the administrative process and substantive scope of the environmental impact evaluation designed to ensure that deciding authorities have a proper understanding of the potential environmental consequences of a contemplated course of action. The CEQ regulations require that an environmental assessment (EA):

- Briefly provide sufficient evidence and analysis to determine whether an environmental impact statement (EIS) or finding of no significant impact (FONSI) should be prepared;
- Aid in an agency's compliance with NEPA when no EIS is required; or,
- Facilitate preparation of an EIS, when required.

This EA identifies, describes, and evaluates the potential environmental impacts that may result from the Proposed Action and the No Action Alternative. The EA also explains the Alternatives Formulation and Consideration process in which other alternatives were considered but eliminated from consideration. As appropriate, the affected environment and environmental consequences of the Proposed Action will be

described in terms of site-specific descriptions or a regional overview. Finally, the EA will identify measures that would prevent or minimize environmental impacts, if required.

1.2.1 Resources Evaluated in this Environmental Assessment

The intent of this EA is to meet the NEPA requirements established in 32 CFR 989 (EIAP). Environmental impact analysis requirements established in Federal Aviation Administration (FAA) Order 1050.1E, Environmental Impacts: Policies and Procedures (FAA, 2004) are also relevant to this action because of the use of airspace managed by the FAA (refer to Subchapter 1.2.3). The FAA may adopt this EA to fulfill its NEPA requirements established in Order 1050.1E. The following resource areas are discussed in detail in the EA:

- Airspace Operations (to include aircraft safety and Bird/Wildlife Aircraft Strike Hazard [BASH]);
- Noise;
- Land Use;
- Air Quality;
- Biological Resources; and,
- Cultural Resources.

1.2.2 Resources Eliminated from Detailed Analysis

Resource areas that have been eliminated from further detailed study in this document and the rationale for eliminating them are presented in the following paragraphs.

- **Earth, Water, Floodplains, and Wetlands Resources**. No construction or ground disturbing activities would occur at the Grant County Airport under the Proposed Action. None of the activities associated with the Proposed Action have the potential to increase flood hazards to new or existing development by effectively increasing flood heights and/or velocities or by inadequate floodproofing. None of the proposed activities would result in any alteration of surface water flows that would change existing downstream flows. Although wetlands occur in the areas surrounding the Grant County Airport, none of the activities associated with the Proposed Action would have potential for long-term loss or degradation of wetlands.
- **Hazardous Waste, Hazardous Materials, and Stored Fuels**. No aircraft maintenance or refueling activities would occur at the Grant County Airport under the Proposed Action. No solid waste would be generated at the Grant County Airport. For this reason, there would be no activities at Grant County International Airport that would generate waste; therefore, there would be no Pollution Prevention issues.
- **Socioeconomic Resources and Infrastructure and Utilities**. No personnel would be based and no construction would occur at the Grant County Airport under the Proposed Action.
- **Environmental Management**. No structures would be demolished. Therefore, no asbestos or lead-based paint would be encountered at the Grant County Airport as a result of the Proposed Action.
- **Environmental Justice and Protection of Children.** In 1994, President William J. Clinton issued Executive Order (E.O.) 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, in response to growing concern that minority and low-income populations bear adverse health and environmental effects disproportionately. E.O. 12898 encourages federal facilities to achieve "environmental justice" by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations. Accompanying E.O. 12898 was a Presidential transmittal memorandum, which referenced existing federal statutes and regulations to be used in conjunction with E.O. 12898. One of the items in this memorandum was the use of the policies and procedures of NEPA, specifically that, "Each Federal agency shall analyze the environmental effects, including human health, economic, and social effects, of Federal actions, including effects on minority communities and low-income communities, when such analysis is required by the NEPA 42 USC Section 4321, et seq." In 1997, E.O. 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, was issued by President William J. Clinton. This order requires a similar analysis for children, where Federal agencies must identify

and assess environmental health risks and safety risks that may disproportionately affect children. Environmental health risks or safety risks refer to risks to health or to safety that are attributable to products or substances that the child is likely to come in contact with or ingest (such as air, food, drinking water, recreational water, and soil). While Grant County exhibits a higher minority and low-income population, 27.2 and 18.6 percent, respectively, than the State of Washington, the area that would be affected by the Proposed Action is limited primarily to airport property and approximately six residences located outside airport property that would be exposed to noise level increases by the change in C-17 flight operations. Based on the analyses conducted for this EA, the Proposed Action does not result in significant or adverse effects at any location for the following resources: aircraft operations; aircraft safety; bird/wildlife-aircraft strike hazard; noise; land use; air quality; biological resources; and, cultural resources. Since the Proposed Action would not have any adverse effect, no disproportionately high or adverse impacts upon minority and low-income populations would be anticipated. Therefore, impacts on environmental justice would not occur. Likewise, the Proposed Action would not cause environmental health or safety risks that may disproportionately affect children.

1.2.3 Previous Environmental Impact Analysis for High Airspeed C-17 Operations at the Grant County Airport

Restrictions within the National Airspace System require aircrews to maintain an airspeed not greater than 250 knots indicated airspeed (KIAS, which is approximately 287 miles per hour [mph]) below 10,000 ft above mean sea level (MSL). The Air Force Flight Standards Agency (AFFSA) recently approved a waiver to Federal Aviation Regulation (FAR) 91.117, Aircraft Speed, to allow Air Mobility Command (AMC) owned aircraft flown by AMC pilots to exceed 250 KIAS when flying at an altitude of less than 10,000 ft MSL in visual meteorological conditions (VMC) on a "one day a week" basis to conduct tactical training. The 62d Operations Group at JBLM plan to implement high airspeed training at Grant County Airport in accordance with the AFFSA waiver includes two phases. The first phase was to conduct high airspeed tactical arrivals to no lower than 3,000 feet above ground level (AGL) at airspeeds up to 350 KIAS. This training was environmentally assessed through the completion of an Air Force Form 813, *Request for Environmental Impact Analysis,* dated December 2, 2010. The conclusion of the Form 813 was that the high airspeed operations that occurred no lower than 3,000 ft AGL qualified for categorical exclusion in accordance with 32 CFR 989, Appendix B to Part 984, Exclusions, A2.3.36. The Form 813 also states that additional impact analysis will be required for any training conducted below 3,000 ft AGL. Completion of this EA is the second of two phases in the 62d Operations Group's plan to implement high airspeed tactical training. This EA also satisfies the requirement for environmental impact analysis for high airspeed operations below 3,000 ft AGL as stated in the Air Force Form 813.

1.2.4 FAA Environmental Impact Analysis

Although there would be no changes to the established C-17 maneuver areas that surround the Grant County Airport (*i.e.,* the altitudes and widths would not change as a result of the Proposed Action), the FAA continually reviews airspace activities for environmental compliance. The USAF has obtained technical input from the FAA to prepare this EA. The Air Force works cooperatively with the FAA to ensure that adoption of the findings of this EA will enable continued airspace management that serves not only military aviation needs in the future, but also civil aviation needs.

Based on FAA Order 1050.1e, Section 518h, the FAA may adopt, in whole or in part, draft, or final environmental impact statements (or assessments) prepared by other agencies (see 40 CFR 1506.3). When the FAA adopts another agency's NEPA document in whole or in part, the responsible FAA official must independently evaluate the information contained in the document, take full responsibility for scope and content that addresses FAA actions, and issue its own FONSI or Record of Decision. Table 1-1 lists the FAA's environmental impact analysis categories and the subchapter of the EA that contains the impact analysis for each category for the action evaluated in this EA.

Table 1-1. Impact Analysis Categories Identified in FAA Order 1050.1E

FAA Impact Analysis Categories	How Addressed by EA Analysis [relevant section]	Remarks
Air Quality	Subchapters 3.4, 4.1.4 and 4.2.4	
Coastal Resources	(Will not be evaluated in this EA)	The Proposed Action would not affect coastal resources because the Grant County Airport is over 230 miles east of coastal Washington.
Compatible Land Use	Subchapters 3.3, 4.1.3 and 4.2.3	
Construction Impacts	Subchapter 1.2.2 (Will not be evaluated in this EA)	No construction activities would occur at the Grant County Airport as a result of the Proposed Action. The Proposed Action would not require any construction; therefore, natural resources (*i.e.,* sand, gravel or aggregate) would not be consumed for the project.
Department of Transportation Act: Section 4(f)	(Will not be evaluated in this EA)	Designation of airspace for military flight operations is exempt from Section 4(f). The National Defense Authorization Act for Fiscal Year 1998 (Public Law 105-85) provided that "no military flight operations (including a military training flight), or designation of airspace for such an operation, may be treated as a transportation program or project for purposes of section 303(c) of Title 49, United States Code." Note that Section 4(f) of the U.S. Department of Transportation (DOT) Act was codified and renumbered in 1983 as section 303(c) of 49 United States Code.
Farmlands	(Will not be evaluated in this EA)	None of the activities associated with the Proposed Action have the potential to convert farmland to non-agricultural uses.
Fish, Wildlife, and Plants	Subchapters 3.5, 4.1.5 and 4.2.5	
Floodplains	Subchapter 1.2.2 (Will not be evaluated in this EA)	None of the activities associated with the Proposed Action have the potential to increase flood hazards to new or existing development by effectively increasing flood heights and/or velocities or by inadequate floodproofing.
Hazardous Materials, Pollution Prevention, and Solid Waste	Subchapter 1.2.2 (Will not be evaluated in this EA)	No aircraft maintenance or refueling activities would occur at the Grant County Airport under the Proposed Action. No solid waste would be generated at the Grant County Airport.
Historical, Architectural, Archaeological, and Cultural Resources	Subchapters 3.6, 4.1.6, and 4.2.6	
Light Emissions and Visual Impacts	(Will not be evaluated in this EA)	The Proposed Action would not produce lighting that would annoy people or situations where the visual sight of aircraft would be intrusive.
Natural Resources and Energy Supply	(Will not be evaluated in this EA)	The Proposed Action would not result in any change in the number of personnel, aircraft, or flying hours; therefore, there would be no change in fuel consumption or electrical power requirements for the airport. Sand, gravel and aggregate would not be consumed for the project.
Noise	Subchapters 3.2, 4.1.2, and 4.2.2	
Cumulative Impacts	Subchapters 2.4, 4.2.1.4, 4.2.2.3, 4.2.3.2, 4.2.4.1, 4.2.5.1, 4.2.6.4, and 4.2.7.1	

Table 1-1. Impact Analysis Categories Identified in FAA Order 1050.1E (Cont'd)

FAA Impact Analysis Categories	How Addressed by EA Analysis [relevant section]	Remarks
Socioeconomic Impacts, Environmental Justice, Safety Risks	▪ Socioeconomics will not be evaluated in this EA (see Subchapter 1.2.2). ▪ Environmental Justice is evaluated in Subchapters 3.2 and 4.2 ▪ Safety Risks are evaluated in Subchapters 3.1, 4.1.1, and 4.2.1	No personnel would be based and no construction would occur at the Grant County Airport under the Proposed Action.
Water Quality	(Will not be evaluated in this EA)	The Proposed Action would not result in any discharges to water bodies or other impacts to water resources in Grant County. The Proposed Action would not result in any degradation of surface or groundwater quality.
Wetlands	Subchapter 1.2.2 (Will not be evaluated in this EA)	None of the activities associated with the Proposed Action have the potential for impact to wetlands.
Wild and Scenic Rivers	(Will not be evaluated in this EA)	The Proposed Action would not impact any wild and scenic rivers. There are three rivers in Washington that are designated by the U.S. Department of the Interior, National Park Service in the National Wild and Scenic Rivers System: ▪ Klickitat River is located in southern Washington approximately 135 miles from Moses Lake. ▪ Skagit River is located in northwestern Washington approximately 130 miles from Moses Lake. ▪ White Salmon River is located in southern Washington approximately 150 miles from Moses Lake. The nearest wild and scenic rivers in Idaho and Oregon are all over 120 miles from the Grant County International Airport.

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CHAPTER 2
ALTERNATIVES INCLUDING THE PROPOSED ACTION

This chapter describes the elements associated with development of alternatives that were considered by the Air Force. The specifics of the proposal for meeting the project's purpose and need are discussed for each alternative. The methodology used to identify alternatives and the alternatives considered but not carried forward for analysis are provided in Subchapter 2.1. This chapter also describes the No Action Alternative, in accordance with Council of Environmental Quality (CEQ) regulations (40 CFR 102.14(d). Elements of the Proposed Action are described in Subchapter 2.3.

2.1 Alternatives Formulation and Consideration

2.1.1 Selection Standards for Alternatives

As stated in Subchapter 1.2.3, the AFFSA recently approved a waiver to allow AMC owned aircraft flown by AMC pilots to exceed 250 KIAS when flying at an altitude of less than 10,000 ft MSL in VMC on a "one day a week" basis to conduct tactical training. This waiver would allow 62 and 446 AWs C-17 aircrews to accomplish high altitude/high airspeed and low altitude/high airspeed (maximum airspeed of 350 KIAS) C-17 tactical arrival and departure training at an airfield.

An airfield that could be used for high altitude/high airspeed and low altitude/high airspeed C-17 tactical arrival and departure training associated with a landing zone (LZ) must:

- Have C-17 LZ that meets LZ dimensions without upgrades. An LZ is a prepared or semi-prepared (unpaved) runway similar to a forward operating location. An LZ is typically shorter and narrower than a standard runway. The minimum dimensions for a C-17 LZ is 3,500 ft long and 90 ft wide. The maximum dimensions are 5,000 ft long and 100 ft wide. The LZ must also be able to accommodate the heavy weight of the C-17.
- Be within a reasonable travel distance from JBLM to reduce "transit" time between the Base and the airfield. Transit time is undesirable in flying training programs because training events are not accomplished during that time. Flying training programs are developed to maximize the number of training events accomplished in the shortest period possible to conserve valuable training funds that include fuel consumption costs. Enroute travel of 45 minutes is considered to be a reasonable distance.
- Have adequate crash and fire protection services.
- Have an aircraft operating condition in which operations by other aircraft would cause minimal disruption to C-17 high altitude/high airspeed and low altitude/high airspeed training.

2.1.2 Identification of Alternatives

Personnel from HQ AMC and the 62 and 446 AWs reviewed options to develop alternatives at which high altitude/high airspeed and low altitude/high airspeed tactical arrivals and departures to/from a LZ could be accomplished. As a result of the process and, in addition to the No Action Alternative, HQ AMC and 62 and 446 AWs personnel identified the following airfields as potential alternatives to satisfy the need identified in Subchapter 1.1:

- **McChord Field C-130 Airstrip.** Parallel to the main runway at McChord Field at JBLM, the LZ is approximately 3,760 ft long and 60 ft wide, with 10-ft wide paved shoulders and is used by C-130 aircraft.
- **Grant County Airport.** This airport, owned by the Port of Moses Lake, Washington, has five runways including Runway 09/27, which is a paved 3,500 ft long by 90 ft wide LZ. The airport is used by civil and military aircraft, and a community college conducts flying training at the airport.
- **Boise Air Terminal/Gowen Field.** Located at Boise, Idaho, this joint civilian/military, commercial and general aviation airport. The airfield has three runways, one of which is a LZ that meets the dimensions for a C-17 LZ. The runway is used by the Idaho Air National Guard, National Interagency Fire Center, and U.S. Forest Service.

- **Camp Guernsey.** A joint civilian/military use airport at Guernsey, Wyoming, this airfield has a 5,500 foot-long by 75 ft wide runway. The primary mission of Camp Guernsey is to provide a major training area and logistic support for Wyoming Army and Air National Guard units. Secondarily, it hosts other National Guard, Reserve, and active military units.
- **Altus AFB.** Located in southwestern Oklahoma, this airfield has three runways, one of which is 3,515 foot-long by 94 ft wide and is used for combat training for C-17 aircraft.
- **Travis AFB.** Located in northern California, this airfield has two runways that are over 10,000 ft long. A C-17 LZ is being constructed at Travis AFB, with completion estimated for late 2011 or early 2012.
- **Yakima Training Center (TC).** Yakima TC is an Army maneuver training area located in central Washington, approximately 100 miles east-southeast of JBLM. This facility is for helicopter use only. Runway 4/22 is 3,835 ft long and 150 ft wide.
- **Gray Army Air Field (AAF).** The 66th Aviation Brigade of the Washington Army National Guard is based at Gray AAF on JBLM. This helicopter brigade provides firefighting support for wildfires.
- **Pacemaker Landing Zone.** Also located on JBLM, the runway at Pacemaker LZ is 3,500 ft by 60 ft wide.

The Air Force also considered use of the flight training simulator for aircrew training. The simulator does not currently provide realistic training for high altitude/high airspeed and low altitude/high airspeed tactical arrival and departure training. Because the simulator currently lacks the upper and lower cockpit side windows, it does not provide proper visual cues, especially in high degrees of bank, which are needed to visually acquire the runway and land. The simulator also does not properly provide routine distractions (such as air traffic control tower radio traffic and other aircraft in the area) that occur during arrivals and departures (USAF, 2010). Thus, use of the flight simulator to meet training requirements was not considered as a viable alternative.

2.1.3 Application of Selection Standards to Alternatives Considered

Personnel from the 62 and 446 AWs compared the alternatives identified in Subchapter 2.1.2 to the selection standards in Subchapter 2.1.1. Table 2-1 summarizes the selection process. "Yes" indicates the alternative would meet the standard or that the airfield would be an acceptable LZ for C-17 high altitude/high airspeed and low altitude/high airspeed tactical arrival and departure training. As indicated in Subchapter 2.1.1, a site must meet all four selection standards to be considered viable.

Table 2-1. Application of Selection Standards to Alternatives Considered

Selection Standards	Site								
	McChord C-130 Airstrip	Grant County Airport	Boise Air Terminal	Camp Guernsey	Altus AFB	Travis AFB	Yakima TC	Gray AAF	Pacemaker LZ
An existing C-17 LZ that meets LZ dimensions and would not need upgrading	No	Yes	Yes	No	Yes	Yes[1]	No	No	No
Reasonable travel distance from JBLM (does not exceed 45 minutes enroute time)	Yes	Yes	No	No	No	No	Yes	Yes	Yes
Has crash/fire protection services	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	No
Have an aircraft operating condition in which operations by other aircraft would cause minimal disruption to C-17 high altitude/high airspeed or low altitude/high airspeed training.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Eliminated from further consideration	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: Travis AFB would meet the LZ dimensions requirement after the LZ is completed.

As shown in Table 2-1, only the Grant County Airport would meet all four selection standards. The only other existing airfields suitable for C-17 tactical training are located at Altus AFB and Travis AFB, neither of which is within a reasonable enroute distance from JBLM. Based on the summary in Table 2-1, the Grant County Airport was identified as the alternative best suited to meet the need identified in Subchapter 1.1. Therefore, other alternatives, except the No Action Alternative, have been eliminated from further review.

2.2 Description of the No Action Alternative

The Air Force is required by regulation to consider the No Action Alternative. Under the No Action Alternative, C-17 aircrews based at JBLM and other bases would continue to use Grant County Airport for training. The training includes tactical arrival and departure training, but not at airspeeds that exceed 250 KIAS below 10,000 ft MSL. Table 2-2 reflects baseline operations at the Grant County Airport, which would also represent operations that would occur under the No Action Alternative. Figure 2-1 shows the location of the Grant County Airport.

Table 2-2. Baseline Annual and Average Daily Airfield Operations at the Grant County Airport

	Arrival and Departure Operations		Closed Pattern Operations		Total Operations	
Aircraft Category/ Aircraft	**Annual**	**Average Busy Day**	**Annual**	**Average Busy Day**	**Annual**	**Average Busy Day**
Air Carrier						
B-747	1,983	5.43	4,530	12.41	6,513	17.84
B-787	1,133	3.11	3,383	9.27	4,516	12.38
B-777	283	0.78	673	1.84	956	2.62
B-767	283	0.78	673	1.84	956	2.62
B-737	1,983	5.43	4,530	12.41	6,513	17.84
Subtotal	5,667	15.53	13,788	37.77	19,445	53.30
Air Taxi						
C-208	2,080	5.70	903	2.47	2,983	8.17
General Aviation						
C-172	1,884	5.16	679	1.86	2,563	7.02
BE23	4,396	12.04	1,585	4.34	5,981	16.38
BE19	4,396	12.04	1,585	4.34	5,981	16.38
C-210	1,884	5.16	679	1.86	2,563	7.02
Subtotal	12,560	34.40	4,528	12.40	17,088	46.80
Military						
C-17	14,374	43.56	6,876	20.84	21,250	64.40
P-3	1,121	3.07	536	1.47	1,658	4.54
EA-6B	336	0.92	161	0.44	497	1.36
Subtotal	15,832	47.55	7,573	22.75	23,405	70.30
Total	36,139	103.18	26,792	75.39	62,931	178.57

Notes:

Approximately 37 percent of the C-17 operations occur during the nighttime (10:00 p.m. to 7:00 a.m.). None of the other aircraft accomplish nighttime operations. C-17 operations include operations by C-17s from JBLM and Travis, Elmendorf, and Hickam AFBs.

An operation is the accomplishment of a single maneuver such as a takeoff/departure, an arrival/landing, a touch and go landing, or a closed pattern. A closed pattern consists of two operations; one takeoff, and one landing.

Although the number of operations at an airfield usually varies from day to day, the noise model requires input of the specific numbers of daily flight operations. The Air Force does not follow FAA's use of the "average annual day" in which annual operations/events are averaged over an entire 365-day year. Neither does the Air Force use the "worst-case day" since it typically does not represent the typical noise exposure. Instead, the Air Force uses the "average busy day" concept in which annual operations/events for an aircraft type are averaged over the number of flying days per year by that aircraft type. Non-flying days (e.g., weekends or holidays) are not used in computing the "average busy day" operations. The "average busy day" concept is used for noise modeling in this EA. Average busy day operations for C-17s are based on 330 days per year. Average busy day for all other aircraft types is based on 365 days per year.

No Action C-17 operations reflect the estimated level of operations for all C-17s at the Airport and are based on the maximum number of landings under the contract between the 62 AW and the Grant County International Airport. Twelve months of data ending in February 2011 define the No Action Alternative (baseline) for the other aircraft types.

Source: Grant County International Airport, 2011; 62 OSS, 2011 (for C-17s).

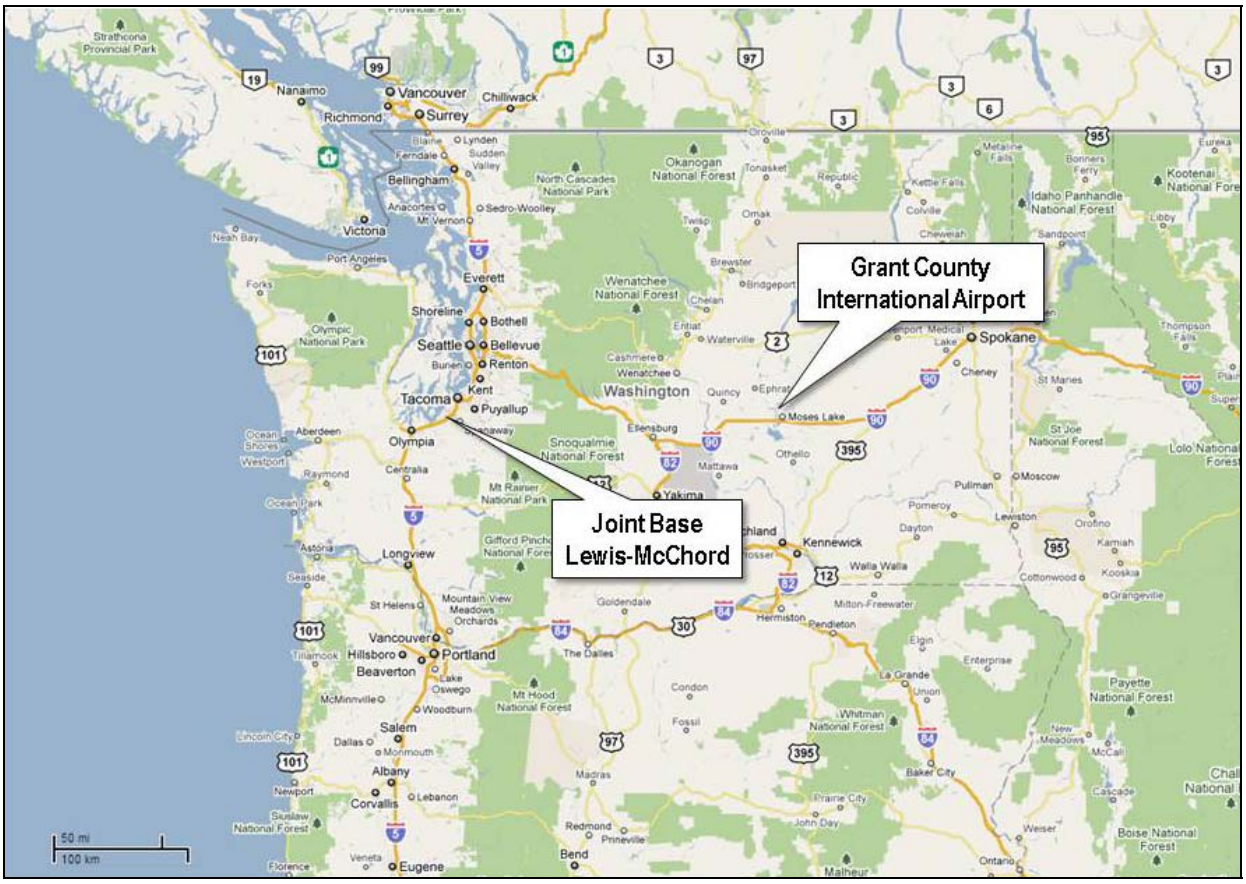

Figure 2-1. Location of Grant County International Airport

The 62nd Airlift Wing manages and schedules C-l7 tactical training at the Grant County Airport for not only McChord crews, but also for C-17 aircrews from Travis, Hickam, and Elmendorf AFBs. The Grant County Airport currently is the sole C-17 LZ west of Altus AFB. Although these other crews train at Grant County Airport, their training is less than one percent of the air traffic. The primary C-17 users are crews from the 62nd and 446th Airlift Wings. The other C-17 units that conduct training at Grant County Airport coordinate with the 62nd Operations Group to schedule training on the local Air Movement Table (AMT).

Two corridors in which tactical arrival and departure events are accomplished have been established at the Grant County Airport for several years. Training would continue to be restricted to within the tactical corridors to the north and east of the airfield as well as the area immediately surrounding the airport (see Figure 2-2).

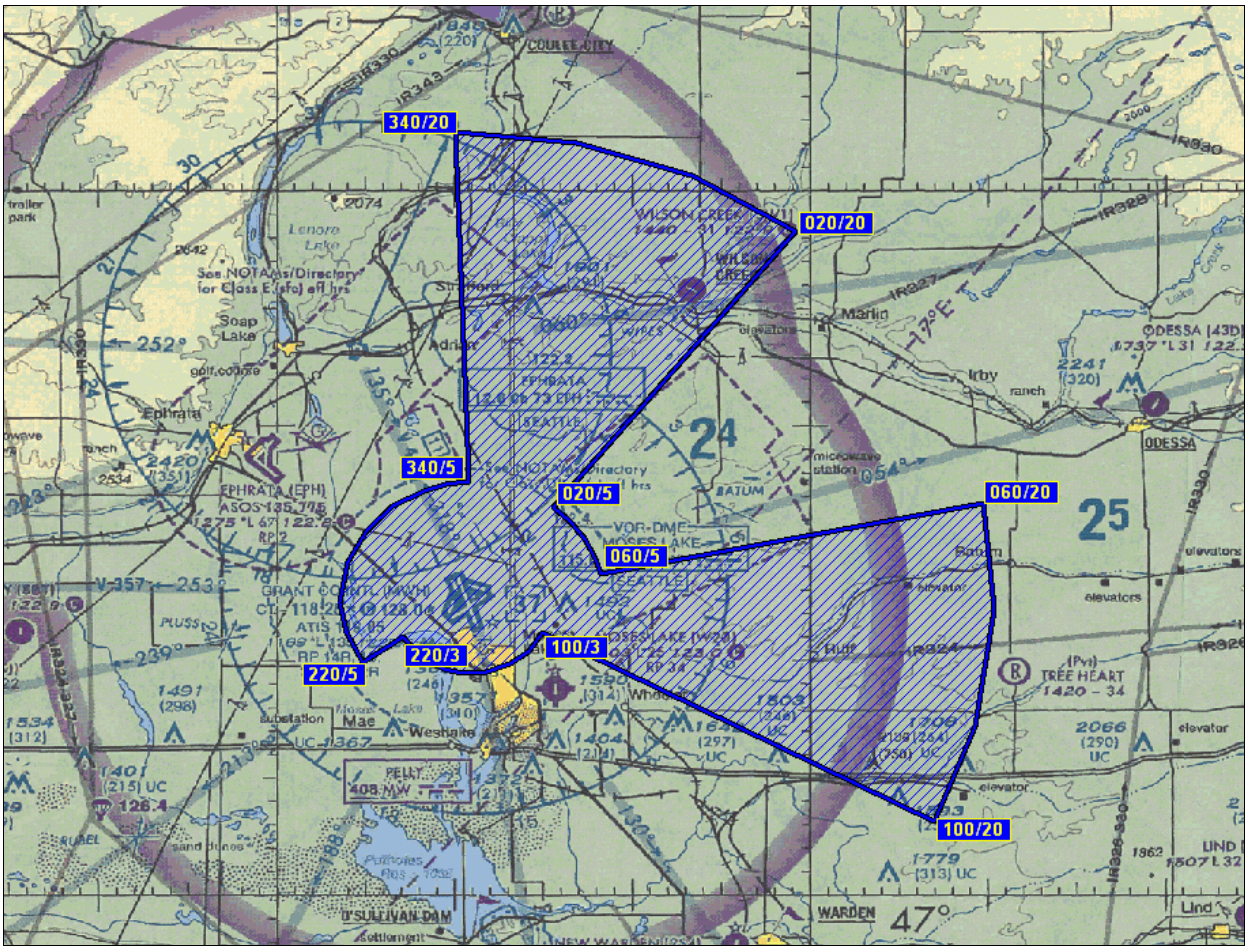

Figure 2-2. Maneuver Area for C-17 Training Events at the Grant County Airport

2.3 Description of the Proposed Action

Under the Proposed Action, high altitude/high airspeed and low altitude/high airspeed tactical arrivals and departures would be accomplished one day per week at the Grant County Airport. This training would be accomplished only in VMC and when it does not conflict with other air traffic. The 62 AW anticipates the use of different days of the week throughout the year to meet changing mission needs.

In accordance with the terms of the AFFSA waiver, the 62nd Operations Group would track usage and would not allow the number of training days to exceed 52 days in any given year (USAF, 2010). The 62 AW would continue to schedule C-17 training at the Grant County Airport by the Wing's and other unit's C-17s through the local AMT. The following procedures regarding low altitude/high airspeed tactical training would be followed.

- The 62nd Operations Group would issue a Notice To Airmen (NOTAM) advising other pilots of the opening and closing of training in the high airspeed tactical training corridors. The FAA's NOTAM system alerts pilots of any hazards en route or at a specific location.
- The high airspeed tactical training could occur between 9:00 a.m. and 2:00 a.m. Actual use times may vary with the seasons.
- The high airspeed tactical training would be accomplished under concurrence from ATC when the air traffic control tower is open.
- The 62 AW has an agreement with the Grant County Airport air traffic control tower that allows Air Force personnel to be on the airport to observe operations and act as a coordinator between Air Force aircraft and any civil aircraft arriving and departing the Airport when the air traffic control

tower is closed. The personnel monitor Air Force training and advise C-17 aircrews to adjust patterns as needed to ensure flight safety and the minimization of noise to the local community. The personnel can suspend training at any time and will alert crash/fire personnel and coordinate any response while they are present. The Air Force personnel would ensure the NOTAM has been published before any high airspeed training is accomplished when the air traffic control tower is closed. Additionally, the tower would be requested to record a message on the Automated Surface Observation System (ASOS) advising aircraft that high airspeed training is being accomplished and, if able, to contact the Air Force personnel on the common traffic advisory frequency prior to 20 miles from the airfield to coordinate arrival. The ASOS is an automated sensor system designed to serve aviation meteorological needs and allows a recorded message with information about the airfield.

- C-17s would not have priority in the pattern for this high airspeed training and this training would be allowed only when air traffic conditions allow.
- High airspeed tactics training would not be authorized when non-participating traffic is reported or sighted within 10 miles of the airport, civil aircraft are operating in the Grant County Airport traffic pattern, or when advisory traffic is reported by the FAA's Seattle Air Route Traffic Control Center (ARTCC).
- A maximum of three C-17s would be allowed in the pattern when performing high airspeed approaches when the air traffic control tower is operational. No more than two C-17s would be in the traffic pattern when the tower is closed.
- The aircrews would request a report of any observed traffic from Seattle ARTCC prior to conducting steep high airspeed approaches.
- Low level/high airspeed approaches would be accomplished within the defined tactical corridors and over unpopulated areas.
- C-17s conducting high airspeed training would have an operating Traffic Collision Avoidance System (TCAS) as well as one safety observer in the cockpit at all times. The TCAS is an aircraft avoidance system that uses a transponder and is designed to reduce the incidence of mid-air collisions. The system warns pilots of the presence of other transponder-equipped aircraft that may present a threat of a mid-air collision.

The primary ground track for high altitude/high airspeed and low altitude/high airspeed arrivals in the East Corridor would be a straight-in approach starting below Flight Level (FL) 210 (FL210) and not lower than 1,000 ft AGL. These arrivals would occur within the tactical corridors depicted on Figure 2-2. Landings from these arrivals would occur on the LZ (Runway 09/27). FL is used by air traffic controllers to simplify the vertical separation of aircraft and one exists every 1,000 ft relative to an agreed pressure level. Above a transitional altitude, which varies from country to country, the worldwide arbitrary pressure datum of 29.92 inches of mercury is entered into the altimeter and altitude is then referred to as a FL. The altimeter reading is converted to a flight level by removing the trailing two zeros: for example, 29,000 ft becomes FL290 and 25,500 ft is FL255. When the pressure at sea level is by chance the international standard, then the flight level is also the altitude. To avoid confusion, below the transition altitude, height is referred to as altitude AGL.

The primary ground track for high altitude/high airspeed and low altitude/high airspeed arrivals in the North Corridor would be at a 90-degree angle to the LZ from 10,000 ft above MSL down to 1,000 ft AGL, with maneuvering to land on the LZ occurring either north or south of the LZ (Runway 09/27). These tracks would overfly very sparse areas of population and would be in compliance with current noise abatement procedures and agreements with the Grant County Airport and the ATC Manager.

C-17 and other military and civil aircraft would continue to accomplish operations on flight tracks used under the No Action Alternative. Flight tracks/profiles would be added for the high altitude/high airspeed and low altitude/high airspeed C-17 tactical arrivals. Although some of the C-17 tactical arrivals and departures would continue to be low altitude (but not below 1,000 ft AGL), they would not exceed 250 KIAS.

Although high altitude/high airspeed and low altitude/high airspeed tactical arrivals would be added to the events C-17 aircraft accomplish at Grant County Airport, there would be no change in the total number of

operations or aircraft types when comparing the Proposed Action to the No Action Alternative (see Table 2-2 for the total operations and operations by each aircraft type). As indicted in Table 2-3, there would be 3.26 average busy day high altitude/high airspeed and low altitude/high airspeed tactical arrivals under the Proposed Action. There would be a commensurate reduction of 3.26 average busy day operations associated with the currently flown high altitude/low airspeed and low altitude/low airspeed tactical arrivals. As a result, C-17 aircraft would continue to accomplish 64.40 average busy day operations. Overall, there would continue to be 178.57 average busy day operations for all aircraft. Table 2-3 lists the numbers of proposed C-17 high altitude/high airspeed and low altitude/high airspeed arrivals at the Grant County Airport. The total 3.26 average busy day high altitude/high airspeed and low altitude/high airspeed arrivals, which are included in the 64.40 C-17 operations, equate to approximately 17 percent of the total C-17 arrivals at the airport. None of the departure or closed pattern operations would be high altitude/high airspeed or low altitude/high airspeed. C-17 aircraft would continue to accomplish about 37 percent of its operations at nighttime (10:00 p.m. to 7:00 a.m.). None of the other aircraft types would accomplish operations during nighttime.

Table 2-3. High Altitude/High Airspeed and Low Altitude/High Airspeed Arrivals

Arrival Type	East Corridor	North Corridor	Daily Total
High Altitude/High Airspeed	0.98	0.08	1.06
Low Altitude/High Airspeed	0.65	1.55	2.20
Average Busy Day Total	1.63	1.63	3.26

No personnel would be based at JBLM or the Grant County Airport and no construction activities would occur at the Grant County Airport as a result of the Proposed Action.

2.4 Description of Past, Present, and Reasonably Foreseeable Future Actions

The complete EIAP of the No Action Alternative and the Proposed Action must consider cumulative impacts due to other actions. A cumulative impact, as defined by the CEQ (40 CFR 1508.7), is the "impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of which agency (federal or non-federal) or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."

There are two known projects near the Grant County Airport:

- SGL Automotive Carbon Fibers, LLC, a joint venture between SGL Carbon and BMW Auto, was formed to manufacture carbon fiber for use in the chassis of BMW's Megacity Vehicle to be released in 2013. Several thousand tons of carbon fiber will be manufactured each year at the facility. Construction of the facility began in July 2010 (Grant County EDC, 2011). The factory is located approximately 0.5 mile east of Runway 9/27. This project is located outside the Runway 9/27 Runway Protection Zone (RPZ).
- Boeing Company is proposing to install and experiment with a new Ground-Based Augmentation System (GBAS) at the Grant County Airport. GBAS is a satellite navigation system being developed by the FAA. GBAS uses signals from the Global Positioning System (GPS) to develop an extremely accurate navigation signal that focuses its service on the airport area (approximately a 20-30 mile radius).

Based on a review of the State of Washington Department of Ecology State Environmental Policy Act (SEPA) Register, there are no other planned projects in the vicinity of the Grant County Airport.

The primary element of the proposed action is the addition of C-17 high altitude/high airspeed and low altitude/high airspeed tactical arrivals at the Grant County Airport. There are no other projects identified at or near the Grant County Airport that include changes in the number or type of aircraft operations at this airfield. Thus, there would be no cumulative impacts from the No Action Alternative or Proposed Action at this airfield.

2.5 Preferred Alternative

The preferred alternative is the Proposed Action which would result in a change in tactical training by C-17 aircraft at the Grant County Airport. The Proposed Action would result in the addition of C-17 high altitude/high airspeed and low altitude/high airspeed tactical arrivals in the existing C-17 maneuver areas in the area surrounding the airport.

2.6 Comparison of Environmental Effects of All Assessed Alternatives

Table 2-4 summarizes the impacts of the No Action Alternative and the Proposed Action.

Table 2-4. Summary of Environmental Impacts for High Altitude/High Airspeed and Low Altitude/High Airspeed C-17 Training at the Grant County Airport

Aircraft Operations, Aircraft Safety and Bird/Wildlife-Aircraft Strike Hazard
No Action Alternative ▪ The airfield would continue to operate at about 18 percent of the annual capacity and 15 percent of the hourly capacity. ▪ The air traffic control procedures, to include JBLM C-17 operations when the air traffic control tower is closed and which accommodate the current level of activity, would continue to be used to control and accommodate aircraft operations. ▪ The potential for aircraft accidents or bird/wildlife-aircraft strikes would remain at baseline conditions at the Grant County Airport. The risk that an aircraft involved in an accident at or around the airfield would strike a person or structure on the ground would continue to be low. Likewise, it would continue to be unlikely that a bird/wildlife-aircraft strike incident at or around the airfield would involve injury either to aircrews or to the public, or damage to property (other than the aircraft).
Proposed Action ▪ The airfield would continue to operate at about 18 percent of the annual capacity and 15 percent of the hourly capacity. ▪ The C-17 high altitude/high speed and low altitude/high speed tactical arrivals would be accomplished in the same maneuver area in which the current high altitude/low speed and low altitude/low speed tactical arrivals to Runway 09/27, as well as other C-17 operations at the airport, are accomplished. No additional airspace would be needed for the high altitude/high speed and low altitude/high speed tactical arrivals. ▪ The high airspeed tactical training would be accomplished under concurrence from ATC when the air traffic control tower is open. Additionally, C-17s would not have priority in the pattern for high airspeed training and this training would be allowed only when air traffic conditions allow. ▪ The risk is low that an aircraft involved in an accident or a bird/wildlife aircraft strike at or around the airport would strike a person or structure on the ground.
Noise
No Action Alternative ▪ Seven residences would continue to be exposed to Day-Night Average Sound Level (DNL) 65 decibel (dBA) and greater noise, with one of the residences in the DNL 70-75 dBA noise zone. ▪ Disruptions to speech would last only as long as noise from the overflying aircraft remains at 66 dB or greater. ▪ No structural damage would occur from aircraft noise at or around the airfield. ▪ Neither noise induced hearing damage nor nonauditory health effects would occur.
Proposed Action ▪ Eight residences would be exposed to DNL 65 dBA and greater noise, with one of the residences continuing to be in the DNL 70-75 dBA noise zone. ▪ To minimize the potential for noise impacts, tactical maneuvers such as high altitude/high airspeed and low altitude/high airspeed arrivals, as well as other C-17 operations at the airport, would be accomplished over unpopulated areas to the maximum extent practicable when considering the operating characteristics of the aircraft. ▪ Disruptions to speech would last only as long as noise from the overflying aircraft remains at 66 dB or greater. ▪ No structural damage would occur from aircraft noise at or around the airfield. ▪ Neither noise induced hearing damage nor nonauditory health effects would occur.

Table 2-4. Summary of Environmental Impacts for High Altitude/High Airspeed and Low Altitude/High Airspeed C-17 Training at the Grant County Airport (Cont'd)

Land Use
No Action Alternative ▪ Activities associated with continuation of current aircraft operations would not conflict with current land use in the Grant County Comprehensive Plan, zoning in the Comprehensive Plan of the City of Moses Lake, or the Airport Master Plan.
Proposed Action ▪ Aircraft operations and associated noise would not conflict with current land use in the Grant County Comprehensive Plan or zoning in the Comprehensive Plan of the City of Moses Lake. ▪ Noise from aircraft operations would not preclude adjacent or nearby properties from continuing to be used for existing activities. ▪ The Proposed Action would not be inconsistent with the 2005 Airport Master Plan nor would it conflict with the FAR Part 77 imaginary surfaces or runway protection zones.
Air Quality and Greenhouse Gas Emissions
No Action Alternative ▪ There would be no changes to existing air pollutant emissions from C-17 operations at the Grant County Airport. ▪ Existing air pollutant emissions are less than 10 percent of the AQCR's overall area emissions and are not considered significant.
Proposed Action ▪ Emissions would represent a small percentage of the AQCR's overall area emissions. Nitrogen oxide emissions would increase by 0.0019 percent. ▪ Grant County is classified as attainment for all criteria pollutants. Because the increase in criteria pollutant emissions from the Proposed Action is less than 10 percent of baseline air quality control region emissions, the Proposed Action will not cause or contribute to new violations of any national ambient air quality standard in the affected area. ▪ Greenhouse gas emissions would amount to approximately 0.000004 percent of the total greenhouse gas emissions generated by the U.S.; there would be no measurable impacts to global climate change.
Biological Resources
No Action Alternative ▪ No changes to existing biological resources would occur at the Grant County Airport. Current C-17 aircraft operations do not affect threatened or endangered species of wildlife or plants. Aircraft operations at the airport do not result in adverse effects on nesting long-billed curlew (no Federal status, a species monitored by the State of Washington) or wintering bald eagles. ▪ There would continue to be no disturbance or removal of any native vegetation, ornamental landscaping, or other habitat that would serve as nesting habitat for native birds.
Proposed Action ▪ The approximately 2 dBA increase in noise levels would not affect biological resources at the Grant County Airport or surrounding area. ▪ The Proposed Action does not involve any construction or removal of vegetation; therefore, direct or indirect impacts to vegetation or wildlife found within a 5-mile radius of the Grant County Airport would not occur. ▪ The Proposed Action would not adversely affect threatened or endangered species of wildlife or plants. ▪ The increased noise level would not affect the nesting long-billed curlew (no Federal status, a species monitored by the State of Washington) or wintering bald eagles. ▪ The potential impact on bird populations from bird collisions with aircraft is extremely low.
Cultural Resources
No Action Alternative ▪ There are no NRHP listed archaeological sites or historic properties within one mile of the Area of Potential Effects (APE), an area within five miles of the Grant County Airport. ▪ While the occurrence of aircraft accidents is statistically low, impacts from C-17 flying operations on historic cultural resources would remain low due to routine airfield maintenance and aircraft operations activities. ▪ The Air Force would continue to have no management responsibility for cultural resources within the APE.

Table 2-4. Summary of Environmental Impacts for High Altitude/High Airspeed and Low Altitude/High Airspeed C-17 Training at the Grant County Airport (Cont'd)

Cultural Resources (Cont'd)
Proposed Action ▪ Since there are no known archaeological sites near the Grant County Airport, there would be no effect on archaeological resources. ▪ There are no NRHP-listed historic resources directly below the C-17 flight tracks that surround the Grant County Airport. ▪ The greatest maximum sound level generated by the C-17 would be 106 dBA at 500-ft AGL during takeoff, for which there is no change from the baseline. The maximum noise level from a proposed high airspeed tactical arrival would be 96 dBA. These maximum noise levels would be well below the threshold at which structural damage would occur (*i.e.*, 127 dBA). ▪ No structures at the Grant County Airport would be used and the level of noise to which they would be subjected would be well below 127 dBA; thus, there would be no impact to any potentially historic properties at the Grant County Airport. ▪ Low altitude/high speed C-17 operations would not adversely affect Native American interests in the area.

2.7 Mitigation Measures

The environmental analysis contained in this EA has found that no significant impacts would result from implementation of the Proposed Action. Therefore, no mitigation measures would be recommended.

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CHAPTER 3
AFFECTED ENVIRONMENT

This chapter describes the existing environmental resources that could be affected by or could affect the No Action Alternative and Proposed Action. Only those specific resources relevant to potential impacts are described in detail. The baseline represents the current condition for the respective resource or conditions that may exist due to the No Action Alternative.

3.1 Aircraft Operations, Aircraft Safety and Bird/Wildlife-Aircraft Strike Hazard

3.1.1 Aircraft Operations

3.1.1.1 Definition of Resource

Airspace is a finite resource defined vertically, horizontally, and temporally. As such, it must be managed and used in a manner that best serves commercial, general, and military aviation needs. The FAA is responsible for overall management of airspace and has established different airspace designations to protect aircraft while operating to or from an airport, transiting enroute between airports, or operating within "special use" areas identified for defense-related purposes. Rules of flight and air traffic control procedures were established to govern how aircraft must operate within each type of designated airspace. The Federal Aviation Regulations (FARs) apply to both civil and military aircraft operations unless the FAA grants the military service an exemption or a regulation specifically excludes military operations. All aircraft operate under either instrument flight rules (IFR) or visual flight rules (VFR). Appendix D contains additional information regarding low-altitude flying limitations and IFR and VFR weather conditions.

3.1.1.2 Baseline Conditions

The airspace around the airport and up to 10,000 ft above MSL is controlled by Grant County Terminal Radar Approach Control (TRACON), which provides radar vectoring, sequencing, and separation service for VFR and IFR aircraft operating within the airspace as well as into and out of the airport.

There are five public and one private use airports within or adjacent to the controlled airspace associated with the Grant County Airport. Seven low-altitude federal airways pass through the airspace surrounding the airport. The Okanogan and Roosevelt Military Operations Areas are located approximately 50 miles north of the Grant County Airport, and the Yakima Training Center restricted area is located 35 miles to the southwest.

The airfield consists of two primary instrument runways (14Left/32Right [14L/32R] and 04/22), and two shorter runways (14R/32L and 18/36). Additionally, Runway 09/27, which is 3,500 ft long and 90 ft wide, is used as an LZ for C-17 training. Runway 04/22 is oriented northeast/southwest and is 9,999 ft long and 100 ft wide. Runway 14L/32R is oriented northwest/southeast and measures 13,502 ft long and 200 ft wide. The two shorter runways are located to the west of the primary runways. Runway 14R/32L measures 3,025 ft long and 75 ft wide. Runway 18/36 is 3,263 ft long and 75 ft wide. Airport elevation is 1,185 ft MSL. The Grant County Airport air traffic control tower operates between 6:00 a.m. and 10:00 p.m. daily. Fifteen instrument approach procedures are available for arrivals to the Grant County Airport. Aircraft traffic pattern altitudes are 1,000 ft AGL for rectangular patterns and 1,500 ft AGL for overhead patterns. Pilots use a common traffic advisory frequency (CTAF) to advise other pilots in the area of their intentions when the air traffic control tower is not operating.

The 62 AW and the Grant County Airport have an agreement that allows Air Force personnel to be on the airport to observe operations and act as a coordinator between Air Force aircraft and any civil aircraft arriving and departing the Airport when the air traffic control tower is closed (*i.e.*, 10:00 p.m. to 7:00 a.m.). When operating at an uncontrolled airfield, pilots of arriving and departing aircraft, and aircraft accomplishing closed patterns, are requested to advise other pilots who may be operating at the airport or within the airspace around the airport of their intentions via radio calls on a CTAF assigned to the airport. The Air Force personnel monitor Air Force training and advise C-17 aircrews to adjust patterns as needed to ensure flight safety and the minimization of noise to the local community. The personnel can suspend training at any time and will alert crash/fire personnel and coordinate any response while they are present. A maximum of three C-17s can be in the pattern when the air traffic control tower is operational. No more

than two C-17s can be in the traffic pattern when the tower is closed. Additionally, under the agreement, C-17 aircraft will not operate between 2:00 a.m. and 7:00 a.m. at the Grant County Airport.

Aircraft operations at the Grant County Airport are a mix of military, civil, air taxi, and general aviation activities. C-17 operations are accomplished on Runways 14L/32R, 04/22, and the LZ (Runway 09/27). Baseline C-17 operations on the LZ include tactical maneuvers such as spiral up departures, spiral down arrivals, high altitude/low airspeed and low altitude/low airspeed arrivals and departures, steep straight-in arrivals, and steeper than normal climb out on departure. Table 2-2 summarizes aircraft operations at the Grant County Airport. C-17s accomplish about 64 operations per day. Figure 2-2 depicts the maneuver areas for C-17 training at the Grant County Airport and Figure 3-1 depicts the baseline aircraft ground tracks.

FAA Advisory Circular AC 50/5060-5, *Airport Capacity and Delay*, is used to calculate airfield operations capacities for civil airports. Capacity determination takes into account: runway configuration; the number of arrivals and departures; the number of touch and go operations; the number and configuration of taxiways intersecting the runways; airspace limitations that could restrict aircraft operations at the airport; and, air traffic control facilities and services. Using these factors, the annual service volume and hourly capacities of an airfield are calculated. The annual service volume is a reasonable estimate of an airports annual capacity. Hourly capacity is the maximum number of aircraft operations that can be accommodated at the airport in an hour.

Based on information in AC 50/5060-5, the Grant County Airport is estimated to have an annual service volume of 355,000 operations and an IFR hourly capacity of approximately 59 airfield operations. Assuming nearly all operations occur primarily between 6:00 a.m. and 2:00 a.m., there would be 20 hours of operations per day for hourly capacity purposes. The baseline annual 62,931 operations equate to about 18 percent of the annual airfield capacity. Based on a 20-hour day, the average hourly operations would be about 9 operations, or 15 percent of the hourly capacity.

3.1.2 Aircraft Safety

3.1.2.1 Definition of Resource

Air Force Aircraft Safety

Areas around airports are exposed to the possibility of aircraft accidents, even with well-maintained aircraft and highly trained aircrews. Despite stringent maintenance requirements and countless hours of training, past history makes it clear that accidents are going to occur. The Air Force defines five categories of aircraft flight mishaps: Classes A, B, C, E, and High Accident Potential. Appendix D contains additional information regarding the Air Force safety program.

Civil Aviation Aircraft Safety

An aircraft accident, as defined by the National Transportation Safety Board, is an occurrence associated with the operation of an aircraft that takes place between the time any person boards the aircraft with the intention of flight and all such persons have disembarked, and in which any person suffers death or serious injury, or in which the aircraft receives substantial damage. Appendix D contains additional information regarding civil aviation aircraft safety.

3.1.2.2 Baseline Conditions

Air Force Aircraft Safety

Class A mishaps are the most serious of aircraft-related accidents and represent the category of mishap most likely to result in a crash. The 5-year Class A mishap rate for the C-17 aircraft is 0.83 mishaps. The rate reflects the Air Force-wide data for all phases of flight of all missions and sorties for the C-17. The mishap rate is an annual average based on the total number of Class A mishaps and 100,000 flying hours.

Figure 3-1. Baseline Aircraft Ground Tracks

Civil Aviation Aircraft Safety

Table 3-1 lists accident and incident data for the period from 2002 to 2006 for civil aircraft similar to those that operate at the Grant County Airport. The estimated annual average accident/incident rate appears relatively high for certain general aviation aircraft because these models have lower reported airtime information. The Cessna 172, for example, has exhibited relatively high accident rates over the five-year reporting period, but is also no longer used as frequently as during earlier years. From 2002 to 2006, airtime for the Cessna 172 has dropped by approximately 90 percent.

Table 3-1. Civil Aircraft Accident and Incident Information

Type	Aircraft	Representative Model(s)	Accidents	Incidents	Average Annual Accident/ Incident Rate (per 100,000 airtime hours)
Air Carrier	B-727	Boeing 727-100, 727-100c/Qc, 727-200/231a	6	0	0.803
	B-737	Boeing 737-700/700lr, 737-900, 737-800, 737-5/600lr, 737-5/600lr, 737-500, 737-400, 737-300, 737-100/200, 737-200c	26	22	0.031
	B-747	Boeing 747-100, 747-100, 747-200/300, 747-400, 747f	5	3	0.218
	B-767	Boeing 767-400, 767-200/Er/Em	3	2	0.016
	B-777	Boeing 777-200/200lr/233lr	5	1	0.208
	DC-9	McDonnell Douglas Dc-9-10, Dc-9-15f, Dc-9-30, Dc-9-40, Dc-9-50	13	5	0.102
	MD-83	McDonnell Douglas DC9 Super 80/Md81/2/3/7/8	1	1	0.003
Helicopter	Bell 212	Bell 212, Bell B-206a, Bell 212HP and Bell BH-212	5	1	14.534
General Aviation	C-210	Cessna 206/207/209/210 Stationair	207	1	6.994
	Beech Baron	Beech 55, 95-C55, B55, E-55, 95-55, BE-95-55, 95B55	47	1	378.685
		Beech 58, BE-58, 58P, BE-58, 58TC	36	2	ND
	Cessna Turboprop	Cessna 441	7	0	ND
	DHC-6	Dehavilland Twin Otter DHC-6	9	0	0.525
	Gulfstream II	Gulfstream Aerospace G-III	1	0	ND
	Gulfstream IV	Gulfstream Aerospace G-IV	4	0	ND
	Learjet 35	Gates Learjet Lear-25	11	0	ID
	Single Engine Fixed Pitch Propeller	Cessna 172, C-172N, C-172S, C-172G and C-172M	844	7	517.780
	Single Engine Variable Pitch Propeller	Beech 24, Beech 23 Musketeer	19	0	ID

Note: Accident/Incident data reflect records from January 1, 2002 through January 1, 2007 and 5 years of airtime data from 2002 through November 2006 (11 months only for 2006). Data excludes 2006 airtime information for the DC-9 aircraft.

ND = airtime data not available for aircraft type.

ID = insufficient airtime to compute a valid accident rate.

Sources: National Transportation Safety Board, 2007 and BTS, 2007

3.1.3 Bird/Wildlife-Aircraft Strike Hazard

3.1.3.1 Definition of Resource

Bird and wildlife strikes by aircraft constitute a safety concern because of the potential for damage to aircraft, injury to aircrews, or local populations if an aircraft strike and subsequent aircraft accident should

occur in a populated area. Also, if the frequency of bird strikes were high, certain bird species populations might be reduced.

3.1.3.2 Baseline Conditions

Aircraft may encounter birds at altitudes of 30,000 ft MSL or higher; however, most birds fly close to the ground. Over 95 percent of reported bird strikes occur below 3,000 ft AGL. Approximately 49 percent of bird strikes occur in the airport environment, and 15 percent during low-level cruise (USAF, 2003c). Table 3-2 contains the distribution of Air Force-wide bird/wildlife-aircraft strikes at airports by altitude. Historically, one-half of 1 percent of all reported bird/wildlife-aircraft strikes involving Air Force aircraft resulted in a serious mishap. The data in the table would also apply to civil airports because the sizes and operating characteristics of civil aircraft are similar to Air Force aircraft.

Table 3-2. Air Force-Wide Bird/Wildlife-Aircraft Strikes at Airports by Altitude

Altitude (ft AGL)	Percent of Total
0-49	29.11%
50-99	10.69%
100-199	6.62%
200-299	6.73%
300-399	5.34%
400-499	2.49%
500-599	5.90%
600-699	1.48%
700-799	1.33%
800-899	1.75%
900-999	0.62%
1,000-1,499	7.76%
1,500-1,999	6.77%
2,000-2,999	6.82%
3,000-3,999	4.41%
4,000-4,999	1.00%
5,000 and greater	1.17%

Note: Current as of January 1, 2007. Statistics reflect bird-aircraft strike data for which the altitude was known.
Source: Air Force Safety Center, 2011.

AFI 91-202 (*The U.S. Air Force Mishap Prevention Program*) requires that Air Force units supporting a flying mission have a BASH Plan. The 62 AW Plan provides guidance for reducing the incidents of bird strikes in and around areas where flying operations are being conducted, to include Grant County Airport. The Plan is reviewed annually and updated as needed. Appendix D contains additional information about BASH.

Collisions between aircraft and birds are an inherent risk. However, C-17 aircrews use guidance and procedures contained in the 62 AW BASH Plan, which uses data from the Bird Avoidance Model (BAM), to minimize the potential for bird-aircraft strikes at all locations at which flight operations are accomplished. The Model is a predictive bird avoidance model that uses Geographic Information System technology for analysis and correlation of bird habitat, migration, and breeding characteristics to reduce the risk of bird collisions with aircraft. Use of the model allows aircrews to avoid severe BASH risk areas if the mission allows.

The FAA compiles bird and wildlife strike information for airports by aircraft type and animal species (if known). During the 11-year period from January 1, 2000 to December 31, 2010, there were 125 incidents of bird/wildlife strikes involving aircraft using the Grant County Airport (annual average of 11.4 strikes).

Table 3-3 summarizes bird-aircraft strikes by C-17 at the Grant County Airport. Strikes by C-17s comprised approximately 15 percent of the 125 strike incidents. For most of the C-17 incidents, no damage or damage valued at less than $50,000 occurred (FAA, 2011). Table 3-3 presents the bird-aircraft strikes for C-17 aircraft at the Grant County Airport for the period January 2000 to December 2010.

Table 3-3. Bird/Wildlife-Aircraft Strikes by C-17 Aircraft at the Grant County Airport

Year	No. of Incidents	No. of Incidents by Unknown Bird or Bat	Bird Species
2010	1	1	--
2006	13	7	American robin (*Turdus migratorius*)
			Song sparrow (*Melospiza melodia*)
			Barn owl (*Tyto alba*)
			(perching bird, species unknown)
			White-crowned sparrow (*Zonotrichia leucophrys*)
			Horned lark (*Eremophila alpestris*)
2005	5	4	Western meadowlark (*Sturnella neglecta*)

Note: There were no strikes by C-17 aircraft for the years 2000 through 2004 and 2007 through 2009. Bird species shown in last column denote one strike per species.
Source: FAA, 2011

3.2 Noise

3.2.1 Definition of Resource

The characteristics of sound include parameters such as amplitude (loudness), frequency (pitch), and duration. Sound varies over an extremely large range of amplitudes. The decibel (dB) is the accepted standard unit for describing levels of sound. Decibels are expressed in logarithmic units to account for the variations in amplitude. On the dB scale, an increase of three dB represents a doubling of sound energy. A difference on the order of 10 dB represents a subjective doubling of loudness.

The terms noise and sound are often used interchangeably. Physically there is no difference between these concepts, although it is an important distinction for the human listener. Noise is defined as any sound that is unwanted 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.

Different sounds have different frequency contents. Because the human ear is not equally sensitive to sound at all frequencies, a frequency-dependent adjustment, called A-weighting, was developed to measure sound similar to the way the human hearing system responds. The adjustments in amplitude, established by the American National Standards Institute (ANSI, 1983), are applied to the frequency content of the sound. Appendix D contains information regarding Appendix D contains information regarding noise metrics, analysis methods and effects.

3.2.2 Baseline Conditions

Single Event Noise

Table 3-4 lists the sound exposure level (SEL), average noise (L_{eq}), and maximum sound level (L_{max}) values for C-17 takeoffs and tactical arrivals when the aircraft is directly overhead and at varying slant range distances. Airspeeds for takeoffs and low airspeed tactical arrivals are 160 and 250 KIAS, respectively.

Table 3-4. C-17 Noise Levels in Sound Exposure Level, Maximum Sound Level, and Average Noise (dBA) when Aircraft is Directly Overhead or at Various Lateral Distances for Takeoffs and Low Airspeed Tactical Arrivals

Sound Metric/ Phase of Flight	Aircraft Directly Overhead at 1,000 ft AGL	Aircraft Directly Overhead at 1,000 ft AGL	Aircraft at 500 ft AGL				
			500 ft Lateral Distance to Ground Track	1,000 ft Lateral Distance to Ground Track	2,000 ft Lateral Distance to Ground Track	4,000 ft Lateral Distance to Ground Track	6,000 ft Lateral Distance to Ground Track
Sound Exposure Level (SEL)							
Takeoff, 160 KIAS	106	99	102	97	90	82	76
Low airspeed tactical arrival, 250 KIAS	95	89	92	87	79	69	62
Maximum Sound Level (L_{max})							
Takeoff, 160 KIAS	100	91	95	89	81	71	64
Low airspeed tactical arrival, 250 KIAS	92	84	88	82	72	61	53
Average Noise (L_{eq})							
Takeoff, 160 KIAS	56	49	53	48	41	33	27
Low airspeed tactical arrival, 250 KIAS	46	39	42	38	30	20	13

The C-17s that currently operate at Grant County Airport produce an L_{max} of about 100 dBA when the aircraft is directly overhead at 500 ft AGL on takeoff. This sound level would be below the level at which damage to structures and structural vibration would be anticipated (*i.e.*, 127 dBA and 110 dBA, respectively).

Averaged Noise

The primary source of noise in the vicinity of the Grant County Airport is airfield operations. Baseline noise conditions are based on the average busy airfield operations shown on Table 2-2 (No Action Alternative). About 179 average busy day airfield operations occur at the Grant County Airport under the baseline condition. Figure 3-1 shows the baseline condition aircraft ground tracks and Figure 3-2 depicts the noise exposure area for the baseline.

Table 3-5 lists the off-airport numbers of acres and residences within the DNL 65 dBA and greater noise exposure that occurs within land use categories of Rural Residential 1, Rural Residential 2, and Rural Remote (see Figure 3-2). The baseline noise contours were overlaid on an aerial photograph to determine if and where residences might be exposed to aircraft noise at DNL 65 dBA and greater. A total of seven residences would be exposed to aircraft noise of DNL 65 dBA and greater. Figures 3-3 and 3-4, respectively, detail the areas north and east of the airport where residences occur within the noise exposure zones.

Table 3-5. Baseline Off-Airport Residential Land Area and Residences Exposed to DNL 65 dBA and Greater

Category	DNL Interval (dBA)			
	65-70	70-75	75-80	Total
Residential Use Acres	347	23	0	370
Residences	6	1	0	7

Note: Acres reflect only off-airport land area.

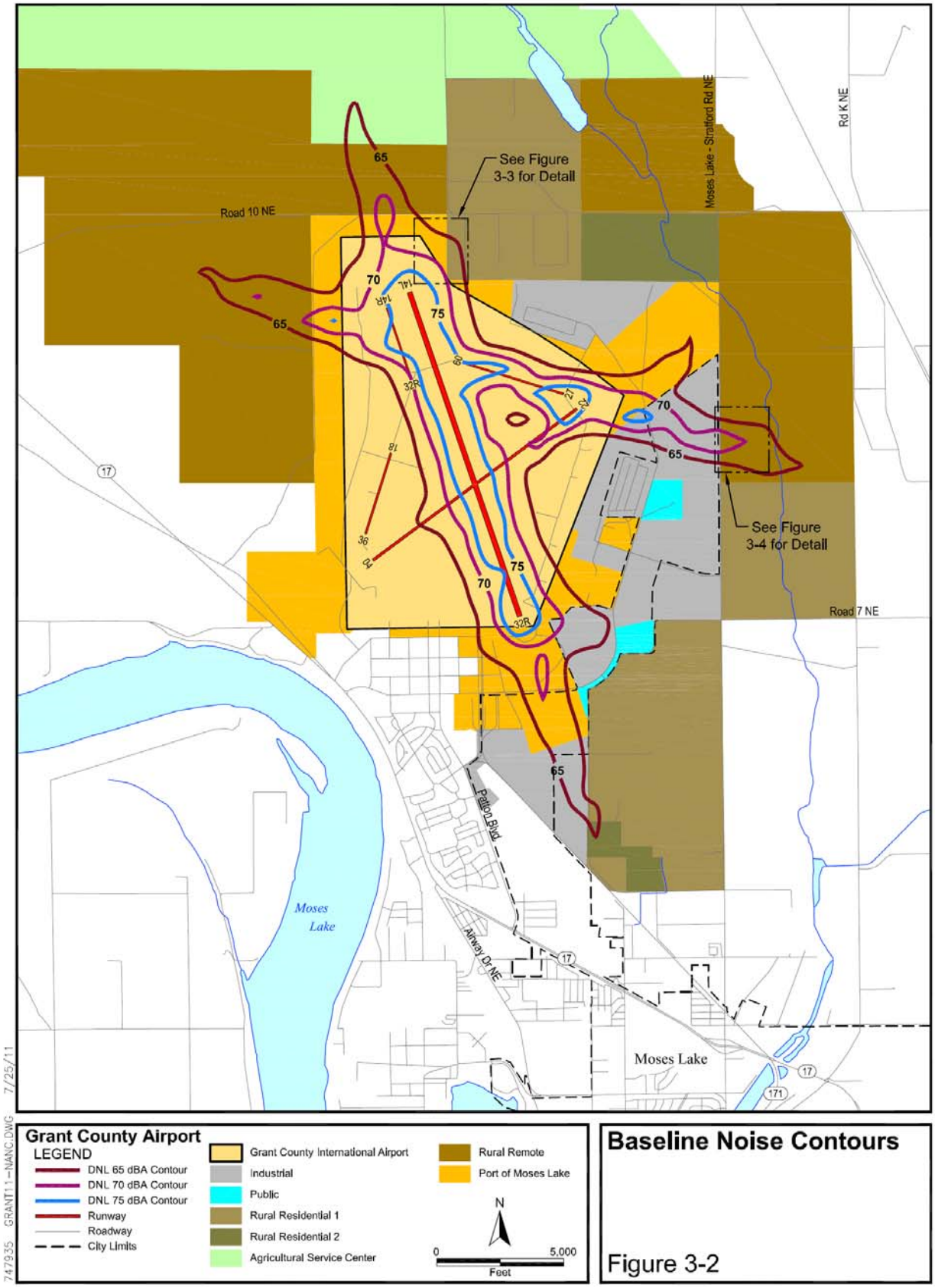

Figure 3-2. Baseline Noise Contours

Figure 3-3. Detail of Baseline Noise Contours, North

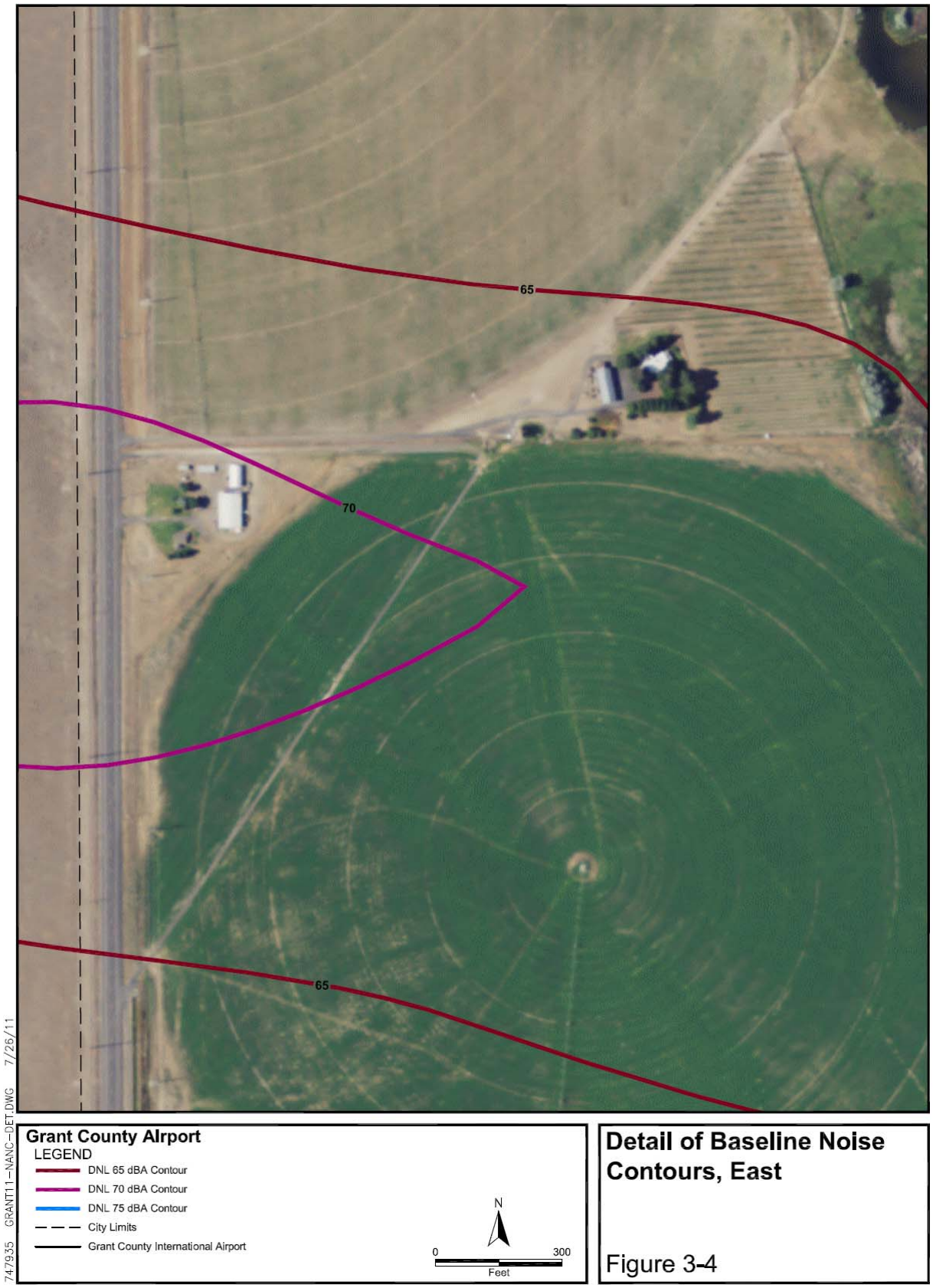

Figure 3-4. Detail of Baseline Noise Contours, East

3.3 Land Use

3.3.1 Definition of Resource

Land use comprises natural conditions or human-modified activities occurring at a particular location. Human-modified land use categories include residential, commercial, industrial, transportation, communications and utilities, agricultural, institutional, recreational, and other developed use areas. The attributes of land use considered in this analysis include general land use patterns, land ownership, land management plans, and special use areas. General land use patterns characterize the types of uses within a particular area including agricultural, residential, military, and recreational. Land ownership is a categorization of land according to type of owner. The major land ownership categories include private, federal, and state. Management plans and zoning regulations determine the type and extent of land use allowable in specific areas and are often intended to protect specially designated or environmentally sensitive areas.

3.3.2 Baseline Conditions

The State of Washington Growth and Management Act (GMA) establishes the primacy of comprehensive planning for cities and counties in the state. Counties are required to adopt county-wide planning policies to guide plan adoption within the county for urban growth and rural development. Local comprehensive plans must include: land use; housing, capital facilities; utilities; and transportation. County and local development regulations must be consistent with the comprehensive plans. Figure 3-2 depicts land use designation as defined in the Grant Count Comprehensive Plan and zoning from the City of Moses Lake Master Plan for the area around the airport that is in the city's corporate limits.

The Grant County Airport is located northwest of Moses Lake in Grant County, Washington. The largest on-airport land use is air operations, and the second largest is open/agricultural. The on-airport aviation support land use area includes the terminal and fire fighting training area. Industrial land use is included in the aviation support land use category.

Land use in the area immediately around the airport consists of (Grant County, 2010):

- Rural Residential 1 (maximum of one dwelling unit per five acres);
- Rural Residential 2 (maximum of one dwelling unit per two acres);
- Rural Remote (maximum of one dwelling unit per 20 acres);
- Port of Moses Lake;
- Industrial; and,
- Public.

The lake is southwest of the airport, and ranchland occurs to the west and north. There are houses north of the airport in an area zoned Rural Residential 2 (see Figure 3-3). Likewise, there are houses about one mile east of the airport in areas zoned as Rural Residential 1 (see Figure 3-4). Land southeast of the airport is cultivated farmland. The area south of the airport toward the City of Moses Lake is the most developed. However, there are many large open areas and vacant lots between the airport and the City of Moses Lake.

Unified Facilities Criteria 3-260-01, *Airfield and Heliport Planning and Design*, establishes clear zones (CZ) at the ends of the runways for military airports. However, FAA guidance does not establish CZs at civil airports. Instead, FAA Advisory Circular 150/5300-13, *Airport Design*, establishes runway protection zones (RPZ) at civil airports. An RPZ is comparable to a CZ and is established to enhance the protection of people and property. The dimensions for an RPZ for a precision instrument approach runway from which large aircraft operate are: 2,500 ft long and 1,000 ft wide at the inner end, which is 200 ft from the runway end; and, 1,750 ft wide at the outer end. The total area of the RPZ is 78.914 acres.

The DoD Air Installation Compatible Use Zone (AICUZ) program establishes recommendations for land use planning around Air Force installations. Land use incompatibility under the AICUZ program considers two factors: noise and safety. The FAA's FAR Part 150, *Airport Noise Compatibility Planning*, is a land use

compatibility planning program comparable to the DoD AICUZ program. Part 150 contains guidance for the FAA program and identifies land use compatibility based only on noise. FAA Advisory Circular 150/5300-13 contains the guidance for safety in land use planning. Additionally, FAR Part 77, Subpart C, establishes airspace imaginary surfaces that control obstructions to air navigation, thereby influencing safety at and around civil airports.

Part 150 provides a means for civilian airports to reduce the number of people affected by noise, consistent with airport operations. The FAR Part 150 process provides airport operators with the procedures, standards, and methods governing the development, submission, and review of airport Noise Exposure Maps (typically referred to as noise contours) and airport Noise Compatibility Programs.

The FAR Part 150 process is voluntary, and the Grant County Airport has not prepared a FAR Part 150 study. The Airport, however, has prepared an airport master plan (update) in accordance with FAA guidance. The master plan establishes RPZs at the ends of the runways. The airport master plan is the planner's concept of the long-term development of an airport. Master plans are prepared to support modernization of existing airports and creation of new airports. The goal of a master plan is to provide guidelines for future airport development that will satisfy aviation demand, while at the same time resolve the aviation, environmental, and socioeconomic issues existing in the community. The airport operator is encouraged to accomplish a noise compatibility planning program and noise exposure maps as part of the master planning process. Noise compatibility planning for an airport master plan is carried out following the guidelines in FAR Part 150.

3.4 Air Quality

3.4.1 Definition of Resource

Air quality in any given region is measured by the concentration of various pollutants in the atmosphere, typically expressed in units of parts per million (ppm) or in units of micrograms per cubic meter ($\mu g/m^3$). Air quality is not determined by the types and quantities of atmospheric pollutants, but also by surface topography, the size of the air basin, and by the prevailing meteorological conditions.

3.4.1.1 Air Pollutants and Regulations

The Clean Air Act (CAA), as amended in 1977 and 1990, provides the basis for regulating air pollution to the atmosphere. Different provisions of the CAA apply depending on where the source is located, which pollutants are being emitted, and in what amounts. The CAA required the USEPA to establish ambient ceilings for certain criteria pollutants. These criteria pollutants are usually referred to as the pollutants for which the USEPA has established National Ambient Air Quality Standards (NAAQS). The ceilings were based on the latest scientific information regarding the effects a pollutant may have on public health or welfare. Subsequently, the USEPA promulgated regulations that set NAAQS. Two classes of standards were established: primary and secondary. Primary standards define levels of air quality necessary, with an adequate margin of safety, to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards define levels of air quality necessary to protect public welfare (e.g., decreased visibility, damage to animals, crops, vegetation, wildlife, and buildings) from any known or anticipated adverse effects of a pollutant.

Air quality standards are currently in place for six pollutants or "criteria" pollutants: carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), sulfur oxides (SO_x, measured as sulfur dioxide [SO_2]), lead (Pb), and particulate matter with an aerodynamic diameter less than or equal to 10 micrometers (PM_{10}) and 2.5 micrometers ($PM_{2.5}$). There are many suspended particles in the atmosphere with aerodynamic diameters larger than 10 micrometers. The collective of all particle sizes is commonly referred to as total suspended particulates (TSP). TSP is defined as particulate matter as measured by the methods outlined in 40 CFR Part 50, Appendix B. The NAAQS are the cornerstone of the CAA. Although not directly enforceable, they are the benchmark for the establishment of emission limitations by the states for the pollutants USEPA determines may endanger public health or welfare.

Ozone (ground-level ozone), which is a major component of "smog," is a secondary pollutant formed in the atmosphere by photochemical reactions involving previously emitted pollutants or precursors. Ozone precursors are mainly nitrogen oxides (NO_x) and volatile organic compounds (VOC). NO_x is the

designation given to the group of all oxygenated nitrogen species, including nitric oxide (NO), NO_2, nitrous oxide (N_2O), and others. However, only NO, NO_2, and N_2O are found in appreciable quantities in the atmosphere. VOCs are organic compounds (containing at least carbon and hydrogen) that participate in photochemical reactions and include carbonaceous compounds except metallic carbonates, metallic carbides, ammonium carbonate, carbon dioxide (CO_2), and carbonic acid. Some VOCs are considered non-reactive under atmospheric conditions and include methane, ethane, and several other organic compounds.

As noted above, ozone is a secondary pollutant and is not directly emitted from common emissions sources. Therefore, to control ozone in the atmosphere, the effort is made to control NO_x and VOC emissions. For this reason, NO_x and VOC emissions are calculated and reported in emission inventories.

The CAA does not make the NAAQS directly enforceable. However, the Act does require each state to promulgate a State Implementation Plan (SIP) that provides for "implementation, maintenance, and enforcement" of the NAAQS in each Air Quality Control Region (AQCR) in the state. The CAA also allows states to adopt air quality standards more stringent than the federal standards. Table 3-6 lists the national and State of Washington ambient air quality standards.

Table 3-6. National and State of Washington Ambient Air Quality Standards

Criteria Pollutant	Averaging Period	Primary NAAQS[b,c]	Secondary NAAQS[c]	Washington State Standards[a]
Carbon Monoxide	8-hour 1-hour	9 ppm (10 mg/m^3) 35 ppm (40 mg/m^3)	No Standard No standard	9 ppm (10 mg/m^3) 35 ppm (40 mg/m^3)
Lead	Quarterly Rolling 3-Month Average	1.5 μg/m^3 0.15 μg/m^3	1.5 μg/m^3 0.15 μg/m^3	No Standard No Standard
Nitrogen Oxides (measured as NO_2)	Annual 1-Hour	0.053 ppm (100 μg/m^3) 0.100 ppm	0.053 ppm (100 μg/m^3) No Standard	0.05 ppm (100 μg/m^3) No Standard
Ozone[e]	8-hour 1-hour	0.075 ppm (157 μg/m^3)[f] No Standard	0.075 ppm (157 μg/m^3) No Standard	No Standard 0.12 ppm (235 mg/m^3)
Particulate Matter (measured as PM_{10})	Annual 24-hour	No Standard 150 μg/m^3	No Standard 150 μg/m^3	50 μg/m^3 150 μg/m^3
Particulate Matter (measured as $PM_{2.5}$)	Annual 24-hour	15 μg/m^3 35 μg/m^3	15 μg/m^3 35 μg/m^3	No Standard No Standard
Sulfur Oxides (measured as SO_2)	Annual 24-hour 3-hour 1-Hour[d] 1-Hour[e] 1-Hour[f]	0.03 ppm (80 μg/m^3) 0.14 ppm (365 μg/m^3) No Standard No Standard No Standard No Standard	No standard No standard 0.5 ppm (1,300 μg/m^3) No Standard No Standard No Standard	0.02 ppm 0.10 ppm No Standard 0.40 ppm 0.25 ppm 0.80 ppm

a Source: Washington Administrative Code (Chapter 173-400)

b National standards (other than ozone, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest eight hour concentration in a year, averaged over three years, is equal to or less than the standard. For PM_{10}, the 24 hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration is above 150 μg/m^3 is equal to or less than one. For $PM_{2.5}$, the 24 hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard.

c Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

d Not to be above this level more than once in a calendar year.

e Not to be above this level more than twice in a consecutive 7-day period.

f Applicable only to Island, Skagit and Whatcom counties (Northwest Clean Air Agency).

The fundamental method by which the USEPA tracks compliance with the NAAQS is the designation of a particular region as "attainment" or "nonattainment". Based on the NAAQS, each state is divided into three types of areas for each of the criteria pollutants. The areas are:

- Those areas that are in compliance with the NAAQS (attainment);
- Those areas that do not meet the ambient air quality standards (nonattainment); and,
- Those areas where a determination of attainment/nonattainment cannot be made due to a lack of monitoring data (unclassifiable – treated as attainment until proven otherwise).

Generally, areas in violation of one or more of the NAAQS are designated nonattainment and must comply with stringent restrictions until all of the standards are met. In the case of O_3, CO, and PM_{10}, USEPA divides nonattainment areas into different categories, depending on the severity of the problem in each area. Each nonattainment category has a separate deadline for attainment and a different set of control requirements under the SIP.

Based on the requirements outlined in USEPA's general conformity rule for Federal agencies (40 CFR Part 93, Subpart B), a conformity analysis is required to analyze whether the applicable criteria air pollutant emissions associated with the project equal or exceed the threshold emission limits that trigger the need to conduct a formal conformity determination. The intent of the conformity rule is to encourage long range planning by evaluating the air quality impacts from federal actions before the projects are undertaken. This rule establishes the process for analyzing and determining whether a proposed project in a nonattainment area conforms to the SIP and federal standards.

The federal agency responsible for a Proposed Action is required to determine if its actions conform to the applicable SIP. If the action involves the Federal Highway Administration or Federal Transit Authority, it falls under Transportation Conformity Regulations. All other Federal actions fall under General Conformity Regulations.

Grant County is not designated as nonattainment or as a maintenance area for any of the federal or state ambient air quality standards. Therefore, the Proposed Action at Grant County is not subject to the General Conformity rules.

3.4.2 Baseline Conditions

3.4.2.1 Regional Air Quality

Grant County Airport is located in Grant County within the Eastern Washington-Northern Idaho Interstate AQCR. The AQCR is designated as AQCR 62 and includes the Idaho counties of Benewah, Kootenai, Latah, Nez Perce, and Shoshone, and the Washington counties of Adams, Asotin, Columbia, Garfield, Grant, Lincoln, Spokane, and Whitman. Grant County is within the jurisdiction of the Department of Ecology Eastern Region air pollution control district (APCD). Boundaries of the Eastern Region APCD include the Washington counties of Adams, Asotin, Columbia, Ferry, Garfield, Grant, Lincoln, Pend Oreille, Stevens, Walla Walla, and Whitman. Air quality in the area is generally good as reflected by the area's attainment designation. As shown in Table 3-7, there are no nonattainment designations for Grant County.

Table 3-7. Attainment Designation for Grant County, Washington

Criteria Pollutant	Attainment Designation
Carbon Monoxide	Unclassifiable/attainment
Nitrogen Oxides (measured as NO2)	Unclassifiable or better than the national standard
Ozone , 1-hour standard	Unclassifiable/attainment
Ozone, 8-hr standard	Unclassifiable/attainment
Particulate Matter (measured as PM10)	Unclassifiable
Particulate Matter (measured as PM2.5), annual standard	Unclassifiable/attainment
Total Suspended Particulates	Better than national standard
Particulate Matter (measured as PM2.5), 24-hour standard	Unclassifiable/attainment
Sulfur Oxides (measured as SO2)	Better than the national standard

Source: Title 40, Code of Federal Regulations, Part 81.348 - Washington

3.4.2.2 Regional Meteorology

The climate in the Grant County Airport area is characterized as both dry continental and marine. Grant County Airport is situated just north of Moses Lake in the north central section of the Columbia River Basin in east central Washington between the Cascade Mountain Range to the west and the Rocky Mountain Range to the east and north. The mountain ranges surrounding the inland plains of eastern Washington have a pronounced influence on the climate in this region. Specifically, the Rocky Mountains and other ranges in British Columbia protect the area from the severe winter storms moving southerly across Canada. Moist air from the Pacific Ocean is orthographically lifted as the air move across the Cascade Range by the prevailing westerly and southwesterly winds in western Washington. As the moist air rises, cooling and condensation occur resulting in heavy precipitation along the western slopes of the Cascades. The air becomes warm and dry as the air descends along the eastern slopes of the Cascades and moves into the central Columbia River basin.

Based on weather information for 2009, average daily maximum temperature and average daily minimum temperature for the Moses Lake area are 62°F and 41°F, respectively. Temperature highs are experienced during the months of July and August and temperature lows occur during December and January.

Average precipitation in the Moses Lake area was measured at 10.12 inches annually. Precipitation in the fall and mid-winter months average around one inch per month with rainfall decreasing in the spring to only about tenth of an inch during the summer. Snowfall is common from mid-November through February, averaging from over an inch in November, over six inches in December, and about four and three inches, respectively, in January and February. The average snowfall in the Moses Lake area is 14.8 inches annually. During the winter months, warm Pacific air moving across the Cascades mixes with the cold, dry air in the Columbia River basin and produces considerable cloudiness and foggy conditions. Humidity remains fairly constant during the summer and winter months with average annual relative humidity recorded at 57 percent.

Wind speeds in the Moses Lake area measured from 1996 to 2006 are fairly consistent throughout the year with an average annual wind speed of 7.3 miles per hour with the wind direction predominantly from the north. The predominant northerly wind direction occurs during the months from August through April. During the months from May through July, the wind is typically from the south and southwest.

3.4.2.3 Air Pollutant Emissions

An air emissions inventory is an estimate of total actual mass emissions of pollutants generated from a source or sources over a period of time, typically a year. The quantity of air pollutants is generally measured in tons per year. Accurate air emissions inventories are needed for estimating the relationship between emissions sources and air quality. Emission sources may be categorized as either mobile or stationary emission sources. Typical mobile emission sources at airports include aircraft, on- and off-road vehicles, and aerospace ground equipment. Stationary emission sources may include fuel storage and fueling operations, boilers, generators, industrial processes, and burning activities, among others.

Table 3-8 provides the baseline emissions inventory from airfield operations at the Grant County Airport for the year 2006. Aircraft operations have since shown an approximately 29 percent decline, as reflected in Table 2-2.

Table 3-8. Baseline Emissions from Aircraft Operations at the Grant County Airport

	Criteria Air Pollutant (tons per year)					
	CO	VOC	NO_x	SO_x	PM_{10}	PM_{25}
Airfield Operations	543	213	652	36	125	124

Source: USAF, 2008

Table 3-9 lists the stationary source emissions inventory for AQCR 62 for calendar year 2002 (USEPA, 2011b). The air emissions inventory for AQCR 62 includes reported permitted stationary, mobile, and grandfathered air emission sources.

Table 3-9. Baseline Emissions Inventory, AQCR 62

	Criteria Air Pollutant (tons per year)					
	CO	VOC	NO_x	SO_x	PM_{10}	PM_{25}
Baseline AQCR 62 Emissions	386,986	74,049	51,881	3,986	154,735	28,184

Source: USEPA, 2011b (this is the most recent data available for AQCR 62)

3.5 Biological Resources

3.5.1 Definition of Resource

Biological resources encompass living species and vegetation communities crucial to the functions of biological systems, of special public importance, or that are protected under federal or local law or statute. For the purposes of this document, biological resources are divided into three categories: *vegetation communities*; *wildlife*; and *threatened, endangered and special status species*. Animal and plant species include those species listed under the federal Endangered Species Act (ESA), candidates for ESA listing, and those listed as threatened or endangered by state of Washington law.

3.5.2 Baseline Conditions

3.5.2.1 Vegetation Communities

The vegetated areas within the Grant County Airport property are composed primarily of shrub-steppe vegetation consisting of open grass with scattered shrubs. The dominant species found on airport property is big sagebrush (*Artemisia tridentate*), which varies from area to area across the airport. No trees are found on airport property. The shrub-steppe community on the airport property has been subject to past grazing. Small areas of irrigated alfalfa on the west side of the airport are regularly mown for hay (URS Corporation, 2005). Vegetation within Grant County is primarily associated with agricultural use. The historic sage-steppe communities have been replaced or greatly reduced by grazing and other agriculture practices.

3.5.2.2 Wildlife

Wildlife habitat at the Grant County Airport is provided by the shrub-steppe plant community which offers nesting, denning, escape cover and protection from adverse weather. Common wildlife found on airport property include deer mice (*Peromyscus maniculatus*), horned lark (*Eremophila alpestris*), meadowlark (*Sturnella neglecta*), kestrel (*Falco sparverius*), red-tailed hawk (*Buteo jamaicensis*), raven (*Corvus corax* gull (Laridae), coyote (*Canis latrans*) and badger (*Taxidea taxus*), many of which breed on airport property. Northeast and east of the airport, the Crab Creek area is used by geese, ducks and other waterfowl, along with muskrats, mink, deer and other mammals (URS Corporation, 2005).

3.5.2.3 Threatened, Endangered, and Candidate Species

A total of three species that may potentially occur in Grant County have special status by a Federal (U.S. Fish and Wildlife Service) and state (Washington Department of Fish and Wildlife) agency. These listed species are shown on Table 3-10. Species with federal and state designation include one fish, one mammal, and one plant (USFWS, 2011a through d). None of these species would be expected to occur on the Grant County Airport property.

Table 3-10. Federal and State Listed Species for Grant County, Washington

	Common Name	Scientific Name	State Status	Federal Status
Fish				
1	Bull trout	*Salvelinus confluentus*	Candidate	Threatened
Mammals				
2	Pygmy rabbit	*Brachylagus idahoensis*	Endangered	Endangered
Plants				
3	Ute ladies'-tresses	*Spiranthes diluvialis*	Endangered	Threatened

Source: USFWS, 2011a through d (Note: This table indicates only those species reported within 20 miles of the Grant County International Airport.)

- **Bull trout** are members of the family Salmonidae and are native to Washington, Oregon, Idaho, Nevada, Montana and western Canada. Compared to other salmonids, bull trout have more specific habitat requirements that appear to influence their distribution and abundance. They need cold water to survive, so they are seldom found in waters where temperatures exceed 59 to 64 degrees (F). They also require stable stream channels, clean spawning and rearing gravel, complex and diverse cover, and unblocked migratory corridors. Bull trout exhibit two forms: resident and migratory. Resident bull trout spend their entire lives in the same stream/creek. Migratory bull trout move to larger bodies of water to overwinter and then migrate back to smaller waters to reproduce. An anadromous form of bull trout also exists in the Coastal-Puget Sound population, which spawns in rivers and streams but rears young in the ocean. Resident and juvenile bull trout prey on invertebrates and small fish. Adult migratory bull trout primarily eat fish. Resident bull trout range up to 10 inches long and migratory forms may range up to 35 inches and up to 32 pounds. Bull trout are currently listed coterminously as a threatened species. Critical habitat for this species has been designated along the Columbia River southwest of Moses Lake (USFWS, 2011b).
- **Pygmy rabbit** is a North American rabbit, and is one of only two rabbit species in America to dig its own burrow. Pygmy rabbits are typically found in habitat types that include tall, dense stands of sagebrush (*Artemesia* spp.) cover with relatively deep, loose soils. This small mammal is highly dependent on sagebrush for food and shelter throughout the year. Disjunct from the original core range of this species that spanned Oregon, Idaho, Nevada, Utah, Montana, Wyoming and California, the historic range of the pygmy rabbit in Washington is limited to Douglas and Grant Counties. Within Grant County, the species was historically reported from two locations: Sagebrush Flats and Warden (WDFW, 1995) approximately 25 miles northwest and 21 miles southeast of the Grant County Airport, respectively. The Pygmy Rabbit was listed as endangered by the USFWS in 2001. That same year, the Washington Department of Fish and Wildlife began a captive breeding program for the Columbia Basin pygmy rabbit. By mid-2004, the Columbia Basin pygmy rabbit was considered to be extirpated from the wild. In early 2007, 20 captive-bred animals were reintroduced to habitats historically occupied by the species in the Columbia Basin of central Washington. Most of the captive-bred pygmy rabbits released in 2007 fell victim to predators. The entire wild Columbia Basin pygmy rabbit population is now considered to consist of fewer than 30 individuals from just one known site. This population segment is imminently threatened by its small population size and fragmentation, coupled with habitat loss, disease, predation, and inbreeding (USFWS, 2011c). Up to 100 pygmy rabbits from captive-breeding facilities and from the wild in Oregon were released on the Washington Department of Fish and Wildlife (WDFW) Sagebrush Flat Wildlife Area in Douglas County beginning in May 2011. Rabbits will be kept in enclosures until they become familiar with the site (WDFW, 2011).
- **Ute ladies'-tresses**, a perennial herb in the orchid family, was listed as threatened by the USFWS in 1992. This species has been reported from Grant County (Chelan area). Although known primarily from moist meadows associated with perennial stream terraces, floodplains, and oxbows at elevations between 4,300 and 6,850 ft. Surveys since 1992 have expanded the number of vegetation and hydrology types occupied by Ute ladies'-tresses to include seasonally flooded river terraces, subirrigated or spring-fed abandoned stream channels and valleys, and lakeshores. In addition, 26 populations have been discovered along irrigation canals, berms, levees, irrigated meadows, excavated gravel pits, roadside barrow pits, reservoirs, and other human-modified wetlands. New surveys have also expanded the elevational range of the species from 720 to 1,830 ft in Washington. Over one-third of all known Ute ladies'-tresses populations are found on alluvial banks, point bars, floodplains, or ox-bows associated with perennial streams. In 1992, the USFWS identified habitat loss and modification (through urbanization, water development, and conversion of wetlands to agriculture), overcollection, competition from exotic weeds, and herbicides as the main current and potential threats to the long term survival of Ute ladies'-tresses. Since 1992, other threats have been identified including impacts from recreation; mowing for hay production; and, grazing by cattle or horses. A Draft Recovery Plan for this species was released in 1995 and recovery efforts are underway (USFWS, 2011d).

In addition to the three listed species described above, there are four Candidate and 22 Species of Concern identified for Grant County. These species are shown on Table 3-11.

Table 3-11. Federal and State Species of Concern in Grant County, Washington

	Common Name	Scientific Name	State Status	Federal Status
Amphibians				
1	Northern leopard frog	*Rana pipiens*	Endangered	None
Birds				
2	Bald eagle	*Haliaeetus leucocephalus*	Sensitive	Species of Concern
3	Burrowing owl	*Athene cunicularia*	Candidate	Species of Concern
4	Greater sage grouse[a]	*Centroercus urophasianus*	Threatened	Candidate
5	Yellow-billed cuckoo	*Coccyzus americanus*	Candidate	Candidate
6	Ferruginous hawk	*Buteo regalis*	Threatened	Species of Concern
7	Long-billed curlew	*Numenius americanus*	Monitored	None
8	Columbian sharp-tailed grouse	*Tympanuchus phasianellus columbianus*	Species of Concern	Species of Concern
9	Loggerhead shrike	*Lanius ludovicianus*	Species of Concern	Species of Concern
10	Northern goshawk	*Accipiter gentilis*	Candidate	Species of Concern
Fish				
11	Pacific lamprey	*Lampetra tridentate*	None	Species of Concern
12	River lamprey	*Lampetra ayresi*	Species of Concern	Species of Concern
13	Western brook lamprey	*Lampetra richardsoni*	None	Species of Concern
14	Redband trout	*Oncorhynchus mykiss*	Species of Concern	Species of Concern
Mammals				
15	Washington ground squirrel	*Spermophilous washingtoni*	Candidate	Candidate
16	Kincaid meadow vole	*Microtus pennsylvanicus kincaidi*	Monitored	Species of Concern
17	Pallid Townsend's big-eared bat	*Corynorhinus townsendii pallescens*	Candidate	Species of Concern
18	Long-eared myotis (bat)	*Myotis evotis*	Monitored	Species of Concern
Reptiles				
19	Sagebrush Lizard	*Sceloporus graciosus*	None	Species of Concern
Mollusks				
20	California floater	*Anodonta californiensis*	Candidate	Species of Concern
21	Giant Columbia spire snail	*Fluminicola columbiana*	Candidate	Species of Concern
Plants				
22	Northern wormwood	*Artemesia campestris* ssp. *borealis* var. *wormskioldii*	Endangered	Candidate
23	Gray cryptantha	*Cryptantha leucophaea*	None	Species of Concern
24	Basalt daisy	*Erigeron basalticus*	Threatened	Species of Concern
25	Hoover's desert-parsley	*Lomatium tuberosum*	None	Species of Concern
26	Wanapum Crazyweed	*Oxytropis campestris wanapum*	Endangered	Species of Concern

[a] Columbia Basin Distinct Population Segment (DPS)

Source: USFWS, 2011a

Species of Concern: *(1)* An informal term that refers to species that the U.S. Fish and Wildlife believes might be in need of concentrated conservation actions. Such conservation actions vary depending on the health of the populations and degree and types of threats. At one extreme, there may only need to be periodic monitoring of populations and threats to the species and its habitat. At the other extreme, a species may need to be listed as a Federal threatened or endangered species. Species of concern receive no legal protection and the use of the term does not necessarily mean that the species will eventually be proposed for listing as a threatened or endangered species; and, *(2)* A State Species of concern includes those species listed as by the Washington Department of Fish and Wildlife as Endangered, Threatened, Sensitive or Candidate, as well as species listed or proposed for listing by the USFWS.

Monitored: Species that are being monitored by the Washington Department of Fish and Wildlife.

Three of the species shown on Table 3-11 have been reported on or near the Grant County Airport. Kincaid meadow vole has been reported offsite of the airport near Crab Creek; this small rodent prefers lush grass sand wet meadow habitats which is not available on airport property. Long-billed curlew nests in the grass areas between the airport runways. Wintering bald eagles may occur in the vicinity of the Grant County Airport from October 31 through March 31 (URS Corporation, 2005), suitable habitat for most of the listed animal species of Grant County would not be expected to be found beneath the C-17 aircrew training area within a 5-mile radius of the Grant County Airport. With the exception of a wildlife hazard assessment conducted by the Port of Moses Lake in 2002 and 2003, there have been no recent biological surveys of the C-17 aircrew training area.

3.5.2.4 Species Protected Under the Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) of 1918 (50 CFR Section 10.13) implemented the 1916 convention between the United States and Great Britain for the protection of birds migrating between the U.S. and Canada. Similar conventions between the United States and Mexico, Japan and the Union of Soviet Socialists Republics further expanded the scope of international protection of migratory birds. Each new treaty has been incorporated into the MBTA as an amendment and the provisions of the new treaty are implemented domestically. These four treaties and their enabling legislation, the MBTA, establish Federal responsibilities for the protection of nearly all species of birds, their eggs and nests.

The MBTA made it illegal for people to "take" migratory birds, their eggs, feathers or nests. Take is defined in the MBTA to include by any means or in any manner, any attempt at hunting, pursuing, wounding, killing, possessing or transporting any migratory bird, nest, egg, or part thereof. The Bald and Golden Eagle Protection Act affords additional protection to all bald and golden eagles. In total, 836 bird species are protected by the MBTA, 58 of which are currently legally hunted as game birds that are subject to migratory game bird regulations issued by the USFWS. A migratory bird is any species or family of birds that live, reproduce or migrate within or across international borders at some point during their annual life cycle. The recognized breeding season for most species of birds is from February 1 to September 1.

3.5.3 Physical Collision with Birds

A high rate of bird collisions with certain species in a geographic area could impact the status or population well being of the species (i.e., the species would be in decline or possibly a threatened or endangered species). The Air Force has developed the BAM (see Appendix D) to predict these collisions. Factors that increase the probability of bird strikes in these models include the presence of food, water, shelter, open space, habitat, or migration routes at or near a military operation.

3.6 Cultural Resources

3.6.1 Definition of Resource

Cultural resources include prehistoric and historic archaeological sites, buildings, structures, districts, artifacts, objects, or any other physical evidence of human activity considered important to a culture, subculture, or community for scientific, traditional, or religious purposes. Pursuant to Section 106 of the National Historic Preservation Act of 1966 (NHPA), as amended, and its implementing regulations at 36 CFR 800, federal agencies must take into consideration the potential effect of an undertaking on “historic properties,” which refers to cultural resources listed in, or eligible for inclusion in, the National Register of Historic Places (NRHP). Sites not yet evaluated are considered potentially eligible for inclusion in the NRHP and, as such, are afforded the same regulatory consideration as nominated or previously found eligible properties.

Numerous laws and regulations require federal agencies consider the effects of a Proposed Action on cultural resources. While cultural resources on Air Force installations are managed in accordance with Air Force Instruction (AFI) 32-7065, *Cultural Resources Management* and 32 CFR 989, environmental laws include: Executive Order (E.O.) 11593 of 1971; the National Historic Preservation Act of 1966, as amended; the Archeological and Historic Preservation Act of 1974 (P.L. 93-291); the Archaeological Resources Protection Act of 1979 (P.L. 96-95); the American Indian Religious Freedom Act of 1978 (P.L. 95-341); and, the Native American Graves Protection and Repatriation Act of 1990 (P.L. 101-601). Only those potential historic properties that may be eligible under cultural resource legislation are subject to

protection or consideration by a federal agency. Eligibility is determined by application of the NRHP criteria. Eligible cultural resources, whether prehistoric or historic in age, are referred to as "historic properties."

3.6.2 Baseline Conditions

For this analysis, the Region of Influence (ROI) is synonymous with the Area of Potential Effects (APE), as defined by the NHPA. The ROI for the analysis of cultural resources includes all area on the ground within an approximately five (5) mile radius of the Grant County Airport, Moses Lake, Washington that would be used for C-17 aircrew training (as shown on Figure 2-1). These areas include the built environment (*i.e.*, urban, suburban, rural communities) and open space (*i.e.*, undeveloped, agricultural and riverine areas).

Identification of cultural resources potentially impacted by the Proposed Action was accomplished by reviewing historic property inventory information available from the Washington Department of Archaeology & Historic Preservation (2011) and the National Register Information System (NRIS) (NPS, 2011). A search of the NRIS was performed for NRHP-listed archaeological sites, historic resources, and traditional cultural properties in Grant County, Washington. Given the vast area covered by the ROI, only those sites listed in the NRIS database were incorporated into this study. Additional potentially NRHP-eligible sites may exist in the project area, but are not listed in the NRIS.

The Grant County Airport was established in 1942 as Moses Lake Army Air Depot and was a temporary training center (Global Security, 2007). The facility was placed on standby status in 1945, but was used for the following three years as a test site for two Boeing aircraft (USAF, 1961). The facility reopened in 1948 under the Air Defense Command, and in 1950 was re-designated Larson AFB in honor of Major Donald A. Larson, a World War II pilot from Yakima, Washington, killed in action over Germany in 1944. Larson AFB was placed under the Tactical Air Command in 1952. The Air Materiel Command Flight Test Center at Larson AFB tested B-52s from 1955 through 1959 (URS Corporation, 2005). During this time, Boeing built a hangar to accommodate eight B-52s or KC-135 tankers (Global Security, 2007). The Strategic Air Command assumed command of Larson AFB in 1960 (URS Corporation, 2005). Larson AFB was declared surplus in 1964 and closed in 1966. Family housing was sold to the Grant County Housing Authority and the other non-operational buildings (dormitories, commercial, and recreational facilities) and three hangars were transferred to the Big Bend Community College. The flightline (including seven additional hangars) and industrial facilities were transferred to the Port of Lake Moses in 1966 (URS Corporation, 2005).

3.6.2.1 Archaeological Resources

Archaeological resources are prehistoric or historic places where human activity has measurably altered the earth or left deposits of physical remains. Archaeological resources may include some surface deposits and below ground (subsurface) deposits. Examples of prehistoric archaeological resources include village sites, campsites, lithic scatters, burials, hearths (or hearth features), processing sites, caves and rock shelters, and petroglyph and pictograph sites. Examples of historic archaeological resources include homesteads, mines, townsites, roads and trails, privies, and trash deposits. No archaeological resources lie within one mile of the APE for this project.

Based on information from the Washington Department of Archaeology & Historic Preservation (2011) and NRIS (NPS, 2011), no archaeological sites have been identified at the Grant County Airport; though, no known archaeological surveys have been conducted. However, the Grant County Airport project area was previously disturbed during original construction of the flightline and supporting structures in 1942.

3.6.2.2 Historic Resources

For purposes of this analysis, historic resources include buildings and structures, and other physical remains of historic significance present above the ground. Historic resources date from the period of initial European contact in this area (*circa* A.D. 1770) and extend to the present. Examples include houses, homesteads, farmsteads (and associated support structures or buildings), cabins, churches, forts, schools, bridges, dams, logging sites, military facilities, mines, structures or buildings, and townsites. Only the historic structures located at the Grant County Airport are within one mile of the APE for this project.

3.6.2.3 Native American Interests

Native American resources can include, but are not limited to, archaeological sites, burial sites, ceremonial areas, caves, mountains, water sources, trails, plant habitat or gathering areas, or any other natural area important to a culture for religious or heritage reasons. NRHP-eligible traditional sites are subject to the same regulations, and afforded the same protection, as other types of historic properties. The ROI for Native American traditional resources consists of those areas associated with project activities in the vicinity of the Grant County Airport.

Six federally recognized Native American groups are located in the vicinity of the Proposed Action:

- Confederated Tribes of the Colville Reservation
- Confederated Tribes of the Umatilla Indian Reservation
- Nez Perce Executive Committee
- Spokane Tribal Business Council
- Wanapum Interface Office
- Confederated Tribes and Bands of the Yakama Nation

As lead Federal agency, the Air Force provided notification of the project to these six federally recognized Native American tribes to ensure that any sites of traditional cultural value are identified and adequately considered under the Proposed Action. The Air Force sent correspondence to the tribes announcing the action and requesting concerns regarding the Proposed Action (see Appendix B).

CHAPTER 4
ENVIRONMENTAL CONSEQUENCES

This chapter provides analysis of the environmental impacts of the No Action Alternative and Proposed Action. The primary basis for the analysis is the introduction and operation of high altitude/high airspeed and low altitude/high airspeed operations at the Grant County Airport.

4.1 No Action Alternative

4.1.1 Aircraft Operations, Aircraft Safety and Bird/Wildlife-Aircraft Strike Hazard

Airspace and airfield operations impacts would be considered significant if: (1) the airspace and/or airfield did not have the capacity to accommodate the change in aircraft operations associated with the action; or, (2) the changes would conflict with the baseline airfield operations procedures. An aircraft safety impact would be significant if there would be a high probability that an aircraft involved in an accident would strike a person or structure on the ground. A bird/wildlife-aircraft strike hazard (BASH) incident would be significant if it would likely result in an aircraft accident, involve injury either to aircrews or to the public, or damage to property (other than the aircraft). These significance criteria also apply to the Proposed Action.

The types of aircraft operating at the Grant County Airport, as well as airspace and runway use, would remain the same as the baseline. C-17s would continue to accomplish high altitude/low speed and low altitude/low speed tactical arrivals to Runway 09/27 as well as aircraft operations on Runways 14L/32R and 04/22. Annual and average busy day operations would remain at approximately 63,000 and 179 operations, respectively. The airfield would continue to operate at about 18 percent of the annual capacity and 15 percent of the hourly capacity. The air traffic control procedures, to include C-17 operations when the air traffic control tower is closed and which accommodate the current level of activity, would continue to be used to control and accommodate aircraft operations. C-17 aircrews would continue to comply with the low-level flying limitations listed in AFI 11-202 and 62 AW guidance. The potential for aircraft accidents or BASH incidents would remain at the baseline conditions because there would be no change in the level or type of operations. The risk would continue to be low that an aircraft involved in an accident at or around the Grant County Airport would strike a person or structure on the ground. Likewise, it would continue to be unlikely that any of the BASH incidents would involve injury either to aircrews or to the public, or damage to property (other than the aircraft).

4.1.2 Noise

Noise impacts would be considered significant if the degree to which noise levels generated by airfield operation activities would: (1) exceed HUD, FAA, or Air Force standards; (2) adversely affect communication; (3) cause nonauditory health effects; (4) cause hearing loss; (5) cause structural damage; or, (6) cause noise sensitive areas to experience an increase in noise of DNL 1.5 dB or more at or above DNL 65 dB noise exposure. These significance criteria also apply to the Proposed Action.

Noise would continue to be generated by aircraft operations. The number of residential land use acres and residences exposed to noise of DNL 65 dBA and greater would remain at 370 acres and seven residences (see Table 3-5). Listeners in normal communication in a steady background noise of 56 dB that increases to 66 dB due to aircraft noise and are at a distance of 10 ft from each other would continue to have to move to about three ft apart to maintain the same intelligibility or raise their voices. Their speech intelligibility would decrease considerably if they remain at 10 ft of separation. These conditions would last only as long as noise from the overflying aircraft remains at 66 dB or greater. Non-auditory health concerns would not occur because individuals would not be exposed to aircraft noise at levels that cause effects. Noise-induced hearing damage and structural damage would not occur.

4.1.3 Land Use

An impact to land use would be considered significant if one or more of the following would occur as a result of the Proposed Action: (1) conflict with applicable ordinances and/or permit requirements; (2) not conform with applicable land use plans; (3) preclude adjacent or nearby properties from being used for

existing activities; or, (4) conflict with established uses of an area. These significance criteria also apply to the Proposed Action.

Continuation of the current aircraft operations would not conflict with the Grant County Comprehensive Plan, the Comprehensive Plan of the City of Moses Lake, and the Grant County Airport Master Plan. Noise from aircraft operations would not preclude adjacent or nearby properties from being used for existing activities. The No Action Alternative would not result in any impacts to land use.

4.1.4 Air Quality

Impacts to air quality in attainment areas would be considered significant if: (1) pollutant emissions associated with the implementation of the Federal action caused or contributed to a violation of any national, state, or local ambient air quality standard; (2) exposed sensitive receptors to substantially increased pollutant concentrations; (3) represented an increase of ten percent or more in the affected AQCR's emissions inventory; or, (4) exceeded any significance criteria established in the Washington SIP.

Grant County is an area designated as attainment/unclassifiable for all NAAQS, therefore USEPA General Conformity rules do not apply.

Under the No Action Alternative, high altitude/high airspeed and low altitude/high airspeed tactical training by JBLM-based C-17 aircrews would not occur at the Grant County Airport and no changes to existing emissions from existing levels of C-17 operations would occur at the Grant County Airport. Air pollutant emissions from the No Action Alternative would continue at the levels shown on Table 3-11 (baseline emissions at the Grant County Airport). These emissions represent less than ten percent of the emissions inventory of AQCR 62. The air quality impacts of the No Action Alternative would not be significant.

4.1.5 Biological Resources

An impact to biological resources would be considered significant if the action would likely adversely affect a threatened or endangered species, substantially diminish habitat for a plant or animal species, substantially diminish a regionally or locally important plant or animal species, interfere substantially with wildlife movement or reproductive behavior that would reduce the population and/or result in a substantial infusion of exotic plants or animal species. Impacts would be considered significant if any native migratory birds or their active nests were to be harmed, particularly during the breeding bird season (for all migratory nongame native bird species protected by international treaty under the Federal Migratory Bird Treaty Act of 1918). These significance criteria also apply to the Proposed Action.

Under the No Action Alternative, JBLM-based C-17 aircrew high altitude/high airspeed and low altitude/high airspeed tactical training would not occur at the Grant County Airport and no changes to existing biological resources would occur at the Grant County Airport. The No Action Alternative does not involve any construction or removal of vegetation; therefore, this condition does not result in direct or indirect impacts to vegetation or wildlife found within a 5-mile radius of the Grant County Airport. Current C-17 aircraft operations do not result in any impacts to threatened or endangered species of wildlife of plants. Aircraft operations at the airport do not result in effects on nesting long-billed curlew (*Numenius americanus*; no Federal status, a species monitored by the State of Washington) or wintering bald eagles (*Haliaeetus leucocephalus*). The No Action Alternative does not involve any disturbance or removal of any native vegetation, ornamental landscaping, or other habitat that would serve as nesting habitat for native birds.

4.1.6 Cultural Resources

An undertaking is considered to have an effect on a historic property when the undertaking may alter characteristics of the property that may qualify the property for inclusion in the NRHP. An effect is considered adverse when it diminishes the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Adverse effects on historic properties would include, but would not be limited to:

- physical destruction, damage, or alteration of all or part of the property;

- isolation of the property from or alteration of the character of the property's setting when that character contributes to the property's qualification for the National Register;
- introduction of visual, audible, or atmospheric elements that are out of character with the property or alter its setting;
- neglect of a property resulting in its deterioration or destruction; and,
- transfer, lease, or sale of the property (36 CFR 800.9[b]).

Any ground-disturbing action in the area of an NRHP-eligible or potentially eligible archaeological site, or modification to such a site, can affect the integrity of that cultural resource, resulting in alteration or destruction of those characteristics or qualities which make it significant and potentially eligible for inclusion in the NRHP. While archaeological sites or historic buildings or structures can be destroyed during a single event, more often it is the cumulative effect of recurrent disturbing actions that diminish the integrity of the cultural resource and its significant characteristics.

Activities with potential to adversely affect cultural resources would be potential aircraft crashes and noise. A discussion of the current level of information relating to the ways in which noise could affect cultural resources is provided in the following paragraphs.

PL 100-91, passed in August 1987, directed the U.S. Forest Service and the NPS to conduct studies and make recommendations to Congress on aircraft overflight that may be affecting either visitors or resources of the National Forest System and National Parks. Completed in July 1992, this cooperative study (USDA, 1992) concluded the following:

- Because many cultural resources are located in remote and uninhabited areas, documented observations of aircraft noise effects are rare; and,
- Most of the available literature relates to research by the Air Force, National Aeronautics and Space Administration, and the FAA and has focused on the effects of sonic booms.

A recently developed prediction method places a definite risk of damage to prehistoric structures (*e.g.*, rock art [petroglyphs and pictographs], rock alignments, rock cairns) from low overflight of heavy bombers and heavy helicopters; however, measurement programs have been conducted which conclude that there is minimal risk of damage to structures from light, low-flying subsonic jet aircraft and light helicopters.

Some evidence exists that long-term effects of noise exposure could result in damage by initiating or accelerating the deterioration process, especially to already fragile resources. Long-term effects appear as: (1) fatigue effects in walls and other structural elements after extensive exposure; (2) moisture damage initiated by cosmetic cracks in exterior surfaces; and, (3) gradual erosion of surface materials (*e.g.,* adobe mud-plastered walls) from repeated events.

A study that examined noise effects of low-level B-52 overflights on Long House, a 1,000-year old Arizona adobe, concluded that noise from a B-52 aircraft would have no significant effects. Noise levels generated by the B-52 aircraft during this study were as high as 113 dBA. Noise-induced landslides and rockfalls are less probable (less than 0.001 percent probability), so by inference, rock art, rock alignments, and cairns are unlikely to be disturbed (USAF, 1997). Based on these data, noise impacts to archaeological and historic resources are not expected as a result of low-level subsonic aircraft overflight.

Effects of aircraft accidents on cultural resources are unpredictable. There are two potential ways for aircraft accidents to affect cultural resources. These are: (1) aircraft crashing onto or into and damaging sites; and, (2) personnel and vehicles in the process of retrieving falling objects driving over or otherwise damaging cultural resources. However, the occurrence of aircraft accidents is statistically low.

Under the No Action Alternative, C-17 aircrews would continue to fly as many as 21,250 annual operations in the Grant County Airport area. C-17 flying operations would remain at the baseline levels. The potential for impact on historic cultural resources would remain low due to routine airfield maintenance and aircraft operations activities. The Air Force would continue to have no management responsibilities for cultural resources within the APE.

4.2 Proposed Action

4.2.1 Aircraft Operations, Aircraft Safety and Bird/Wildlife-Aircraft Strike Hazard

4.2.1.1 Aircraft Operations

The types of aircraft operating at the Grant County Airport, as well as airspace and runway use, would remain at baseline levels. Annual and average busy day operations at the airport would remain at approximately 63,000 and 179 operations, respectively (see Table 2-2). About 3.26 of the 64.4 average busy day C-17 operations would be high altitude/high airspeed and low altitude/high airspeed arrivals. The airfield would continue to operate at about 18 percent of the annual capacity and 15 percent of the hourly capacity. The airfield has the capacity to accommodate these levels of operations.

Aircrews from JBLM, as well as Travis, Elmendorf, and Hickam AFBs, would continue to schedule operations at the Grant County Airport through the 62 Operations Group. This would ensure compliance with the McChord AFB-Grant County Airport agreement described in Subchapter 2.3. A maximum of three C-17s would be allowed in the Grant County Airport air traffic control pattern airspace when performing high altitude/high speed and low altitude/high speed tactical arrivals when the control tower is open. No more than two C-17s would be in traffic pattern airspace when the tower is closed. These aircraft numbers restrictions are the same as the existing, No Action Alternative, condition. Thus, there would be no increase in the number of C-17 aircraft operating at the Grant County Airport at any one time.

The C-17 high altitude/high speed and low altitude/high speed tactical arrivals would be accomplished in the C-17 maneuver area defined in Figure 2-2. The 62nd Operations Group would issue a NOTAM advising other pilots of the opening and closing of training in the high airspeed tactical training corridors. This is the same area in which the currently flown high altitude/low speed and low altitude/low speed tactical arrivals to Runway 09/27, as well as other C-17 operations at the airport, are accomplished. Thus, no additional airspace or air traffic control procedures would be needed for the high altitude/high speed and low altitude/high speed tactical arrivals. Figure 4-1 depicts the Proposed Action aircraft ground tracks. Figure 4-2 compares the flight profile points (*i.e.*, points on the arrival track at which airspeed, altitude, or Engine Pressure Ratio [EPR, an engine power setting] is changed) for a proposed low altitude/high airspeed tactical arrival with a currently flown low altitude/low airspeed tactical arrival. (Engine Pressure Ratio is the ratio of turbine discharge pressure divided by compressor inlet pressure, which is used as an indication of the amount of thrust being developed by a turbine engine, *i.e.* total pressure ratio across the engine.) As depicted in Figure 4-2, aircraft executing a proposed low altitude/high airspeed tactical arrival would be at a higher altitude for a greater portion of the event than an aircraft executing currently flown low altitude/low airspeed tactical arrival. Specifically, aircraft altitude on a low altitude/high airspeed tactical arrival remains at or above 1,000 feet AGL until within about 2 miles from the end of the runway, while aircraft on a low altitude/low airspeed tactical arrival are at or below 1,000 feet AGL beginning at approximately 6 miles from the end of the runway. Additionally, aircraft executing a high airspeed arrival would descend below 500 feet AGL at a point about 1 mile from the end of the runway, while aircraft on a low airspeed tactical arrival are at and below 500 feet AGL at a point around 6 miles from the end of the runway. C-17 pilots accomplishing high altitude/high speed and low altitude/high speed tactical arrivals would comply with the low-level flying limitations listed in AFI 11-202 and 62 AW guidance.

The high airspeed C-17 tactical training could occur between 9:00 a.m. and 2:00 a.m. These operating hours are the same as the existing, No Action Alternative, hours for C-17 aircraft. Actual use times may vary with the seasons. The high airspeed tactical training would be accomplished under concurrence from ATC when the air traffic control tower is open. Additionally, C-17s would not have priority in the pattern for high airspeed training and this training would be allowed only when air traffic conditions allow.

Pilots would continue to use the CTAF to announce their intentions when the air traffic control tower would not be operating. The procedures and guidance identified in Subchapter 2.3 and discussed in this subchapter would ensure to the maximum extent practicable, that C-17s accomplishing high altitude/high speed and low altitude/high speed tactical arrivals as well as other operations at the airport, would deconflict with other aircraft operations.

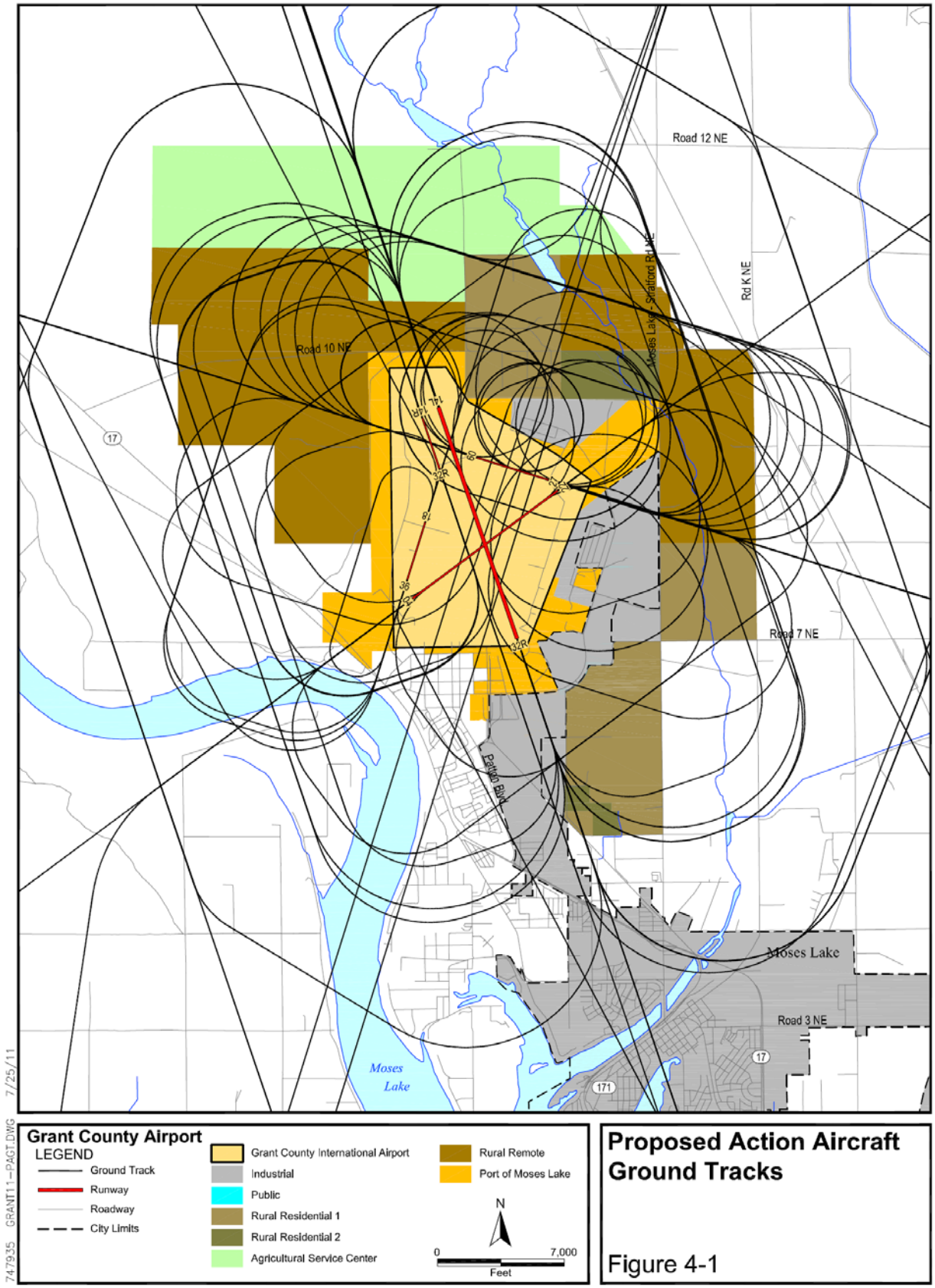

Figure 4-1. Proposed Action Aircraft Ground Tracks

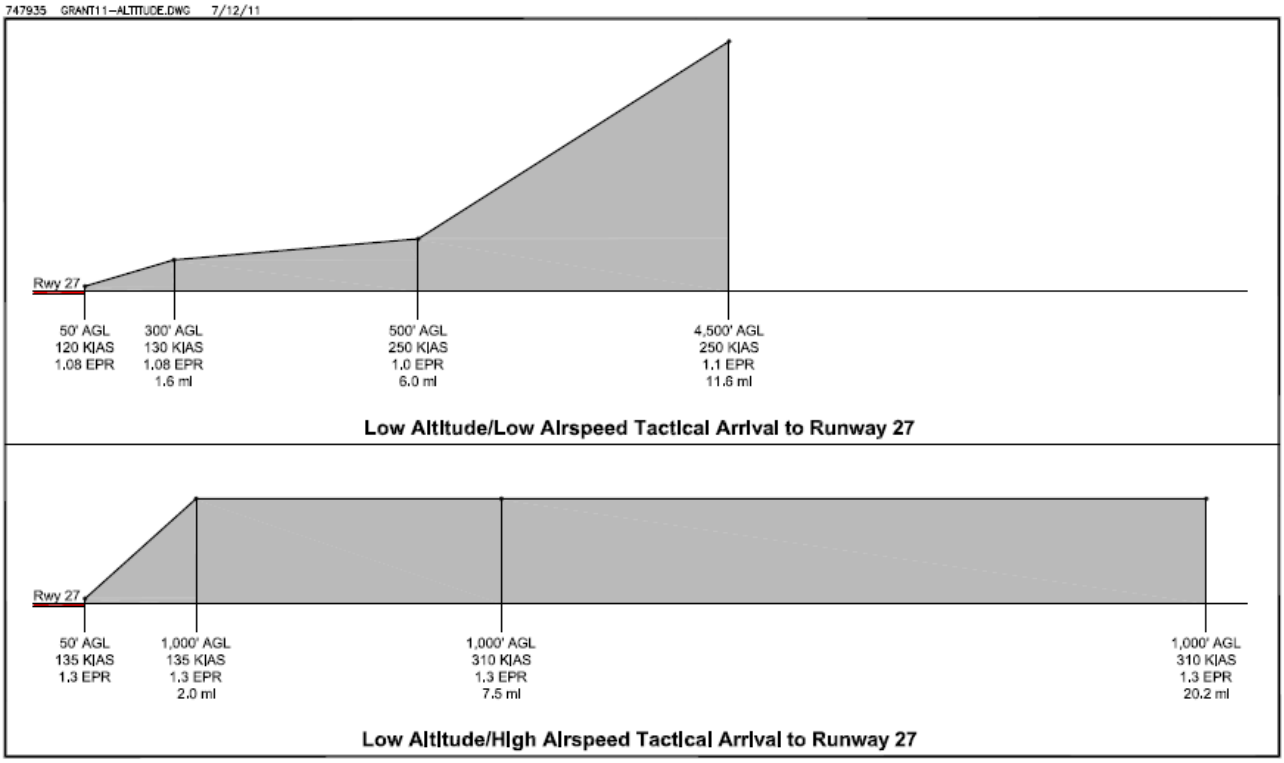

Figure 4-2. Comparison of Existing Low Altitude/Low Airspeed Tactical Arrival and Proposed Low Altitude/High Airspeed Tactical Arrival

4.2.1.2 Aircraft Safety

It is impossible to predict the precise location where an aircraft involved in an in-flight accident would impact the ground. However, aircraft flight tracks are developed to avoid overflying residences and built-up areas to the maximum extent practicable. Although tactical arrivals would be accomplished at higher airspeeds than the currently practiced high altitude/low airspeed and low altitude/low airspeed tactical arrivals, the locations of the higher speed aircraft ground tracks would occur in the corridors used for the currently flown lower airspeed arrival ground tracks. Thus, no new areas around the airport would be exposed to C-17 overflight. The high altitude/high airspeed and low altitude/high airspeed tactical arrivals, as well as the other C-17 operations at the airport, would be consistent with those currently flown at the Grant County Airport, and the C-17 Class A mishap rate of 0.83 mishaps applies. C-17s accomplishing high altitude/high airspeed and low altitude/high airspeed tactical arrivals, as well as other operations at the airport, would use the on-board TCAS avoidance system just as it is used for the events currently flown at the airport. High airspeed tactics training would not be authorized when non-participating traffic is reported or sighted within 10 miles of the airport, civil aircraft are operating in the Grant County Airport traffic pattern, or when advisory traffic is reported by the FAA's Seattle ARTCC. For these reasons, the risk is low that a C-17 aircraft accomplishing high altitude/high airspeed and low altitude/high airspeed tactical arrivals, as well as other operations at the airport would be involved in a collision with another aircraft. Additionally, the risk is low that an aircraft involved in an accident at or around the Grant County Airport would strike a person or structure on the ground.

4.2.1.3 Bird/Wildlife-Aircraft Strike Hazard

Overall, there would be no change in the number of C-17 aircraft operations at the Grant County Airport. Thus, there would be no change in the potential for a C-17 BASH incident at the airport. As noted in Table 3-3, the number of annual C-17 bird-aircraft strikes varies over the 11-year period for which data are provided, with no strikes occurring in eight of the 11 years. Based on the information in the table, there is no distribution of strikes pattern for C-17 bird-aircraft strikes. It is anticipated that C-17 bird-aircraft strikes would continue to be cyclical. Likewise, it is anticipated the altitude distribution of strikes would continue to follow the rates in Table 3-2 because the types of operations at the airfield would be

consistent with the types of operations associated with data in the table. C-17 aircrews would continue to use the guidance in the 62 AW BASH Plan, as well as the BAM and AHAS (see Appendix D), to minimize the potential for bird-aircraft strikes.

As shown in Figure 4-2, aircraft executing a proposed low altitude/high airspeed tactical arrival are at a higher altitude longer than an aircraft executing an existing low altitude/low airspeed tactical arrival. Specifically, aircraft altitude on a low altitude/high airspeed tactical arrival remains at or above 1,000 feet AGL until within about 2 miles from the end of the runway, while aircraft on a low altitude/low airspeed tactical arrival are at or below 1,000 feet AGL beyond approximately 6 miles from the end of the runway. Additionally, aircraft executing a high airspeed arrival would descend below 500 feet AGL at a point about 1 mile from the end of the runway, while aircraft on a low airspeed tactical arrival are at and below 500 feet AGL at a point around 6 miles from the end of the runway. Approximately 61 percent of the bird-aircraft strikes at airports occur in the 0-499 feet AGL range (derived from Table 3-3), while 7.76 percent of the strikes occur in the 1,000-1,499 feet AGL range. Based on the distribution data in Table 3-3, the potential for a bird-aircraft strike from a proposed high airspeed tactical arrival would be equal to or less than the potential for a strike during an existing low airspeed tactical arrival because the aircraft altitude during a high airspeed arrival is higher for a greater portion of the arrival than the aircraft altitude on a low airspeed arrival.

The potential for BASH incidents could fluctuate as a result of the cyclical patterns of bird populations. Historically, one-half of 1 percent of all reported bird/wildlife-aircraft strikes involving Air Force aircraft resulted in a serious mishap. Therefore, it is unlikely that any of these bird/wildlife-aircraft strike incidents would involve injury either to aircrews or to the public, or damage to property (other than the aircraft).

4.2.1.4 Cumulative Impacts

Neither of the projects described in Subchapter 2.4 include aircraft operations. Therefore, there would be no cumulative impacts for aircraft operations, aircraft safety, or BASH.

4.2.1.5 Mitigation

There would be no significant impacts. No mitigation is recommended.

4.2.2 Noise

Noise would continue to be generated by aircraft operations. The Proposed Action would result in a change in C-17 flying activities at the Grant County Airport, effects of which are described in terms of single event noise and averaged noise herein.

4.2.2.1 Single Event Noise Analysis

Table 4-1 lists the SEL, L_{max}, and L_{eq} values for C-17 takeoffs and tactical arrivals when the aircraft is directly overhead and at varying slant ranges. Airspeed for the currently flown low airspeed tactical arrivals is 250 KIAS, while the proposed high airspeed tactical arrivals would be flown at 310 KIAS. A change of 3 dBA is just perceptible to the human ear, while a change of 5 dBA is clearly noticeable (Bies and Hansen, 1988). As noted in the table, the loudness of a high speed, 310 KIAS arrival is 3 dBA or less than a slower speed, 250 KIAS arrival. Therefore, it is unlikely that persons below an arrival track would notice the slightly greater noise level from a high speed arrival when comparing the noise from it to the noise from a slower speed arrival. Additionally, when considering the noise from a proposed low altitude/high airspeed tactical arrival when the aircraft is at 1,000 feet AGL with the noise from an existing low altitude/low airspeed tactical arrival when the aircraft is at 500 feet AGL (see Figure 4-2 and Table 4-1), the noise from a low altitude/high airspeed arrival would be about 5 dBA less than the noise from a low altitude/low airspeed arrival for each of the three metrics.

Table 4-1. C-17 Noise Levels (in dBA) in Sound Exposure Level, Maximum Sound Level, and Average Noise when Aircraft is Directly Overhead or at Various Lateral Range for Takeoffs and Low and High Airspeed Tactical Arrivals

Sound Metric/ Phase of Flight	Aircraft Directly Overhead at 500 ft AGL	Aircraft Directly Overhead at 1,000 ft AGL	Aircraft at 500 Ft AGL				
			500 ft Lateral Distance to Ground Track	1,000 ft Lateral Distance to Ground Track	2,000 ft Lateral Distance to Ground Track	4,000 ft Lateral Distance to Ground Track	6,000 ft Lateral Distance to Ground Track
Sound Exposure Level (SEL)							
Takeoff, 160 KIAS	106	99	102	97	90	82	76
Low airspeed tactical arrival, 250 KIAS	95	89	92	87	79	69	62
High airspeed tactical arrival, 310 KIAS	97	90	94	88	80	70	63
Maximum Sound Level (L_{max})							
Takeoff, 160 KIAS	100	91	95	89	81	71	64
Low airspeed tactical arrival, 250 KIAS	92	84	88	82	72	61	53
High airspeed tactical arrival, 310 KIAS	96	87	91	85	75	63	55
Average Noise (L_{eq})							
Takeoff, 160 KIAS	56	49	53	48	41	33	27
Low airspeed tactical arrival, 250 KIAS	46	39	42	38	30	20	13
High airspeed tactical arrival, 310 KIAS	48	41	44	39	31	20	14

Listeners in normal communication in a steady background noise of 56 dB that increases to 66 dB due to aircraft noise and are at a distance of 10 ft from each other would have to move to about three ft apart to maintain the same intelligibility or raise their voices (see Table D-1). Their speech intelligibility would decrease considerably if they remain at 10 ft of separation. These conditions would last only as long as noise from the overflying aircraft remains at 66 dB or greater. Aircraft operations at the Grant County Airport would be intermittent and occur less than 24 hours per day and 365 days per year. For these reasons, the intermittent noise, 8-hour, and 250 days per year at-ear exposure values from Table 3-5 are used for analysis purposes. The L_{eq} value for the C-17 when directly overhead at 500 ft during takeoff (*i.e.*, 56 dB, see Table 4-1) would not exceed the L_{eq} for the most conservative at-ear exposure level and 8-hour intermittent condition (*i.e.*, 78.0 dB for intermittent 8-hour noise exposure 250 days per year in Table D-2) that could produce hearing damage. When comparing the proposed high airspeed arrivals to existing overflights such as the currently accomplished takeoffs, the proposed arrivals are about 8 dBA lower than existing events. For this reason, hearing damage would not occur due to the Proposed Action.

Based on FICAN recommendations, outdoor SELs of 80 to 100 dBA (60 to 80 dBA indoors) could result in 4 to 10 percent awakenings, respectively, in the exposed population. Over the course of sleeping, different individuals might be awakened by different events, and some individuals might be awakened more than once. Individuals in residences in the area below a high airspeed C-17 arrival flight track could be exposed to indoor SEL of about 77 dBA (see Table 4-1, C-17 high airspeed arrival) during normal sleep periods (10:00 p.m. to 7:00 a.m.). Likewise, individuals in residences in the area below a C-17 departure flight track could be exposed to indoor SEL of about 86 dBA (see Table 4-1, C-17 takeoff) during normal sleep periods. When comparing the proposed high airspeed arrivals to existing overflights such as the currently accomplished takeoffs, the proposed arrivals are about 9 dBA lower than existing events. As many as 10 percent of the

persons who would live below a flight track and within the parameters associated with the noise data in Table 4-1 (i.e., where the aircraft is directly overhead at 500 ft AGL or when the aircraft is at 500 ft AGL and the residence is at lateral distances up to 6,000 ft from the aircraft ground track) could be awakened by aircraft noise during normal sleep periods. The potential for awakening would be greater the closer the residence is to the end of a runway where the aircraft typically is lower. Those individuals who sleep between 7:00 a.m. and 10:00 p.m. likely would be affected just as those persons who sleep during normal nighttime sleep periods. As noted in Subchapter 2.3, the low level/high airspeed arrivals would be accomplished over unpopulated areas to the maximum extent practicable when consider the aircraft operating characteristics. Avoiding overflight of populated areas would minimize the potential for noise impacts, to include sleep awakenings.

The loudest maximum sound level (L_{max}) for C-17 operations at the Grant County Airport would continue be about 100 dBA (i.e., takeoff at 500 feet AGL and directly overhead), which is well below the threshold at which structural damage would occur (*i.e.*, 127 dBA). Additionally, the L_{max} would not exceed the level at and above which window panes may vibrate (*i.e.*, 110 dBA). When comparing the proposed high airspeed arrivals to existing overflights such as the currently accomplished takeoffs, the proposed arrivals are about 4 dBA lower than existing events. Thus, no structural or vibration damage would be expected from C-17 operations at the Grant County Airport.

4.2.2.2 Averaged Noise Analysis

The primary source of noise in the vicinity of Grant County Airport would continue to be from aircraft operations. Although the C-17s would conduct high altitude/high speed and low altitude/high speed arrivals, the types of aircraft that operate at the Airport would be the same as those for the baseline. Likewise, the number of average busy day aircraft operations would remain at approximately 179 operations per day (see Table 2-2 for a detailed listing of the types of aircraft and operations by each type). Nighttime (*i.e.*, 10:00 p.m. to 7:00 a.m.) C-17 operations would continue at 37 percent of the total operations for the aircraft. About 24 of the C-17 operations would occur during nighttime, of which approximately 1.2 operations would be high altitude/high airspeed or low altitude/high airspeed tactical arrivals. None of the other aircraft types would operate during nighttime.

Table 4-2 compares the Proposed Action at the Grant County Airport with the No Action Alternative (*i.e.*, baseline) for off-airport land that use categories of Rural Residential 1, Rural Residential 2, and Rural Remote and residences exposed to noise of DNL 65 dBA and greater (see Figure 4-3). Overall, the Proposed Action at the Grant County Airport noise contours would be very similar in shape when compared to the No Action Alternative (*i.e.*, baseline) (see Figure 4-4). The areas associated with the increase in residential use land area equal to or greater than DNL 65 dBA are primarily to the north and south of Runway 09/27 and at the east end of the contours. Runway 09/27 is the runway to which the high altitude/high airspeed and low altitude/high airspeed tactical arrivals, as well as the on-going low airspeed tactical arrivals, would be flown. The noise exposure areas to the northwest and southeast of the airport along the extended centerline of Runway 14L/32R change very little, with the noise contours for the Proposed Action and No Action Alternative (baseline) being coincidental in many locations.

Table 4-2. Summary of Off-Airport Residential Land Area and Residences Exposed to DNL 65 dBA and Greater, Proposed Action

Category	DNL Interval (dBA)			Total
	65-70	70-75	75-80	
Residential Use, Acres				
No Action Alternative	347	23	0	370
Proposed Action	480	88	0	568
Residences				
No Action Alternative	6	1	0	7
Proposed Action	7	1	0	8

Note: Acres reflect only off-airport land area. The No Action Alternative is also the baseline. Acres reflect only off-airport land area.

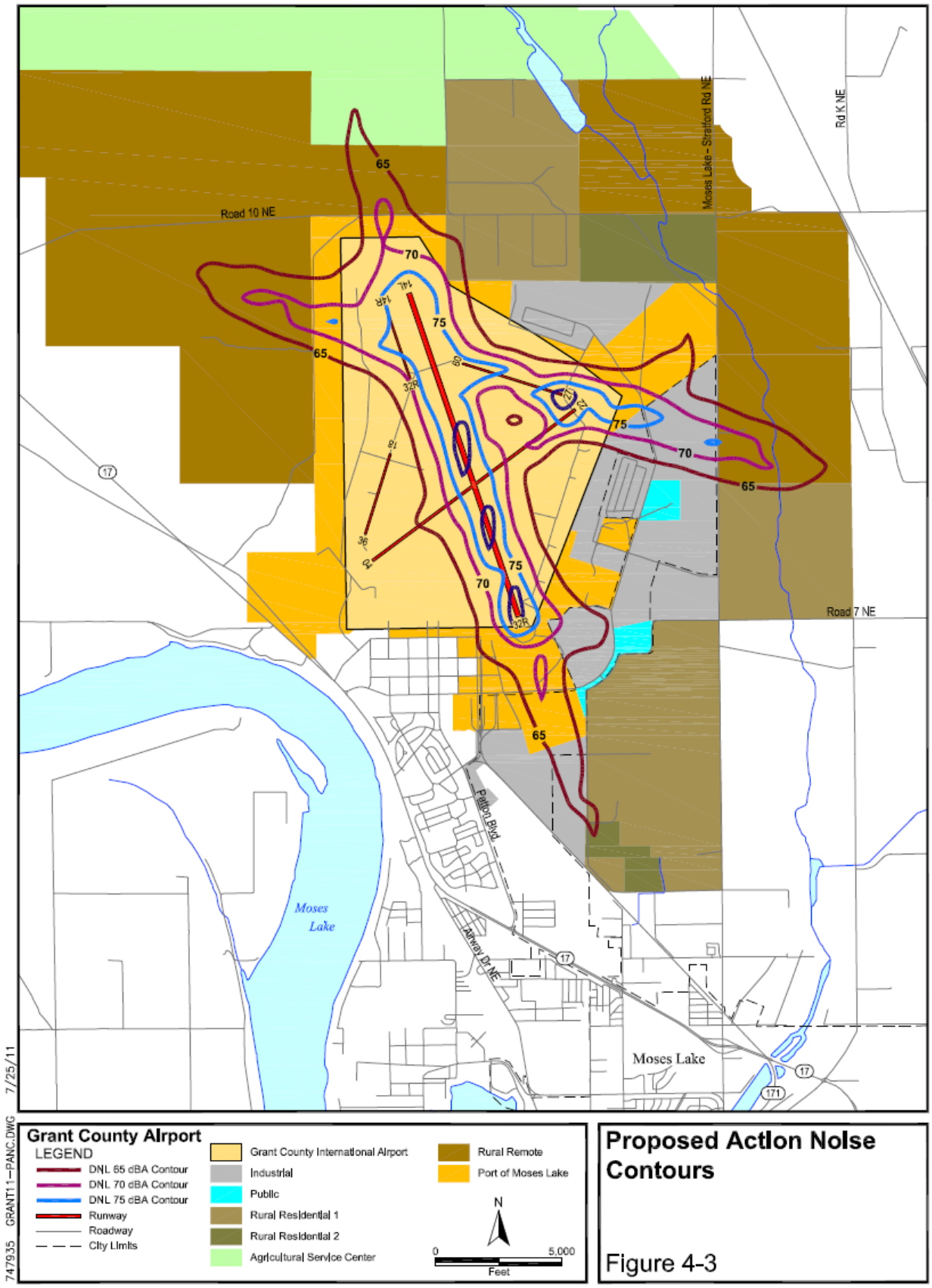

Figure 4-3. Proposed Action Noise Contours

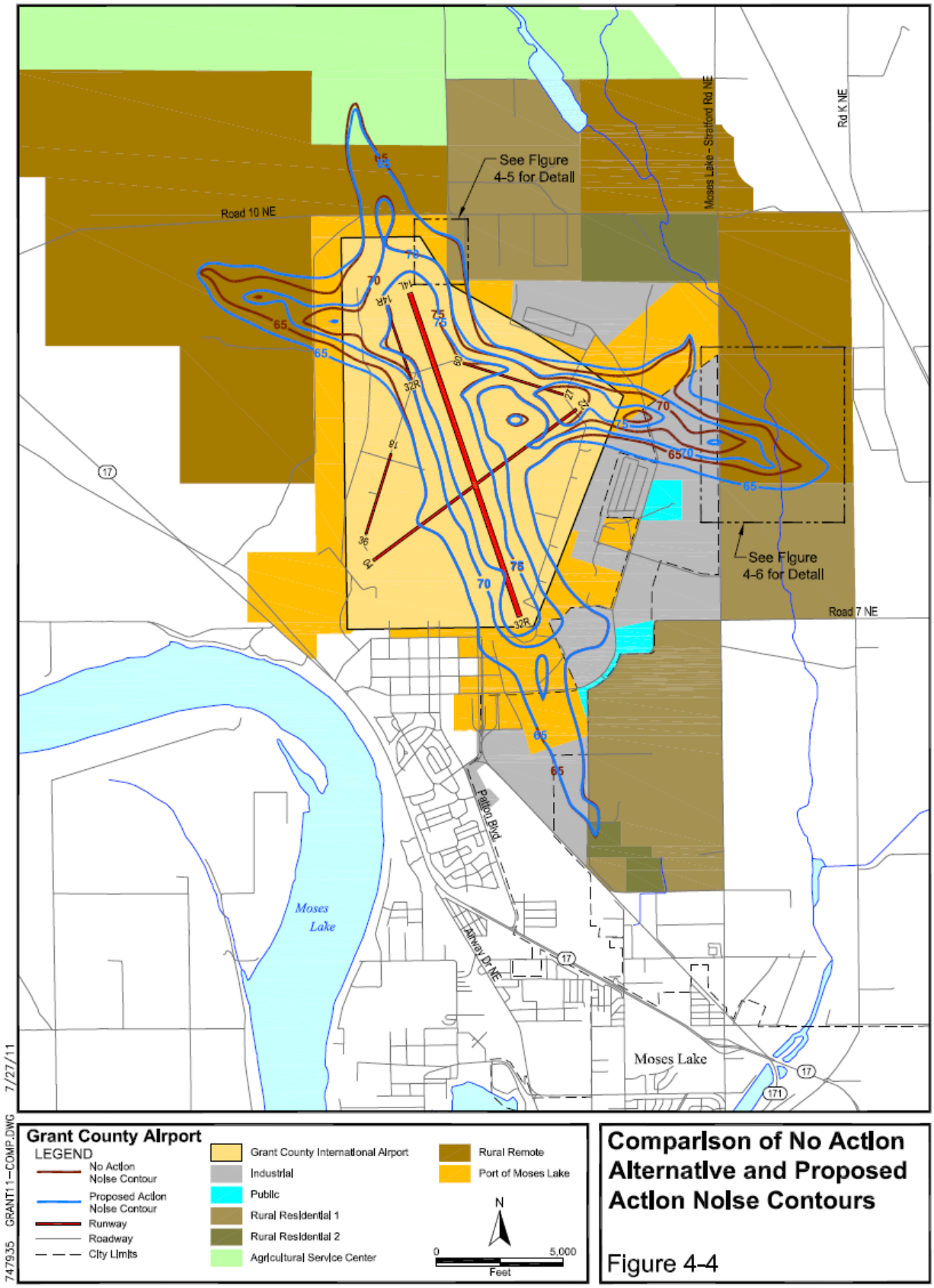

Figure 4-4. Comparison of No Action Alternative and Proposed Action Noise Contours

The Proposed Action noise contours were overlaid on an aerial photograph to determine if and where residences might be exposed to aircraft noise at DNL 65 dBA and greater. Two areas with residences occur within DNL 65 dBA and greater noise exposure area. One area is immediately north of the airfield and the other is to the east. One additional residence in the area north of the airport would be exposed to DNL 65-70 dBA, for a total of seven residences exposed to this level of noise. No residences north of the airfield would be exposed to DNL 70-75 dBA. The one additionally exposed residence would experience an increase of DNL 0.5 dBA, an increase that is below the DNL 1.5 dBA-increase significance criterion. One residence in the area east of the airfield would continue to be in the DNL 65-70 dBA zone and one would continue to be in the DNL 70-75 dBA zone. Based on the slight increase in noise for the one additional residence in the DNL 65 dBA and greater noise exposure, impacts from noise would not be significant. Figures 4-5 and 4-6 detail the areas north and east of the airport, respectively, where residences occur within the noise exposure zones.

Due to the intermittent nature of aircraft operations, individuals would not be exposed to aircraft noise at L_{eq} noise levels of 75 dBA and higher for an 8-hour day. Thus, non-auditory health effects from chronic noise exposure would not occur due to the Proposed Action. For these reasons, noise effects would not be significant.

4.2.2.3 Cumulative Impacts

Neither of the projects described in Subchapter 2.4 include aircraft operations. Therefore, there would be no cumulative impacts for noise from aircraft operations. Although construction noise could occur as a result of the other projects, there would be no construction noise associated with the Proposed Action. Therefore, there would be no cumulative impacts from construction noise.

4.2.2.4 Mitigation

There would be no significant impacts. No mitigation is recommended.

4.2.3 Land Use

4.2.3.1 Comprehensive and Airport Master Plans

As depicted in Figure 4-2, the noise contours for the Proposed Action would be nearly identical to the No Action Alternative (baseline) noise contours except for the areas east and west of the airfield. Although the noise contours expand in these areas (see Figure 4-4), the noise levels in the areas of additional exposure would be consistent with the current land use categories and baseline noise exposure. Thus, the Proposed Action noise exposure would not conflict with current land use in the Grant County Comprehensive Plan or zoning the Comprehensive Plan of the City of Moses Lake. Likewise, the noise from aircraft operations would not preclude adjacent or nearby properties from continuing to be used for existing activities. The Proposed Action would not be inconsistent with the 2005 Airport Master Plan nor would it conflict with the FAR Part 77 imaginary surfaces or RPZs.

4.2.3.2 Cumulative Impacts

The other projects described in Subchapter 2.4 would be constructed in accordance with existing guidance such as the Grant County Comprehensive Plan, the Comprehensive Plan of the City of Moses Lake, the Grant County Airport Master Plan, and FAR Part 77. Construction in accordance with this guidance would ensure there would be no impacts to the facilities from the noise generated by aircraft operations. Likewise, the facilities would not conflict with aircraft operations.

4.2.3.3 Mitigation

There would be no significant impacts. No mitigation is recommended.

Figure 4-5. Detail of No Action Noise Contours and Proposed Action Noise Contours, North

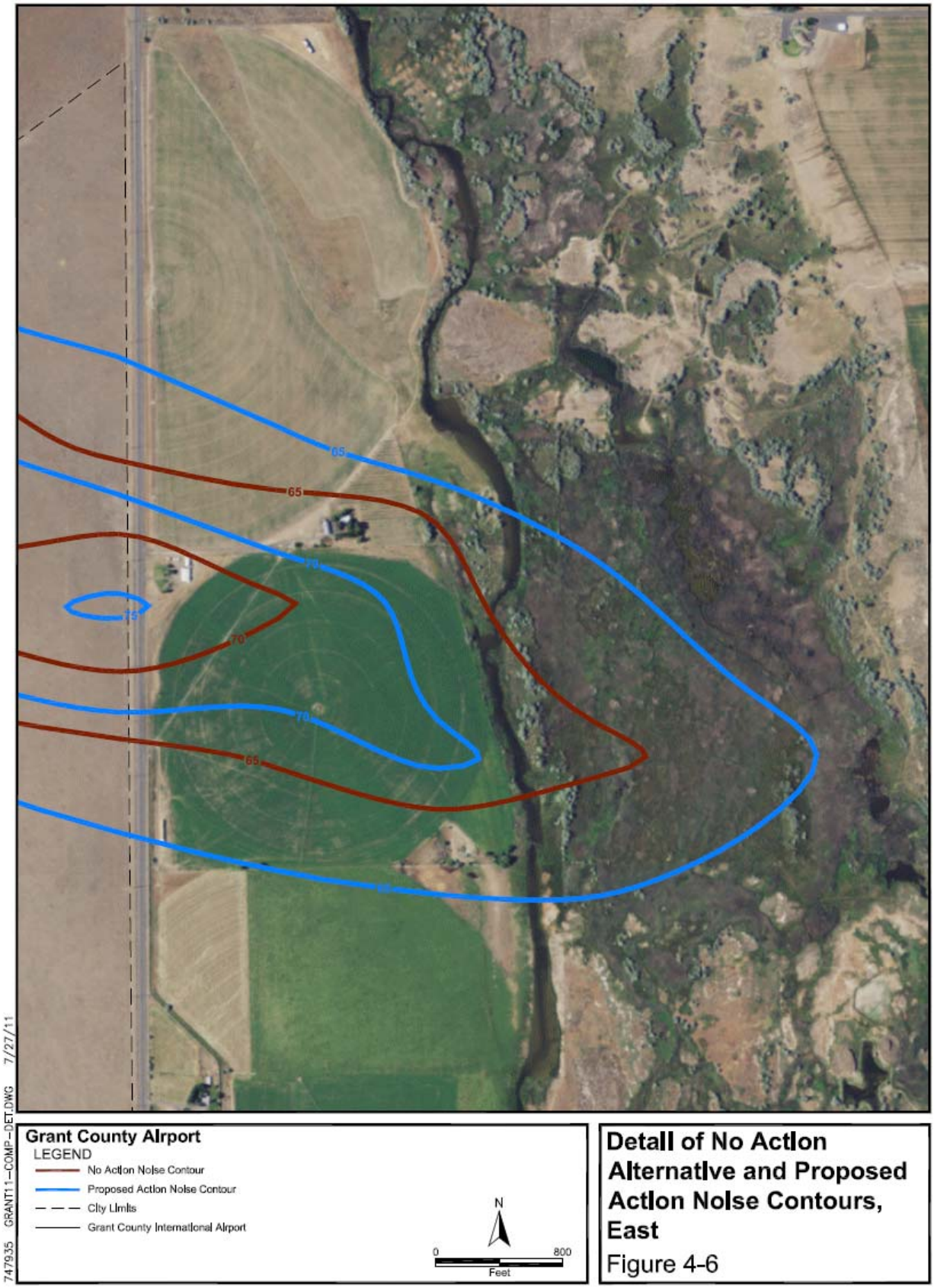

Figure 4-6. Detail of No Action Noise Contours and Proposed Action Noise Contours, East

4.2.4 Air Quality

Emissions from aircraft operations are calculated based on the definition of an operation (refer to Table 2-2). Only activities in an operation occurring below 3,000 ft AGL are considered when calculating emissions from aircraft. The 3,000 ft AGL ceiling is assumed as the atmospheric mixing height above which any pollutants generated would not contribute to increased pollutant concentrations at ground level.

Grant County is an area designated as attainment/unclassifiable for all NAAQS, therefore USEPA General Conformity rules do not apply. Change in aircraft emissions at Grant County Airport from the Proposed Action would only be due to the high altitude/high airspeed and low level/high airspeed tactical training arrivals as shown in Table 4-3. The Air Force uses the "average busy day" concept in which annual operations/events for an aircraft type are averaged over the number of flying days per year by that aircraft type. Non-flying days (e.g., weekends or holidays) are not used in computing the "average busy day" operations. Average busy day operations for C-17s are based on 330 days per year (average busy day for all other aircraft types is based on 365 days per year).

Table 4-3. Proposed C-17 Busy Day and Annual High Airspeed Arrivals at the Grant County Airport

Arrivals	
Annual	**Average Busy Day**
170	3.26

Table 4-4 presents emissions that would occur from the Proposed Action in comparison to the air emissions inventory for the AQCR for calendar year 2002 (http://www.epa.gov/air/data/geosel.html, accessed May 1, 2011). The air emissions inventory for AQCR 62 includes reported permitted stationary, mobile, and grandfathered air emission sources. Emissions from the Proposed Action will be a small percentage of the AQCR's overall area emissions. Emissions from aircraft operations were calculated using the Air Force's Air Emissions Factor Guide to Air Force Mobile Sources, December 2009. For comparison purposes, emissions from the Proposed Action were also calculated using the FAA's Emissions and Dispersion Modeling System (EDMS) Version 5.1.3. The model predicted slightly higher emissions from the Proposed Action due to differences in times-in-mode. The FAA model had a higher time-in-mode during approach.

Table 4-4. Emissions from Proposed C-17 High Airspeed Arrivals at the Grant County Airport

	Criteria Air Pollutant (tons per year)					
	CO	**VOC**	**NO_x**	**SO_x**	**PM_{10}**	**PM_{25}**
Emissions from Proposed C-17 High Airspeed Arrivals	0.0	0.0	1.0	0.0	0.0	0.0
Baseline AQCR Emissions[1]	386,986	74,049	51,881	3,986	154,735	28,184
Emissions Increase as Percent of AQCR Emissions	0.0000%	0.0000%	0.0019%	0.0000%	0.0000%	0.0000%

[1] Represents most recent available data (2002)

Since the Proposed Action is located in an area in attainment for all criteria pollutants and the increase in criteria pollutant emissions is less than 10 percent of baseline AQCR emissions, the Proposed Action at the Grant County Airport has been demonstrated by USEPA standards not to cause or contribute to new violations of any national ambient air quality standard in the affected area.

4.2.4.1 Cumulative Impacts

Neither of the projects described in Subchapter 2.4 include aircraft operations. Therefore, there would be no cumulative impacts to air quality.

4.2.4.2 Mitigation

There would be no significant impacts. No mitigation is recommended.

4.2.4.3 Greenhouse Gas Emissions and Climate Change Analysis

Greenhouse gases (GHG) are gases that trap heat in the atmosphere. These emissions occur from natural processes and human activities. Some studies suggest that the surface temperature of the earth has increased because of the presence in the air of GHGs that absorb infrared radiation. Recent observed changes due to global warming include shrinking glaciers, thawing permafrost, a lengthened growing season, and shifts in plant and animal ranges (IPCC, 2007).

The most common GHGs emitted from natural processes and human activities include carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). Examples of GHGs emitted primarily through human activities include fluorinated gases (hydrofluorocarbons and perfluorocarbons) and sulfur hexafluoride (SF6). Each GHG is assigned a global warming potential (GWP), which is the ability of a gas or aerosol to trap heat in the atmosphere. The GWP rating system is standardized to CO_2, which has a value of one. For example, CH4 has a GWP of 21, which means that it has a global warming effect 21 times greater than CO_2 on an equal-mass basis. Total GHG emissions from a source are often reported as a CO_2 equivalent (CO_2e). The CO2e is calculated by multiplying the emission of each GHG by its GWP and adding the results together to produce a single, combined emission rate representing all GHGs.

On February 18, 2010, the CEQ released its Draft NEPA Guidance on Consideration of the Effects of Climate Change and Greenhouse Gas Emissions, which suggests that Proposed Actions that would be reasonably anticipated to emit 25,000 metric tons or more of CO_2e GHG emissions annually should be evaluated by quantitative and qualitative assessments. This is not a threshold of significance but a minimum level that would require consideration in NEPA documentation. The purpose of quantitative analysis of CO_2e GHG emissions in this EA is for its potential usefulness in making reasoned choices among alternatives.

Aircraft GHG emissions consist of GHG emissions from high airspeed arrivals. GHG emissions were calculated by multiplying jet fuel use rates in pounds per hour (lbs/hr) by the total operating time (hours during the high airspeed approach), by the corresponding jet fuel emission factors for GHGs, and by the total number of operations (high airspeed arrivals). Aircraft GHG emissions from the Proposed Action are then compared to the U.S. 2009 GHG emissions in Table 4-5.

Table 4-5. Greenhouse Gas Emissions from Proposed C-17 Additional Airfield Operations at the Grant County Airport

	Greenhouse Gas, metric tons per year			
	CO_2	CH_4	N_2O	CO_2e
Proposed Action	276.731	0.008	0.009	279.689
U.S. 2009 GHG Baseline Emissions[1]				6,633,200,000
Percent of U.S. 2009 GHG Baseline Emissions				0.000004

[1] Source: USEPA, 2011a

Greenhouse gas emissions from the Proposed Action would amount to approximately 0.000004 percent of the total GHG emissions generated by the U.S. When this individual project's contribution to greenhouse gas emissions is compared to that produced by activities elsewhere in the world, the mass of greenhouse gas emissions generated by the Proposed Action would be so small that the concentration of greenhouse gas emissions in the atmosphere would not be expected to change. For this reason, the Proposed Action's individual impact to global climate change is not significant. The project's incremental contribution to cumulative effects on a regional and global scale would not be considerable. There would be no measureable impacts to global climate change.

4.2.5 Biological Resources

The Proposed Action would result in a change in aircraft operations by JBLM-based C-17 aircrews that utilize the airspace surrounding the Grant County Airport. C-17 aircrews would fly high altitude/high airspeed and low altitude/high airspeed tactical training maneuvers that would result in an increase of approximately 2 dBA from current noise levels. The low altitude/high airspeed tactical arrivals and departures at the airport would result in sound exposure levels of approximately 97 dBA (SEL) and 106 dBA, respectively, when the aircraft is directly overhead at 500 ft AGL. Lateral distance noise at 500 ft and 1,000 ft would be 102 dBA and 97 dBA for departures, and 94 dBA and 88 dBA for arrivals.

Vegetation

The Proposed Action would not involve any disturbance or removal of any native vegetation or ornamental landscaping, or other habitat that would serve as nesting habitat for native birds or wildlife.

Wildlife

The increase in noise conditions would not be expected to adversely impact existing biological resources at the Grant County Airport or surrounding area. Studies on the impact of wildlife from fixed wing aircraft indicate that there were no observed effects on raptors at 89 to 105 dBA, gulls at 101 dBA, and large mammals 85 to 110 dBA (Efroymson et al., 2000). Other researchers found similar responses at 80 dB for California gnatcatcher (*Polioptila californica*) (Awbrey and Hunsacker, 1993) and 96 dB for kit fox (*Vulpes macrotis)* (Bowles et al., 1993). Since the surrounding area is primarily agricultural, large populations of wildlife and birds would not be expected. This once a week activity would also minimize the expose of wildlife to these noise levels.

Threatened, Endangered and Candidate Species

There are three species with Federal or state listing. The increased noise level associated with the Proposed Action would not overlay any water bodies and, therefore, would not affect populations of the threatened bull trout (*Salvelinus confluentus*) or its Critical Habitat along the Columbia River southwest of Moses Lake.

Studies of aircraft noise and sonic boom on various animals, including rabbits, have found that this noise can include anxiety-like behavior and physical weight change (Manci, 1988). The increased noise level associated with the Proposed Action would not likely adversely affect any native or reintroduced pygmy rabbits (*Brachylagus idahoensis*), a Federally endangered species, because their habitat is located over 20 miles from the C-17 flying low altitude range associated with the Grant County Airport.

The increased noise level would not affect the threatened Ute ladies'-tresses (*Spiranthes diluvialis*) whose remaining populations are located over 50 miles from the C-17 flying low altitude range.

The Federal candidate and state-listed threatened greater sage grouse (*Centroercus urophasianus*) relies predominantly on the sagebrush plant community. Once thriving across much of Washington State's then expansive sagebrush-steppe habitat, today the sage grouse are largely isolated to two recognized populations north and south of the Whiskey Dick and Quilomene Wildlife Areas (WWP, 2011). These two areas are west of the Grant County Airport. The airport is within the historically occupied area which now is primarily agricultural degrading most of the former sage grouse habitat. While there are no studies on the effects of aircraft noise on this species, biologists speculate that noise could interfere with communication by this species during the mating season. This potential noise effect from C-17 aircraft would be brief and infrequent. Like other bird species, there would likely be a temporary effect on bird behavior for isolated individuals or small populations near the airport. There would be no effect on the two primary populations west of the airport. This species or its habitat is not likely to be adversely affected by the change in C-17 aircraft operations at the Grant County Airport.

The increased noise level would not likely result in an adverse affect on nesting long-billed curlew (*Numenius americanus;* no Federal status, a species monitored by the State of Washington) or wintering bald eagles (*Haliaeetus leucocephalus*). While there may be some isolated individual responses, studies on the effects from fixed wing aircraft indicate that there were no observed effects on bald eagles at 90 to 105 dBA (Efroymson et al., 2000).

Physical Collision with Local and Migratory Birds

The potential for bird collisions with aircraft exists and the population for a given species could be reduced if a high number of bird collisions for a species occurred in a given area. The effects could be adverse if such a population was at risk due to size of the population. For the Proposed Action, it is estimated C-17 bird strikes or collisions with birds would not be any higher than the current bird strike history indicates. Only 12 bird strikes have been recorded for the past 11 years. It is anticipated that the altitude distribution of the bird-aircraft strikes would follow the data in Table 3-3. Data from the Bird Avoidance Models in Appendix D indicate that the higher risk for bird strikes occurs from November through March, corresponding to migratory bird overwintering and movement. Based on the bird strike

history at this airport and the lack of a species of bird population at risk, the potential impact on bird populations from bird-aircraft strike is extremely low.

4.2.5.1 Cumulative Impacts

Neither of the projects described in Subchapter 2.4 include aircraft operations. Therefore, there would be no cumulative impacts to biological resources.

4.2.5.2 Mitigation

There would be no significant impacts. No mitigation is recommended.

4.2.6 Cultural Resources

4.2.6.1 Archaeological Resources

Since there are no known archaeological sites near the Grant County Airport, there would be no effect to archaeological resources.

4.2.6.2 Historic Resources

No NRHP-listed resources are located directly below the C-17 flight tracks shown on Figure 4-1. As shown on Table 4-1, the greatest maximum sound level generated by the C-17 would be 106 dBA at 500-ft AGL during takeoff, for which there is no change from the baseline. Additionally, the maximum noise level from a proposed high airspeed tactical arrival would be 96 dBA. These maximum noise levels would be well below the threshold at which structural damage would occur (*i.e.*, 127 dBA). The Proposed Action does not include use of the structures at the Grant County Airport and the level of noise to which they would be subjected would be well below the 127 dBA threshold; thus, there is no impact to any potentially historic properties at the Grant County Airport.

4.2.6.3 Native American Interests

Under the Proposed Action, C-17 aircrews based at JBLM would continue to fly as many as 21,250 annual operations in the Grant County Airport area.

Federally recognized Native American tribes and groups identified at the time of preparation of this document are identified in Subchapter 3.6.3. On behalf of JBLM, the Air Force notified Native American tribes and groups (see Appendix B). Of the six notification letters sent by the Air Force, one response has been received to date. The Confederated Tribes and Bands of the Yakama Nation provided a response letter to the Air Force to indicate that members of the Yakama Nation gather traditional foods, medicines, and wild game in the vicinity of the proposed operations. The group is concerned that low altitude/high speed operations will adversely affect members of the Yakama Nation who are currently gathering traditional resources, especially those who are elderly, those that may have medical conditions, those who have young children with them. This concern was subsequently clarified to reflect that the Yakama Nation has no concerns with the proposed change in C-17 flight operations at the Grant County Airport (see Appendix B).

C-17 aircraft training activities associated with the Proposed Action would continue to occur within an approximate 5-mile radius of the airport. As shown on Figure 4-3, the noise level increases associated with the Proposed Action would continue to remain primarily upon airport property and within this 5-mile radius. Areas within the 65 dBA (DNL) or greater noise contour outside of airport property are located on primarily agricultural areas. For this reason, low altitude/high speed C-17 operations would not adversely affect Native American interests in the area.

4.2.6.4 Cumulative Impacts

Neither of the projects described in Subchapter 2.4 include aircraft operations. Therefore, there would be no cumulative impacts to cultural resources.

4.2.6.5 Mitigation

There would be no significant impacts. No mitigation is recommended.

4.3 Unavoidable Adverse Impacts

4.3.1 Air Quality

The emission of air pollutants associated with C-17 training operations in the vicinity of the Grant County Airport is an unavoidable condition, but is not considered significant and a Clean Air Act General Conformity Determination would not be required. Since the Proposed Action is located in an area that is in attainment for all criteria pollutants and the increase in criteria pollutant emissions is less than 10 percent of baseline AQCR emissions, the Proposed Action at the Grant County Airport has been demonstrated by USEPA standards not to cause or contribute to new violations of any national ambient air quality standard in the affected area. Although air pollutant emissions associated with the Proposed Action would be unavoidable, this impact would not be considered significant.

4.3.2 Noise

Noise resulting from C-17 aircrew training activities in the vicinity of the Grant County Airport is an unavoidable condition. It is possible that some sleep disturbance and speech interference may occur for the Proposed Action and would be considered an unavoidable. However, accomplishing operations over unpopulated areas to the maximum extent practicable would minimize the potential for adverse impacts. Neither noise induced hearing damage nor nonauditory health effects would occur. Disruptions to speech would last only as long as noise from the overflying aircraft remains at 66 dB or greater. To minimize the potential for noise impacts, tactical maneuvers such as high altitude/high airspeed and low altitude/high airspeed arrivals, as well as other C-17 operations at the airport, would be initiated and flown over unpopulated areas. No structural damage would occur from aircraft noise at or around the airfield.

4.3.3 Energy Resources

The energy impacts associated with continued operation of the Grant County Airport involve the use of aviation fuel and electricity, neither of which are in short supply. The use of fossil fuels, a nonrenewable natural resource, by the Proposed Action would be considered an unavoidable adverse impact. Energy supplies, although relatively small, would be committed to the Proposed Action. The use of nonrenewable resources is unavoidable, although not considered significant.

4.4 Relationship Between Short-Term Uses and Enhancement of Long-Term Productivity

The Proposed Action would not result in intensification of land use in the area surrounding the Grant County Airport. Implementation of the Proposed Action would not result in any loss of open space as a result of C-17 aircrew training activities. Long-term productivity of the site would not change as a result of the Proposed Action.

4.5 Irreversible and Irretrievable Commitment of Resources

The irreversible environmental changes that would result from implementation of the Proposed Action involve consumption of energy resources and human resources.

4.5.1 Energy Resources

Use of jet fuel and electricity associated with the Proposed Action represent an irreversible commitment of natural resources. Energy resources such as petroleum-based products and electricity used for the Proposed Action would be irretrievably lost. To conserve energy, advance planning and maximization of training schedules will continue to be implemented for C-17 aircrew training. Consumption of these energy resources would not place a significant demand on their supply systems or within the region.

4.5.2 Human Resources

The use of human resources for C-17 aircrew training is considered an irretrievable loss only in that it would preclude the personnel from engaging in other work activities. However, the use of human resources for the Proposed Action contributes to C-17 aircrew proficiency, and is considered beneficial.

CHAPTER 5
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CHAPTER 6
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The following persons and agencies were consulted during preparation of this EA:

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APPENDIX A

INTERAGENCY AND INTERGOVERNMENTAL CORRESPONDENCE FOR ENVIRONMENTAL PLANNING

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INTERAGENCY AND INTERGOVERNMENTAL COORDINATION FOR ENVIRONMENTAL PLANNING

Air Force Instruction (AFI) 32-7060, *Interagency and Intergovernmental Coordination for Environmental Planning*, provides the procedures to comply with applicable federal, state, and local directives for Interagency and Intergovernmental Coordination for Environmental Planning (IICEP). The AFI implements the following:

- Air Force Planning Document 32-70, *Environmental Quality*;
- Department of Defense (DoD) Directive 4165.61, Intergovernmental coordination of DoD Federal Development Programs and Activities;
- Executive Order 12372, Intergovernmental Review of Federal Programs;
- Title IV of the Intergovernmental Coordination Act (ICA) of 1968; and,
- Section 204 of the Demonstration Cities and Metropolitan Development Act of 1966.

Section 401(b) of the ICA states that, "All viewpoints-national, regional, state, and local…will be fully considered…when planning Federal or federally assisted development programs and projects."

To comply with the IICEP, the Air Force, on behalf of Joint Base Lewis-McChord, notified 12 agencies in Washington of the intent to prepare an EA for its proposed change in C-17 flight training operations at the Grant County Airport. The agencies that were provided this IICEP notification letter are listed in Table A-1. The letter to the agencies is included in this appendix.

Table A-1. IICEP Notification List

Mr. Doug Switzer FAA Western Service Center 1601 Lind Avenue SW Renton, WA 98055	Mr. Lawrence Beck, ATC Manager Federal Aviation Administration Northwest Mountain Region 1601 Lind Avenue Southwest Renton, WA 98057	Executive Manager Port of Moses Lake 7810 Andrews St., N.E., Suite 200 Moses Lake, WA 98837
Damien Hooper, Planning Manager Grant County Community Development Planning Division 457 1st Ave. NW Ephrata, WA 98823	Gilbert Alvarado, Planning Director The City of Moses Lake Community Development 401 So. Balsam Moses Lake, WA 98837	Washington Department of Natural Resources P.O. Box 190 Colville, WA 99114
County Commissioners Grant County Courthouse 35 C St. NW Ephrata, WA 98823	State of Washington Environmental Review Washington Department of Ecology P.O. Box 47600 Olympia, WA 98504	Washington State Department of Ecology Eastern Regional Office – Air Quality N. 4601 Monroe St., Suite 100 Spokane, WA 99205-1295
Mr. Craig Baldwin, Airport Manager Grant County International Airport 7810 Andrews St. N.E. Suite 200 Moses Lake, WA 98837	U.S. Fish and Wildlife Service Region 1 Attention: Ecological Services 911 NE 11th Avenue Portland, OR 97232	Air Force Western Regional Environmental Office Attn: Gary Munsterman AFCEE/RO-W 50 Fremont Street, Suite 2450 San Francisco, CA 94105

Three responses to the IICEP notification letter were received, and are included in this appendix.

In addition to the IICEP letter, the Air Force, on behalf of Joint Base Lewis-McChord, sent a letter requesting a species list from the USFWS (Region 1). This letter is included in this appendix.

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR MOBILITY COMMAND

APR 2 2 2011

MEMORANDUM FOR DISTRIBUTION LIST

FROM: HQ AMC/A7P
507 Symington Drive
Scott AFB IL 62225-5022

SUBJECT: Proposed Action and Alternatives (DOPAA) for Proposed Changes in C-17 Flight Training Operations at Grant County International Airport, Moses Lake, Wash.

Please see the attached DOPAA for your review and comment. US Air Force is preparing an Environmental Assessment (EA) for proposed changes to C-17 flight training operations at Grant County International Airport. Aircrews from USAF 62nd Airlift Wing, based at Joint Base Lewis-McChord (JBLM), as well as C-17 aircrews from other units, currently conduct aircraft operations at this airport. Proposed action is to provide C-17 aircrews the opportunity to accomplish high altitude/high airspeed or low altitude/high airspeed arrival and departure training. Proposed action would be accomplished in the maneuver areas currently used for C-17 training at the airport. Figure 2-2 of the attached DOPAA depicts that location of C-17 maneuver areas in the area around Grant County International Airport.

In accordance with Executive Order 12372, *Intergovernmental Review of Federal Programs*, we request your participation and solicit comments on the attached DOPAA for this EA. Comments may include any issues related to this EA. Please provide any comments no later than 30 days from the date of this letter directly to Ms. Jean Reynolds, HQ AMC/A7PI, 507 Symington Drive, Scott AFB, Illinois 62225-5022.

Additionally, we solicit your assistance to identify any resources within your agency's purview that may be impacted. We also request point-of-contact information, relevant documentation available that would assist in preparing the EA, or identification of any other major projects you are aware of that may contribute to cumulative effects and would facilitate cumulative impact analysis for this EA. The environmental analysis will focus on potential impacts to airspace operations (to include aircraft safety and bird/wildlife aircraft strike hazard), noise, land use, air quality, biological resources, cultural resources, environmental justice, and the protection of children. If members of your staff have any questions on this EA, our point of contact (POC) is Ms. Jean Reynolds, (618) 229-0843. The local JBLM POC is Mr. John Ryan (253) 982-4057.

LANCE C. HAFELI, Colonel, USAF
Chief, Programs Division
Directorate of Installations & Mission Support

Attachments:
1. DOPAA
2. Distribution List

Distribution List

Mr. Doug Switzer FAA Western Service Center 1601 Lind Avenue SW Renton, WA 98057-4056	Mr. Lawrence Beck, ATC Manager Federal Aviation Administration Northwest Mountain Region 1601 Lind Avenue SW Renton, WA 98057-4056
U.S. Fish and Wildlife Service Region 1 Attention: Ecological Services 911 NE 11th Avenue Portland, OR 97232	Mr. Craig Baldwin, Airport Manager Grant County International Airport 7810 Andrews St. N.E. Suite 200 Moses Lake, WA 98837
Air Force Western Regional Environmental Office Attn: Gary Munsterman AFCEE/RO-W 50 Fremont Street, Suite 2450 San Francisco, CA 94105	Washington Department of Natural Resources P.O. Box 190 Colville, WA 99114
Damien Hooper, Planning Manager Grant County Community Development Planning Division 457 1st Ave. NW Ephrata, WA 98823	Gilbert Alvarado, Planning Director The City of Moses Lake Community Development 401 So. Balsam Moses Lake, WA 98837
County Commissioners Grant County Courthouse 35 C St. NW Ephrata, WA 98823	State of Washington Environmental Review Washington Department of Ecology P.O. Box 47600 Olympia, WA 98504
Washington State Department of Ecology Eastern Regional Office – Air Quality N. 4601 Monroe St., Suite 100 Spokane, WA 99205-1295	Executive Manager Port of Moses Lake 7810 Andrews St. N.E., Suite 200 Moses Lake, WA 98837

PORT OF MOSES LAKE
GRANT COUNTY INTERNATIONAL AIRPORT
Foreign Trade Zone #203

7810 Andrews St. N.E., Suite 200
Moses Lake, WA, USA 98837-3204

PHONE 509-762-5363
FAX 509-762-2713
E-MAIL info@portofmoseslake.com
WEB SITE www.portofmoseslake.com

May 4, 2011

Ms. Jean Reynolds
HQ SMC/A7PI
507 Symington Drive
Scott AFB, Illinois 62225-5022

Dear Ms. Reynolds:

The Port of Moses Lake has reviewed the Environmental Assessment (EA) for proposed changes to C-17 flight training operation at the Grant County International Airport. In reviewing the EA, we believe, to the best of our knowledge the proposed changes will not have any potential impacts to airspace operations at our facility.

Please feel free to contact my office should you have any questions or concerns.

Sincerely,

Craig L. Baldwin
Executive Manager

dfj

PARSONS
100 West Walnut Street, Pasadena, California ● 91124 ● (800) 883-7600 ● Fax: (626) 440-6200 ● www.parsons.com

10 June 2011

U.S. Fish and Wildlife Service, Region 1
Attention: Ecological Services
911 NE 11th Avenue
Portland, OR 97232

SUBJECT: **Environmental Assessment for Proposed Change in C-17 Flight Training Operations at Grant County International Airport, Moses Lake, Washington by Joint Base Lewis-McChord; Request for Species List**

In accordance with National Environmental Policy Act (NEPA) requirements, the U.S. Air Force (with the assistance of Parsons) is preparing an Environmental Assessment (EA) for the proposed change in C-17 flight training operations at the Grant County International Airport at Moses Lake, Washington. Aircrews from the U.S. Air Force's 62nd Airlift Wing, based at Joint Base Lewis-McChord (JBLM) and under the command of the Headquarters Air Mobility Command (AMC), as well as C-17 aircrews from other units such as the 446th Airlift Wing (Air Force Reserve Command), currently conduct aircraft operations at this airport. The attached figure depicts the location of C-17 maneuver areas in the area around the Grant County International Airport.

The purpose of the Proposed Action is to provide C-17 aircrews the opportunity to accomplish high altitude/high airspeed or low altitude/high airspeed arrival and departure training. Although 62nd AW and 446 AW C-17 aircrews currently accomplish low altitude tactical arrival and departure training at the Grant County International Airport, the aircrews do not have an airfield where they can practice high altitude/high airspeed or low altitude/high airspeed tactical arrivals and departures. Current restrictions prohibit airspeeds in excess of 250 knots indicated airspeed (KIAS) below 10,000 feet above mean sea level (MSL). The Air Force Flight Standards Agency (AFFSA) recently approved a waiver to allow AMC owned aircraft flown by AMC pilots to exceed 250 KIAS when below 10,000 feet MSL in visual meteorological conditions on a "one day a week" basis to conduct tactical training. This waiver would allow C-17 aircrews to accomplish low altitude/high airspeed C-17 tactical arrival and departure training at the Grant County International Airport. Operations on the proposed high altitude/high speed and low altitude/high speed tactical arrivals and departures would occur no lower than 1,000 feet above ground level. The proposed action would be accomplished in the maneuver areas currently used for C-17 training at the airport. The environmental analysis will focus on potential impacts to: airspace operations (to include aircraft safety and bird/wildlife aircraft strike hazard); noise; land use; air quality; biological resources; cultural resources; and, environmental justice and the protection of children.

To assist in preparation of the EA, we request that you advise us of any potential impacts from the proposed action to any threatened or endangered species known to exist in the proposed action area, or in the area surrounding the action site. Your response by 12 July 2011 will ensure that the EA remains on schedule. Please forward the species list to Rosemarie Crisologo, Parsons, 100 West Walnut Street, Suite B4, Pasadena, CA 91124 or via email at rosemarie.crisologo@parsons.com. For questions, you may contact me at (626) 440-6048 or Ms. Jean Reynolds, HQ AMC/A7PI, 507 Symington Drive, Scott AFB, Illinois 62225-5022, who can be reached at (618) 229-084. Thank you for your assistance in this matter.

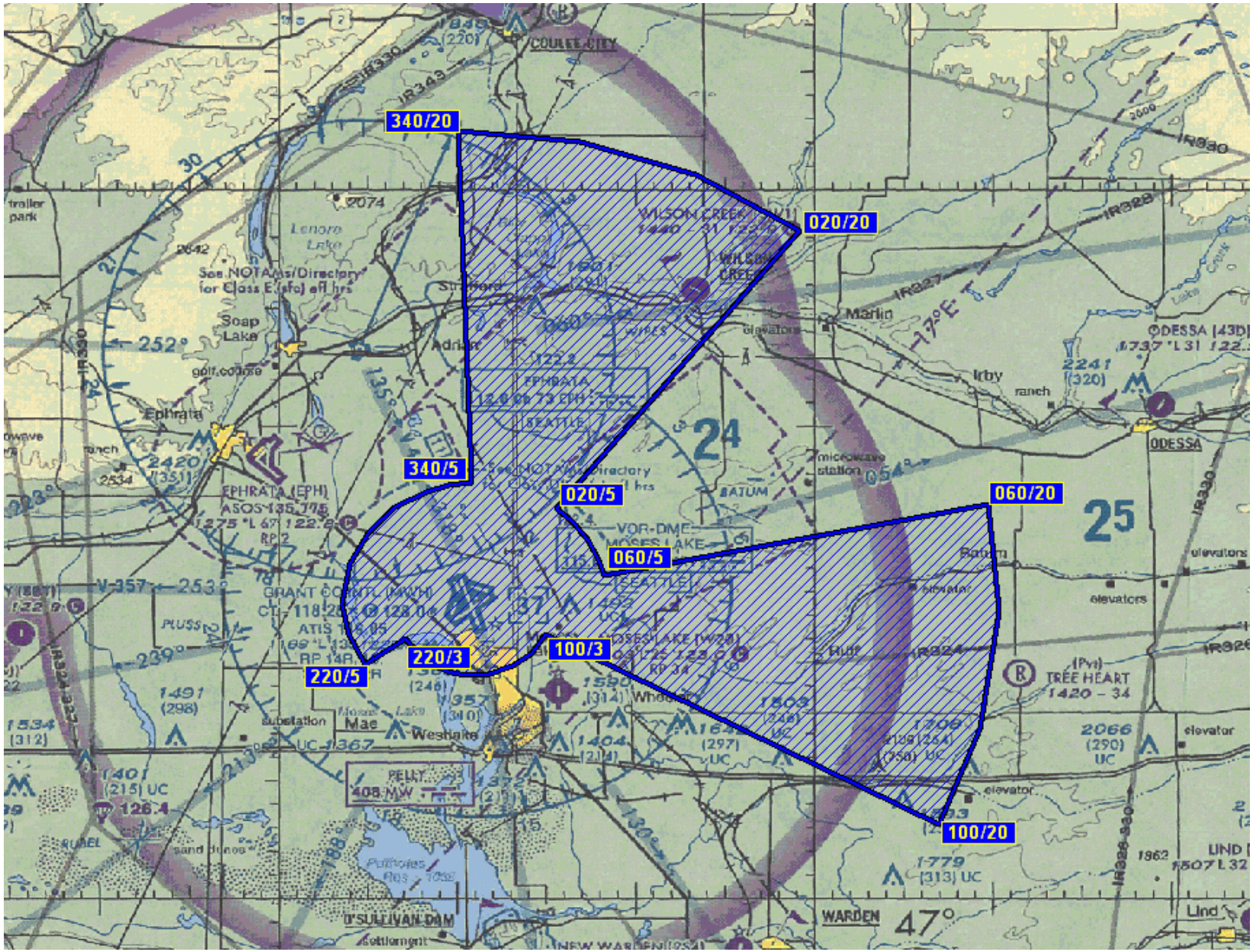
Sincerely,

PARSONS

Rosemarie Crisologo

Rosemarie Crisologo

Attachments: Project Location Diagram



Maneuver Area for C-17 Training Events at the Grant County International Airport

1

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APPENDIX B

NATIVE AMERICAN COORDINATION

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR MOBILITY COMMAND

MAY 9 2011

HQ AMC/A7P
507 Symington Drive
Scott AFB IL 62225-5022

The Honorable Michael Finley, Chair
Colville Business Council
Confederated Tribes of the Colville Reservation
1 Colville Street
Nespelem WA 99155

Dear Chairman Finley

Please see the attached Description of Proposed Action and Alternatives (DOPAA) for your review and comment. U.S. Air Force is preparing an Environmental Assessment for proposed changes to C-17 flight operations at Grant County International Airport. Per NEPA requirements a letter was sent to the local government agencies; however due to your status as a sovereign nation, the US Air Force is sending this letter requesting tribal input.

Aircrews from the U.S. Air Force's 62nd Airlift Wing, based at Joint Base Lewis-McChord, as well as other C-17 aircrews from other units, currently conduct aircraft operations at the Grant County Airport. The purpose of the Proposed Action is to provide C-17 aircrews the opportunity to accomplish high altitude/high airspeed or low altitude/high airspeed arrival and departure training. Proposed high altitude/high speed and low altitude/high speed tactical arrivals and departures would occur no lower than 1,000 feet above ground level, and would be accomplished in the maneuver areas currently used for C-17 training at the airport. Figure 2.2 of the attached DOPAA depicts the location of the C-17 maneuver areas in the area around Grant County Airport. There will be no change to the runways; no construction activities will occur. This action is solely a change in how maneuvers are conducted at the Grant County International Airport.

To ensure any areas of sacred or spiritual significance to Native American groups are considered, we would appreciate your help in identifying any interests or concerns regarding traditional resources or properties within the lands in the flight corridor. If you have concerns with the proposed change of maneuvers and use of the Grant County Airport, you can address any comments or questions to Ms. Jean Reynolds, HQ AMC/A7PI, 507 Symington Drive, Scott AFB IL 62225-5022, at (618) 229-0843. If you have any concerns regarding sensitive cultural issues or concerns, please contact Ms. Donna Turnipseed at (253) 477-3891; via E-mail at

donna.l.turnipseed@us.army.mil; or at Department of the Army, Public Works, Box 339500 MS 17, Joint Base Lewis-McChord, 98433-9500. Please provide any comments or information within 30 days from the date of the letter. Thank you for your interest in the project.

BRIAN C. MURPHY, Colonel, USAF
Deputy Chief, Programs Division
Directorate of Installations & Mission Support

Attachment:
DOPAA

cc:
Mr. Guy Moura, Acting Tribal Historic Preservation Officer
Ms. Donna Turnipseed
Mr. Bill Van Hoesen

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR MOBILITY COMMAND

MAY 9 2011

HQ AMC/A7P
507 Symington Drive
Scott AFB IL 62225-5022

The Honorable McCoy Oatman, Chairman
Nez Perce Executive Committee
100 Agency Road
Lapwai ID 83540

Dear Chairman Oatman

Please see the attached Description of Proposed Action and Alternatives (DOPAA) for your review and comment. U.S. Air Force is preparing an Environmental Assessment for proposed changes to C-17 flight operations at Grant County International Airport. Per NEPA requirements a letter was sent to the local government agencies; however due to your status as a sovereign nation, the US Air Force is sending this letter requesting tribal input.

Aircrews from the U.S. Air Force's 62nd Airlift Wing, based at Joint Base Lewis-McChord, as well as other C-17 aircrews from other units, currently conduct aircraft operations at the Grant County Airport. The purpose of the Proposed Action is to provide C-17 aircrews the opportunity to accomplish high altitude/high airspeed or low altitude/high airspeed arrival and departure training. Proposed high altitude/high speed and low altitude/high speed tactical arrivals and departures would occur no lower than 1,000 feet above ground level, and would be accomplished in the maneuver areas currently used for C-17 training at the airport. Figure 2.2 of the attached DOPAA depicts the location of the C-17 maneuver areas in the area around Grant County Airport. There will be no change to the runways;no construction activities will occur. This action is solely a change in how maneuvers are conducted at the Grant County International Airport.

To ensure any areas of sacred or spiritual significance to Native American groups are considered, we would appreciate your help in identifying any interests or concerns regarding traditional resources or properties within the lands in the flight corridor. If you have concerns with the proposed change of maneuvers and use of the Grant County Airport, you can address any comments or questions to Ms. Jean Reynolds, HQ AMC/A7PI, 507 Symington Drive, Scott AFB IL 62225-5022, at (618) 229-0843. If you have any concerns regarding sensitive cultural issues or concerns, please contact Ms. Donna Turnipseed at (253) 477-3891; via E-mail at

donna.l.turnipseed@us.army.mil; or at Department of the Army, Public Works, Box 339500 MS 17, Joint Base Lewis-McChord, 98433-9500. Please provide any comments or information within 30 days from the date of the letter. Thank you for your interest in the project.

BRIAN C. MURPHY, Colonel, USAF
Deputy Chief, Programs Division
Directorate of Installations & Mission Support

Attachment:
DOPAA

cc:
Ms. Vera Sonneck, Cultural Resource Program Manager
Ms. Donna Turnipseed
Mr. Bill Van Hoesen

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR MOBILITY COMMAND

MAY 9 2011

HQ AMC/A7P
507 Symington Drive
Scott AFB IL 62225-5022

The Honorable Greg Abrahamson
Chairman Spokane Tribal Business Council
6195 Ford Wellpinit Road
Wellpinit WA 99040

Dear Chairman Abrahamson

Please see the attached Description of Proposed Action and Alternatives (DOPAA) for your review and comment. U.S. Air Force is preparing an Environmental Assessment for proposed changes to C-17 flight operations at Grant County International Airport. Per NEPA requirements a letter was sent to the local government agencies; however due to your status as a sovereign nation, the US Air Force is sending this letter requesting tribal input.

Aircrews from the U.S. Air Force's 62nd Airlift Wing, based at Joint Base Lewis-McChord, as well as other C-17 aircrews from other units, currently conduct aircraft operations at the Grant County Airport. The purpose of the Proposed Action is to provide C-17 aircrews the opportunity to accomplish high altitude/high airspeed or low altitude/high airspeed arrival and departure training. Proposed high altitude/high speed and low altitude/high speed tactical arrivals and departures would occur no lower than 1,000 feet above ground level, and would be accomplished in the maneuver areas currently used for C-17 training at the airport. Figure 2.2 of the attached DOPAA depicts the location of the C-17 maneuver areas in the area around Grant County Airport. There will be no change to the runways; no construction activities will occur. This action is solely a change in how maneuvers are conducted at the Grant County International Airport.

To ensure any areas of sacred or spiritual significance to Native American groups are considered, we would appreciate your help in identifying any interests or concerns regarding traditional resources or properties within the lands in the flight corridor. If you have concerns with the proposed change of maneuvers and use of the Grant County Airport, you can address any comments or questions to Ms. Jean Reynolds, HQ AMC/A7PI, 507 Symington Drive, Scott AFB IL 62225-5022, at (618) 229-0843. If you have any concerns regarding sensitive cultural issues or concerns, please contact Ms. Donna Turnipseed at (253) 477-3891; via E-mail at

donna.l.turnipseed@us.army.mil; or at Department of the Army, Public Works, Box 339500 MS 17, Joint Base Lewis-McChord, 98433-9500. Please provide any comments or information within 30 days from the date of the letter. Thank you for your interest in the project.

BRIAN C. MURPHY, Colonel, USAF
Deputy Chief, Programs Division
Directorate of Installations & Mission Support

Attachment:
DOPAA

cc:
Mr. John Matt, Director of the Cultural Department
Ms. Donna Turnipseed
Mr. Bill Van Hoesen

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR MOBILITY COMMAND

MAY 9 2011

HQ AMC/A7P
507 Symington Drive
Scott AFB IL 62225-5022

The Honorable Leo Stewart, Acting Chair, Board of Trustees
Confederated Tribes of the Umatilla Indian Reservation
Nixyaawii Governance Center
46411 Timine Way
Pendleton OR 97801

Dear Chairman Stewart

Please see the attached Description of Proposed Action and Alternatives (DOPAA) for your review and comment. U.S. Air Force is preparing an Environmental Assessment for proposed changes to C-17 flight operations at Grant County International Airport. Per NEPA requirements a letter was sent to the local government agencies; however due to your status as a sovereign nation, the US Air Force is sending this letter requesting tribal input.

Aircrews from the U.S. Air Force's 62nd Airlift Wing, based at Joint Base Lewis-McChord, as well as other C-17 aircrews from other units, currently conduct aircraft operations at the Grant County Airport. The purpose of the Proposed Action is to provide C-17 aircrews the opportunity to accomplish high altitude/high airspeed or low altitude/high airspeed arrival and departure training. Proposed high altitude/high speed and low altitude/high speed tactical arrivals and departures would occur no lower than 1,000 feet above ground level, and would be accomplished in the maneuver areas currently used for C-17 training at the airport. Figure 2.2 of the attached DOPAA depicts the location of the C-17 maneuver areas in the area around Grant County Airport. There will be no change to the runways; no construction activities will occur. This action is solely a change in how maneuvers are conducted at the Grant County International Airport.

To ensure any areas of sacred or spiritual significance to Native American groups are considered, we would appreciate your help in identifying any interests or concerns regarding traditional resources or properties within the lands in the flight corridor. If you have concerns with the proposed change of maneuvers and use of the Grant County Airport, you can address any comments or questions to Ms. Jean Reynolds, HQ AMC/A7PI, 507 Symington Drive, Scott AFB IL 62225-5022, at (618) 229-0843. If you have any concerns regarding sensitive cultural issues or concerns, please contact Ms. Donna Turnipseed at (253) 477-3891; via E-mail at

donna.l.turnipseed@us.army.mil; or at Department of the Army, Public Works, Box 339500 MS 17, Joint Base Lewis-McChord, 98433-9500. Please provide any comments or information within 30 days from the date of the letter. Thank you for your interest in the project.

BRIAN C. MURPHY, Colonel, USAF
Deputy Chief, Programs Division
Directorate of Installations & Mission Support

Attachment:
DOPAA

cc:
Ms. Catharine Dickson, Cultural Resources Protection Program
Ms. Donna Turnipseed
Mr. Bill Van Hoesen

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR MOBILITY COMMAND

MAY 9 2011

HQ AMC/A7P
507 Symington Drive
Scott AFB IL 62225-5022

Mr. Rex Buck
Wanapum Interface Office
15655 Wanapum Village Lane
Beverly WA 99321

Dear Mr. Buck

Please see the attached Description of Proposed Action and Alternatives (DOPAA) for your review and comment. U.S. Air Force is preparing an Environmental Assessment for proposed changes to C-17 flight operations at Grant County International Airport. Per NEPA requirements a letter was sent to the local government agencies, however due to your status as a sovereign nation, the US Air Force is sending this letter requesting tribal input.

Aircrews from the U.S. Air Force's 62nd Airlift Wing, based at Joint Base Lewis-McChord, as well as other C-17 aircrews from other units currently conduct aircraft operations at the Grant County Airport. The purpose of the Proposed Action is to provide C-17 aircrews the opportunity to accomplish high altitude/high airspeed or low altitude/high airspeed arrival and departure training. Proposed high altitude/high speed and low altitude/high speed tactical arrivals and departures would occur no lower than 1,000 feet above ground level, and would be accomplished in the maneuver areas currently used for C-17 training at the airport. Figure 2.2 of the attached DOPAA depicts the location of the C-17 maneuver areas in the area around Grant County Airport. There will be no change to the runways; no construction activities will occur. This action is solely a change in how maneuvers are conducted at the Grant County International Airport.

To ensure any areas of sacred or spiritual significance to Native American groups are considered, we would appreciate your help in identifying any interests or concerns regarding traditional resources or properties within the lands in the flight corridor. If you have concerns with the proposed change of maneuvers and use of the Grant County Airport, you can address any comments or questions to Ms. Jean Reynolds, HQ AMC/A7PI, 507 Symington Drive, Scott AFB IL 62225-5022, at (618) 229-0843. If you have any concerns regarding sensitive cultural issues or concerns, please contact Ms. Donna Turnipseed at (253) 477-3891; via E-mail at

donna.l.turnipseed@us.army.mil; or at Department of the Army, Public Works, Box 339500 MS 17, Joint Base Lewis-McChord, 98433-9500. Please provide any comments or information within 30 days from the date of the letter. Thank you for your interest in the project.

BRIAN C. MURPHY, Colonel, USAF
Deputy Chief, Programs Division
Directorate of Installations & Mission Support

Attachment:
DOPAA

cc:
Ms. Donna Turnipseed
Mr. Bill Van Hoesen

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR MOBILITY COMMAND

MAY 9 2011

HQ AMC/A7P
507 Symington Drive
Scott AFB IL 62225-5022

The Honorable Harry Smiskin, Chairman
Confederated Tribes and Bands of the Yakama Nation
401 Fort Road
Toppenish WA 98948

Dear Chairman Smiskin

Please see the attached Description of Proposed Action and Alternatives (DOPAA) for your review and comment. U.S. Air Force is preparing an Environmental Assessment for proposed changes to C-17 flight operations at Grant County International Airport. Per NEPA requirements a letter was sent to the local government agencies; however due to your status as a sovereign nation, the US Air Force is sending this letter requesting tribal input.

Aircrews from the U.S. Air Force's 62nd Airlift Wing, based at Joint Base Lewis-McChord, as well as other C-17 aircrews from other units, currently conduct aircraft operations at the Grant County Airport. The purpose of the Proposed Action is to provide C-17 aircrews the opportunity to accomplish high altitude/high airspeed or low altitude/high airspeed arrival and departure training. Proposed high altitude/high speed and low altitude/high speed tactical arrivals and departures would occur no lower than 1,000 feet above ground level, and would be accomplished in the maneuver areas currently used for C-17 training at the airport. Figure 2.2 of the attached DOPAA depicts the location of the C-17 maneuver areas in the area around Grant County Airport. There will be no change to the runways; no construction activities will occur. This action is solely a change in how maneuvers are conducted at the Grant County International Airport.

To ensure any areas of sacred or spiritual significance to Native American groups are considered, we would appreciate your help in identifying any interests or concerns regarding traditional resources or properties within the lands in the flight corridor. If you have concerns with the proposed change of maneuvers and use of the Grant County Airport, you can address any comments or questions to Ms. Jean Reynolds, HQ AMC/A7PI, 507 Symington Drive, Scott AFB IL 62225-5022, at (618) 229-0843. If you have any concerns regarding sensitive cultural issues or concerns, please contact Ms. Donna Turnipseed at (253) 477-3891; via E-mail at

donna.l.turnipseed@us.army.mil; or at Department of the Army, Public Works, Box 339500 MS 17, Joint Base Lewis-McChord, 98433-9500. Please provide any comments or information within 30 days from the date of the letter. Thank you for your interest in the project.

BRIAN C. MURPHY, Colonel, USAF
Deputy Chief, Programs Division
Directorate of Installations & Mission Support

Attachment:
DOPAA

cc:
Mr. Johnson Meninick, Program Manager, Cultural Resources
Ms. Donna Turnipseed
Mr. Bill Van Hoesen

Confederated Tribes and Bands of the Yakama Nation
Established by the Treaty of June 9, 1855

Post Office Box 151
Toppenish Washington 98948

Jean Reynolds
HQ AMC/A7PI
507 Symington Drive
Scott AFB, IL 62225-5022

May 20, 2011

RE: C-17 flight operations at Grant County International Airport

Dear Ms. Reynolds,

Thank you for contacting Yakama Nation regarding the proposed C-17 flight operations at Grant County International Airport. The proposed operations are located within the Ceded Lands of the Yakama Nation, the legal rights to which were established by the Treaty of 1855, between the Yakama Nation and the United States Government. The Treaty set forth that the Yakama Nation shall retain rights to resources upon these lands and, therefore, it is with the assistance and backing of the United States Federal Government that Yakama Nation claims authority to protect traditional resources.

Between the months of March and August, members of the Yakama Nation gather traditional foods, medicines, and wild game in the vicinity of the proposed operations. We are concerned that the low altitude/high speed operations will adversely affect members of the Yakama Nation who are currently gathering traditional resources, especially those who are elderly, those that may have medical conditions, or those who have young children with them. We ask that this be taken into consideration during scheduling of such operations.

If you have any questions, please feel free to contact me at 509-865-5121 x4737.

Sincerely,

Johnson Meninick for Casey Barney
Yakama Nation Cultural Resources Program Manager

-----Original Message-----

From: Turnipseed, Donna L CIV USA [mailto:donna.l.turnipseed@us.army.mil]

Sent: Wednesday, June 15, 2011 12:42 PM

To:

Subject: RE: C17 flight operations--Grant County Airport (UNCLASSIFIED)

Classification: UNCLASSIFIED

Caveats: NONE

The Yakama have no concerns with the change if airport use by C17 flights.
There is no need for adjustments to the Proposed High Speed Training action.

Sincerely,

Donna Turnipseed, Cultural Resource Manager JBLM

-----Original Message-----

From: Turnipseed, Donna L CIV USA [mailto:donna.l.turnipseed@us.army.mil]

Sent: Tuesday, June 14, 2011 2:40 PM

To:

Subject: C17 flight operations--Grant County Airport (UNCLASSIFIED)

All,

I talked with Mr. Johnson Meninick and he has no concerns with the change in flight operations at the Grant County International Airport. His concerns lie with other projects. I wanted to let everyone involved understand his concerns.

Sincerely,

Donna Turnipseed, Cultural Resource Manager, JBLM

Classification: UNCLASSIFIED

Caveats: NONE

APPENDIX C

PUBLIC INVOLVEMENT

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PUBLIC INVOLVEMENT

The *Air Force Environmental Impact Analysis Process* (32 CFR 989), 15 Jul 99, and amended 28 Mar 01, states that the environmental assessment and Finding of No Significant Impact should be made available to agencies under the IICEP (see Appendix A) and the public for comment.

C.1 Responses to IICEP Notification

Prior to release of this Draft EA, the Air Force provided advance notification of the Proposed Action to 12 agencies (see IICEP letter dated 22 April 2011 in Appendix A). Three of the 12 agencies (Port of Moses Lake, FAA Western Service Center, and Air Force Western Regional Environmental Office) provided responses to the 22 April 2011 IICEP letter (see Appendix A). Comments and issues raised in these letters were considered and addressed within the Draft EA (August 2011).

C.2 Notice of Availability of the Draft EA

A notice announcing the availability of this Draft EA and its 30-day public comment period was published in the Columbia Basin Herald newspaper on August 24, 25 and 29, 2011 (Exhibits C-1 through C-4). Copies of the Draft EA were made available for public review at the Moses Lake Public Library, 418 5th Street, Moses Lake, WA 98837.

The Draft EA was mailed to the following 17 agencies:

Mr. Doug Switzer FAA Western Service Center 1601 Lind Avenue SW Renton, WA 98055	Mr. Lawrence Beck, ATC Manager Federal Aviation Administration Northwest Mountain Region 1601 Lind Avenue Southwest Renton, WA 98057	Mr. Craig Baldwin, Airport Manager Grant County International Airport 7810 Andrews St. N.E. Suite 200 Moses Lake, WA 98837
Damien Hooper, Planning Manager Grant County Community Development Planning Division 457 1st Ave. NW Ephrata, WA 98823	Gilbert Alvarado, Planning Director The City of Moses Lake Community Development 401 So. Balsam Moses Lake, WA 98837	Washington Department of Natural Resources P.O. Box 47000 1111 Washington Street SE Olympia, WA 98504-7000
U.S. Fish and Wildlife Service, Region 1 Attention: Ecological Services 911 NE 11th Avenue Portland, OR 97232	Jessica Gonzales, Asst. Project Leader U.S. Fish and Wildlife Service, Region 1 Wenatchee Ecological Svcs Field Office 215 Melody Lane Wenatchee, WA 99801-8121	Air Force Western Regional Environmental Office Attn: Gary Munsterman, AFCEE/RO-W 50 Fremont Street, Suite 2450 San Francisco, CA 94105
County Commissioners Grant County Courthouse 35 C St. NW Ephrata, WA 98823	State of Washington Environmental Review Washington Department of Ecology P.O. Box 47600 Olympia, WA 98504	Washington State Department of Ecology Eastern Regional Office – Air Quality N. 4601 Monroe St., Suite 100 Spokane, WA 99205-1295
Johnson Meninick Cultural Resources Program Manager Confederated Tribes and Bands of the Yakama Nation P.O. Box 151 Toppenish, WA 98948	Washington State Historic Preservation Officer Department of Archaeology & Historic Preservation 1063 South Capitol Way, Suite 106 Olympia, WA 98501	Washington Department of Fish and Wildlife Natural Resources Building 1111 Washington St. SE Olympia, WA 98501
Executive Manager Port of Moses Lake 7810 Andrews St., N.E., Suite 200 Moses Lake, WA 98837	Washington Department of Fish and Wildlife North Central Region 2 1550 Alder St. NW Ephrata, WA 98823-9699	

C.3 Comments Received on the Draft EA

One comment letter from the Federal Aviation Administration (FAA) – Office of the Air Traffic Organization, Western Service Area was received on the Draft EA (see Exhibit C-5). Comments and issues raised in this

letter have been considered and addressed within this EA. A summary of responses to FAA comments is provided on Table C-1.

Table C-1. Responses to Comments Received on the Draft EA

Summary of Comment	Response
U.S. Department of Transportation – Federal Aviation Administration (September 26, 2011)	
Level of significance for noise impacts. Include a description of data source and variables used to develop the noise contours for the No Action and proposed changes.	The FAA significance criterion has been added to Subchapter 4.1.2. As stated in Subchapter 4.2.2.2, one additional exposed residence would experience an increase of DNL 0.5 dBA, an increase that is below the FAA significance criterion of DNL 1.5 dB. The data sources and variables used to develop the noise contours are described in Subchapter 4.2.2.2 and Appendix D (Subchapter D4.2).
Figure 4-2 indicates the altitude profile of a high speed, 20.2 mile approach to Grant County Airport at 1,000 ft AGL compared to the existing lower speed approach at 4,500 ft AGL. Provide clarification and/or noise impact analysis for this change in altitude and speeds for these tracks.	The high speed arrivals are flown only to the assault strip and arrive from the east and north. For this reason, the analysis, when comparing the Proposed Action and the No Action Alternative, focuses on areas to the north and east of the assault strip. The DNL contour extends not quite 2 miles east of the boundary and remains on the airport property to the north of the assault strip. Assuming that this comment pertains to single event noise (rather than averaged DNL noise), the analysis in Subchapter 4.2.2.1 has been expanded to specifically compare the noise differences between the two arrival profiles by using the data in Table 4-1, which was expanded to reflect noise levels for an aircraft at 1,000 ft directly overhead. The data in the table relate to the profiles presented in Figure 4-2.

AFFIDAVIT OF PUBLICATION

(STATE OF WASHINGTON: COUNTY OF GRANT)

I, Connie Cummins , do solemnly swear that I am the Principle Agent of the Columbia Basin Herald, a newspaper established and regularly published five days a week in the English language, in and of general circulation continuously for more than six (6) months prior to the 31st day of March, 1944; that said newspaper is printed in an office maintained at its place of publication in the City of Moses Lake, Washington ; that said newspaper was approved and designated as a legal newspaper by order of the Superior Court of the State of Washington for Grant County on the 31st day of March, 1944; and that said order has not been revoked and is in full force and effect.

This is to certify that AIR MOBILITY COMMAND Advertising was inserted into our Newspaper in the manner described and on the dates provided as follows. And said Newspaper was regularly available to the public during all of said periods, that the full amount of the fee charged for the foregoing publication is the sum corresponding to the statement of advertisement.

August 25, 26th and 29th , 2011 2 X 5 ½ $ 506.22

Connie Cummins

Connie Cummins

Subscribed and sworn to before me this 29th Day of August 2011

DENISE LEMBCKE
COMMISSION EXP.
NOTARY
PUBLIC
DEC. 15, 2013
STATE OF WASHINGTON

Denise Lembcke

Notary Public in and for the State of Washington
Residing at Moses Lake, Washington

Exhibit C-1. Affidavit of Publication for the Draft EA Notice of Availability

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Local news

for a jury to believe him beyond a reasonable doubt," Prosecutor Angus Lee stated.

Hancock faces between a year and a month to a year and five months in prison. Prosecutors plan to recommend a residential-based drug offender sentencing alternative. The sentence would mean Hancock will not go to prison. Instead, she will enroll in a drug treatment program and spend time in

store, according to a Moses Lake police report.

The victim fell asleep, waking up in the morning to find Hancock hadn't returned. He sent the woman a text message.

Feeling something was wrong, the victim walked to a nearby grocery store and sent Hancock another text message. She replied she would return in a few minutes, according to the police

came out of the bathroom carrying a gun.

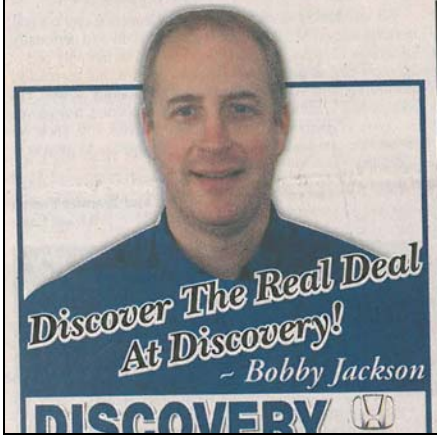
Brown reportedly held the gun to the victim's head, ordering him to empty his pockets, taking $140 in cash and the victim's car keys and cellphone, according to the police report. Brown reportedly told the victim they were going to his residence so the victim could transfer the car's title to them.

Brown allegedly handed

her best interest to tell them where the victim was. He reportedly said the victim had stolen items from a woman living with Brown, according to the police report.

Krebs pleaded guilty to robbery in the second degree and was sentenced to a year and a month in prison.

Brown still faces charges of robbery in the first degree and unlawful possession of a firearm in the first degree.



NOTICE OF AVAILABILITY
DRAFT ENVIRONMENTAL ASSESSMENT AND DRAFT FINDING OF NO SIGNIFICANT IMPACT FOR THE PROPOSED CHANGE IN C-17 FLIGHT TRAINING OPERATIONS AT THE GRANT COUNTY INTERNATIONAL AIRPORT BY JOINT BASE LEWIS-McCHORD

The 62nd Airlift Wing is proposing to change its C-17 aircraft training operations carried out by aircrews stationed at Joint Base Lewis-McChord. These and other C-17 aircrews currently conduct tactical training at the Grant County International Airport in Moses Lake. The purpose of the Proposed Action is to enable C-17 crews to maintain a forward airspeed greater than 250 knots indicated airspeed (KIAS) when entering or departing the Grant County International Airport. Current restrictions pr[illegible] speeds in excess of 250 KIAS while below 10,000 ft above mean s[illegible]el (MSL). The Air Mobility Command (AMC) recently obtained a wa[illegible] from the Air Force Flight Standards Agency to allow AMC aircraft to [illegible]erate between 250 and 330 KIAS below 10,000 ft MSL one day a week [illegible]onduct tactical training. The proposed change in flying maneu[illegible]s, at an [illegible]creased speed, would occur with a floor of 1,000 ft abo[illegible]ground level. The Proposed Action would result in an increase in airspeed while continuing to operate in maneuver areas surrounding the airport currently used for C-17 training.

As part of the Air Force Environmental Impact Analysis Process, the Air Force has prepared a Draft Environmental Assessment (DEA) for this action. Resources evaluated in the impact analysis are: airspace operations (aircraft safety and bird/wildlife aircraft strike hazard); noise; land use; air quality; biological resources; and, cultural resources. The DEA is available at the Moses Lake Public Library located at 418 5th Street, Moses Lake, WA 98837. Should you have any comments on the Draft EA, written comments may be mailed to:

Department of the Air Force
Attn: Ms. Jean Reynolds
HQ AMC/A7PI
507 Symington Drive
Scott AFB, IL 62225-5022

All written comment letters must be postmarked by September 26, 2011. Comments may be emailed to jean.reynolds@us.af.mil and must be received by close of business on September 26, 2011. Should you have any questions, please contact Ms. Reynolds at (618) 229-0843.

18674445

Exhibit C-2. Draft EA Notice of Availability Published on August 25, 2011

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Columbia Basin Herald, Friday, August 26, 2011 A3
THE GREAT LIND COULEE

Local news

amended the rules pertaining to privately owned fire hydrants, clarifying annual testing and maintenance requirements and defining ownership.

As with city-owned hydrants, all hydrants located on private businesses' or school districts' property must be painted red and are subject to periodic testing and inspection per state law.

While the Moses Lake Fire Department oversees approximately 2,000 hydrants throughout the city, Moses Lake Fire Chief Tom Taylor said he wanted to make sure the owners of about 290 pri-

Ryan Lancaster/Columbia Basin Herald

The Moses Lake City Council recently clarified rules regarding the testing and maintenance of fire hydrants located on private property.

vate hydrants understand they are responsible for upkeep.

"There have been questions as to who maintains them and we just wanted to get that clear," Taylor said. "They can do it themselves and we've been in contact with all those owners. We'll show them the proper way to do it in conjunction with the water department so they're not stirring up sediment and damaging water mains, things like that."

The fire department will provide training and instructions we've given them to make sure they operate properly in the event we need to use them."

"Who checks up on the checkers?" asked Councilman Dick Deane.

Taylor replied private hydrant owners must fill out a form and complete a maintenance checklist to be submitted to the fire department by July 1 each year. Hydrants in need of repair shall have the necessary repairs performed within thirty days of the time the deficiency is discovered.

"If they fail to fix it there will be a follow-up and that is referred on to code enforcement," Taylor said.

NOTICE OF AVAILABILITY
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As part of the Air Force Environmental Impact Analysis Process, the Air Force has prepared a Draft Environmental Assessment (DEA) for this action. Resources evaluated in the impact analysis are: airspace operations (aircraft safety and bird/wildlife aircraft strike hazard); noise; land use; air quality; biological resources; and, cultural resources. The DEA is available at the Moses Lake Public Library located at 418 5th Street, Moses Lake, WA 98837. Should you have any comments on the Draft EA, written comments may be mailed to:

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18674445

Exhibit C-3. Draft EA Notice of Availability Published on August 26, 2011

A10 Columbia Basin Herald, Monday, August 29, 2011
www.columbiabasinherald.com

Records

13:16 - Malicious mischief was reported.
14:47 - Graffiti was reported.
15:20 - A residence was burglarized.
15:21 - Threats were reported.
16:07 - A brush fire was reported.
17:00 - A dog bite was reported.
17:04 - Harassment was reported.
17:31 - Trespassing was reported.
17:43 - Trespassing was

NOTICE OF AVAILABILITY
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Exhibit C-4. Draft EA Notice of Availability Published on August 29, 2011

U.S. Department of Transportation
Federal Aviation Administration

Office of the Air Traffic Organization
Western Service Area

1601 Lind Avenue Southwest
Renton, Washington 98057

September 26, 2011

Ms. Jean Reynolds
HQ AMC/A7PI,
507 Symington Drive,
Scott AFB, Illinois 62225-5022

RE: Environmental Assessment Change in C-17 Flight Training Operations at Grant County International Airport

Dear Ms. Reynolds:

The Federal Aviation Administration (FAA) has reviewed the subject environmental assessment (EA) and has the following comments.

The FAA is concerned that the document states an increase of residents in the 65 dB Day/Night Average Sound Level (DNL) contour, yet the conclusion states this is not significant (Section 4.2.2.2 Averaged Noise Analysis). According to FAA Order 1050.1E Change 1, Appendix A:

> ***14.3 SIGNIFICANT IMPACT THRESHOLDS.*** *A significant noise impact would occur if analysis shows that the proposed action will cause noise sensitive areas to experience an increase in noise of DNL 1.5 dB or more at or above DNL 65 dB noise exposure when compared to the no action alternative for the same timeframe.*

Please consider addressing this discrepancy and describe possible mitigation measures to bring the noise impacts below levels of significance. This should include a clearer description of the data source and variables used to develop the noise contours (annual operations, fleet mix, day/night split, etc.) for the no action and proposed changes.

Additionally, figure 4-2 indicates the altitude profile of a high speed, 20.2 mile approach to Grant County Airport at 1000 ft. Above Ground Level (AGL) compared to the existing lower speed approach at 4500 ft. AGL. Please provide clarification and/ or noise impact analysis for this change in altitude and speeds for these tracks.

Thank you for the opportunity to comment.

Sincerely,

John Warner
Manager, Operations Support Group,
Western Service Center

Exhibit C-5. Comment Letter from FAA

APPENDIX D

AIRCRAFT OPERATIONS, AIRCRAFT SAFETY, BIRD/WILDLIFE-AIRCRAFT STRIKE HAZARD, AND NOISE

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AIRCRAFT OPERATIONS, AIRCRAFT SAFETY, BIRD/WILDLIFE-AIRCRAFT STRIKE HAZARD, AND NOISE

D1. AIRCRAFT OPERATIONS

Instrument Flight Rules (IFR) weather conditions represent weather conditions in which factors such as visibility, cloud distance, cloud ceilings, and weather phenomena cause visual conditions to drop below the minima required to operate by visual flight referencing. Visual Flight Rules (VFR) weather conditions require the pilot to remain clear of clouds by specified distances to ensure separation from other aircraft under the concept of see and avoid. IFR represents the regulations and restrictions a pilot must comply with when flying in weather conditions that restrict their ability to fly the plane only by instruments. A pilot can fly under IFR in VFR weather conditions; however, pilots cannot fly under VFR in IFR weather conditions.

FAA guidance places limitations on low-altitude flying for pilots. Air Force Instruction (AFI) 11-202, Volume 3 (*General Flight Rules*), which implements FAA guidance for Air Force operations, states aircraft cannot be flown:

- Over congested areas (*e.g.,* cities, towns, and groups of people) at an altitude of less than 1,000 feet above the highest obstacle within 2,000 feet of the aircraft; and,
- Over non-congested areas at an altitude of less than 500 feet above the surface except over open water, in SUA, or in sparsely populated areas. Under such exceptions, aircraft must not operate closer than 500 feet to any person, vehicle, vessel, or structure.

In addition to the low-altitude limitations in AFI 11-202, 62 AW guidance restricts C-17 pilots from flying below 1,500 feet AGL between 10 and 20 miles from the airport in the corridor north of the airport. Likewise, 62 AW guidance restricts C-17s from flying over the City of Moses Lake.

D2. AIRCRAFT SAFETY

D2.1 Air Force Aircraft Safety

The risk of people on the ground being killed or injured by aircraft accidents is miniscule. However, an aircraft accident is a high-consequence event and, when a crash does occur, the result is often catastrophic. Because of this, the Air Force does not attempt to base its safety standards on accident probabilities.

The Air Force defines five categories of aircraft flight mishaps: Classes A, B, C, E, and High Accident Potential. Class A mishaps result in loss of life, permanent total disability, a total cost in excess of $2 million, destruction of an aircraft, or damage to an aircraft beyond economical repair. Class B mishaps result in total costs ranging between $500,000 and $2 million or result in permanent partial disability, but do not involve fatalities. Class C mishaps result in more than $50,000 (but less than $500,000) in total costs, or a loss of worker productivity exceeding eight hours. Class E mishaps represent minor incidents not meeting the criteria for Classes A through C. High Accident Potential events are significant occurrences with a high potential for causing injury, occupational illness, or damage if they occur and do not have a reportable mishap cost. Class C and E mishaps, the most common types of accidents, represent relatively unimportant incidents because they generally involve minor damages and injuries, and rarely affect property or the public.

D2.2 Civil Aviation Aircraft Safety

Although “death” is easily understood, National Transportation Safety Board guidance provides specific definitions for the terms “serious injury” and “substantial damage.” A “serious injury” is defined by the

National Transportation Safety Board as "…any injury which: (1) requires hospitalization for more than 48 hours, commencing within seven days from the date the injury was received; (2) results in a fracture of any bone (except simple fractures of fingers, toes, or nose); (3) causes severe hemorrhages, nerve, muscle, or tendon damage; (4) involves any internal organ; or, (5) involves second- or third-degree burns, or any burns affecting more than 5 percent of the body surface."

Substantial damage means damage or failure that adversely affects the structural strength, performance, or flight characteristics of the aircraft, and which would normally require major repair or replacement of the affected component. Substantial damage does not include: engine failure or damage limited to an engine if only one engine fails or is damaged, bent fairings or cowling, dented skin, small punctured holes in the skin or fabric, ground damage to rotor or propeller blades, and damage to landing gear, wheels, tires, flaps, engine accessories, brakes, or wingtips.

An "incident" is defined as an occurrence other than an accident, associated with the operation of an aircraft, which affects or could affect the safety of operations. An incident involving a small aircraft need not be reported except when it involves: (1) flight control system malfunction or failure; (2) inability of any required flight crewmember to perform normal flight duties as a result of injury or illness; (3) failure of structural components of a turbine engine excluding compressor and turbine blades and vanes; (4) in-flight fire; or, (5) aircraft collide in flight; (6) damage to property, other than the aircraft, estimated to exceed $25,000 for repair (including materials and labor) or fair market value in the event of total loss, whichever is less.

Incidents involving large, multi-engine aircraft (more than 12,500 pounds maximum certificated takeoff weight) must be reported if they involve: (1) in-flight failure of electrical systems that requires the sustained use of an emergency bus powered by a back-up source such as a battery, auxiliary power unit, or air-driven generator to retain flight control or essential instruments; (2) in-flight failure of hydraulic systems that results in sustained reliance on the sole remaining hydraulic or mechanical system for movement of flight control surfaces; (3) sustained loss of the power or thrust produced by two or more engines; and, (4) an evacuation of an aircraft in which an emergency egress system is utilized.

D3. BIRD/WILDLIFE-AIRCRAFT STRIKE HAZARD

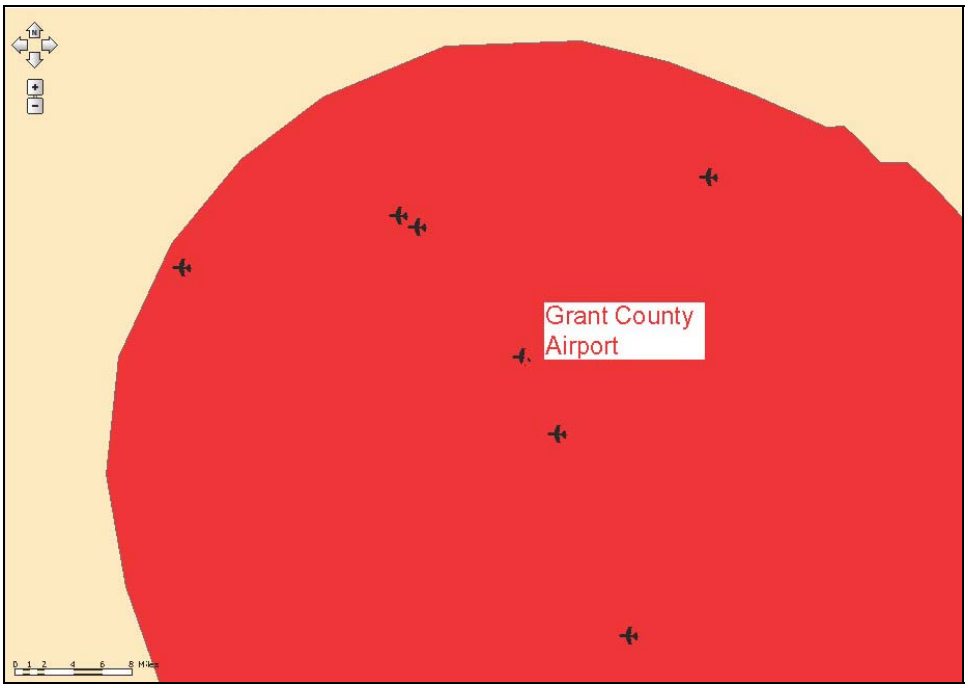
AFI 91-202 (*The U.S. Air Force Mishap Prevention Program*) requires that Air Force units supporting a flying mission have a BASH Plan. The 62 AW Plan provides guidance for reducing the incidents of bird strikes in and around areas where flying operations are being conducted, to include Grant County Airport. The Plan is reviewed annually and updated as needed. Bird/Wildlife-Aircraft Strike Hazard Plans typically contain the following guidance to reduce bird-aircraft strikes.

- In addition to other elements, the BASH Plan is designed to: (1) establish procedures to identify high hazard situations and to aid supervisors and aircrews in altering/discontinuing flying operations when required; (2) establish aircraft operating procedures to avoid high hazard situations; and (3) disseminate information to aircrews on bird hazards and procedures for bird avoidance.
- Flying unit commanders: (1) ensure guidelines are in place for declaring, disseminating, and terminating bird watch conditions; (2) makes operational changes to avoid areas and times of known hazardous bird concentrations, mission permitting; and (3) considers the use of training locations (*e.g.*, airports, military operations areas, military training routes, special use airspace, *etc*.) based on any reported bird hazard or from Bird Avoidance Model (BAM) analysis.
- Flying safety officers: (1) ensure aircrews are briefed to promptly report all bird-aircraft strikes and hazardous conditions; (2) ensure applicable bird hazard information and BAM graphs are readily available and used for briefing aircrews; (3) ensure aircrews are aware of proper flight operations during risk conditions low, moderate, and severe, and (4) brief aircrews on seasonal bird hazards.

The USAF developed the BAM using Geographic Information System (GIS) technology as a key tool for analysis and correlation of bird habitat, migration, and breeding characteristics, combined with key environmental and man-made geospatial data. The model consists of GIS raster grids which span the conterminous United States and Alaska (AHAS, 2010).

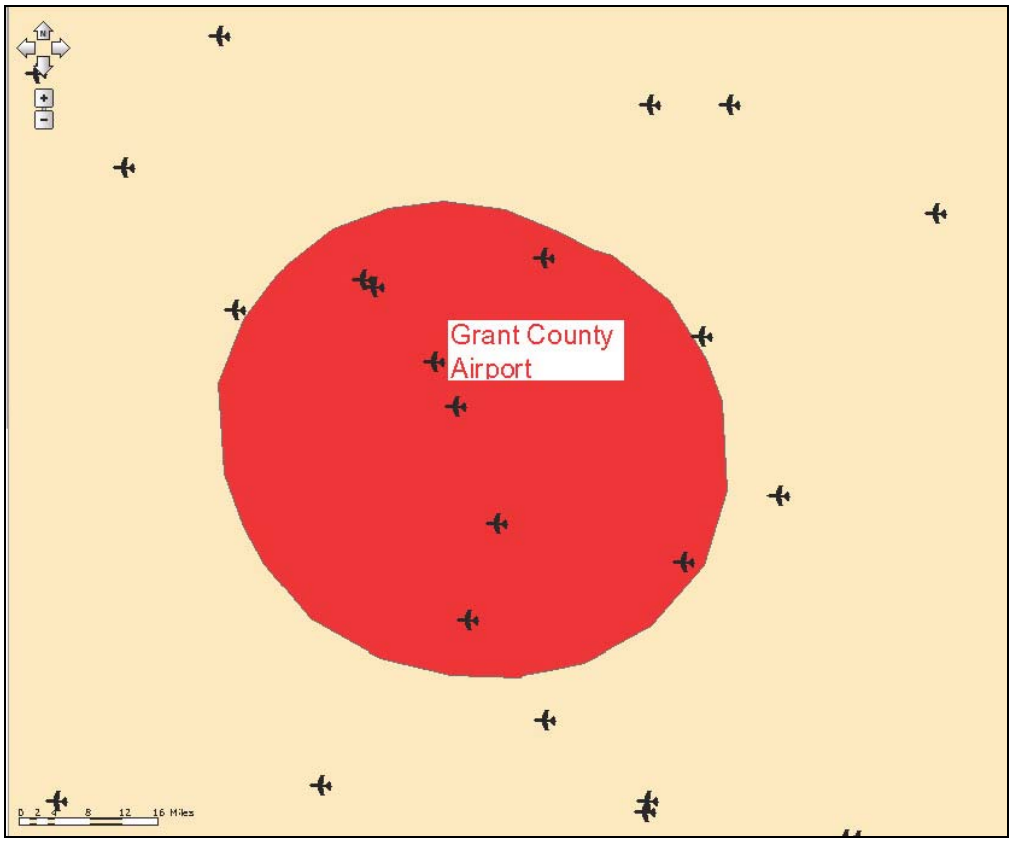
The Avian Hazard Advisory System (AHAS) was constructed with the best available geospatial bird data to reduce the risk of bird collisions with aircraft. Its use for flight planning can reduce the likelihood of a bird collision but will not eliminate the risk. The risk levels describe three predicted risk classes: Low, Moderate, and Severe. The classes are based upon the bird mass in ounces per square kilometer. In other words, the risk levels represent the amount of birds (bird mass) in a kilometer squared spatial area. The "Moderate Zone" indicates a risk ratio that is 57-708 times the risk of the "Low Zone," while the "Severe Zone" indicates a risk ratio that is 2,503-38,647 times the risk of the "Low Zone." These risk values are derived using a logarithmic scale for the risk surfaces (AHAS, 2010).

Figures D-1 through D-12 show the BAM for the Grant County Airport for the months of January through December, respectively. Green represents a low risk level bird-aircraft strikes; beige reflects a moderate risk level; and, red represents a severe risk level. As noted in the figures, the risk level for the area around the Grant County Airport is severe from November through March.



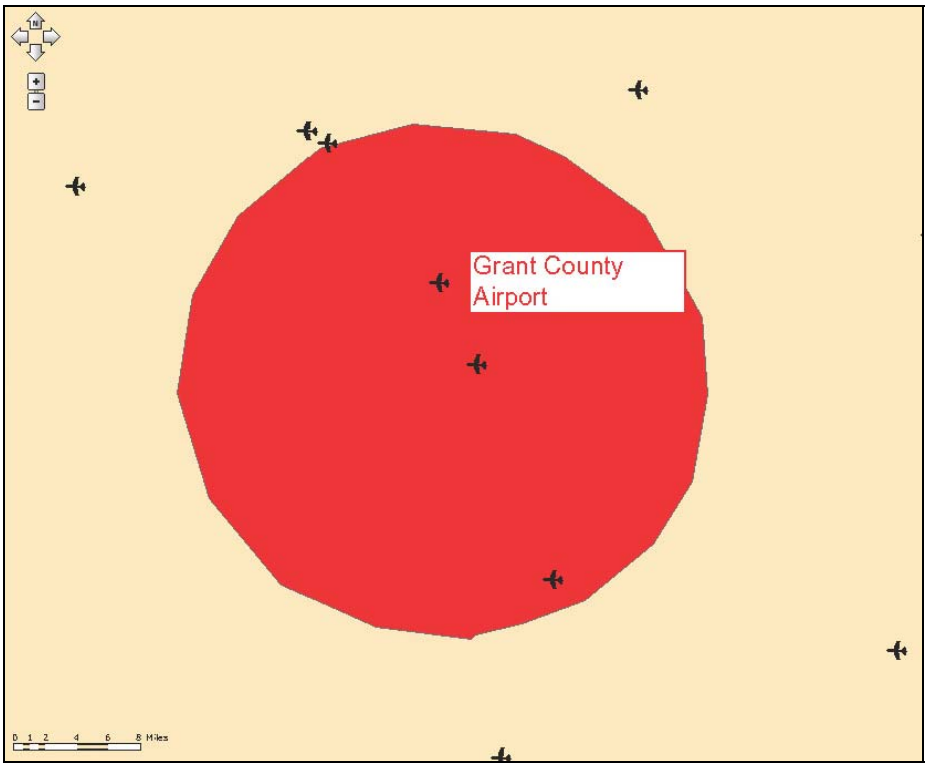
Source: AHAS, 2011

Figure D-1. January Bird Avoidance Model



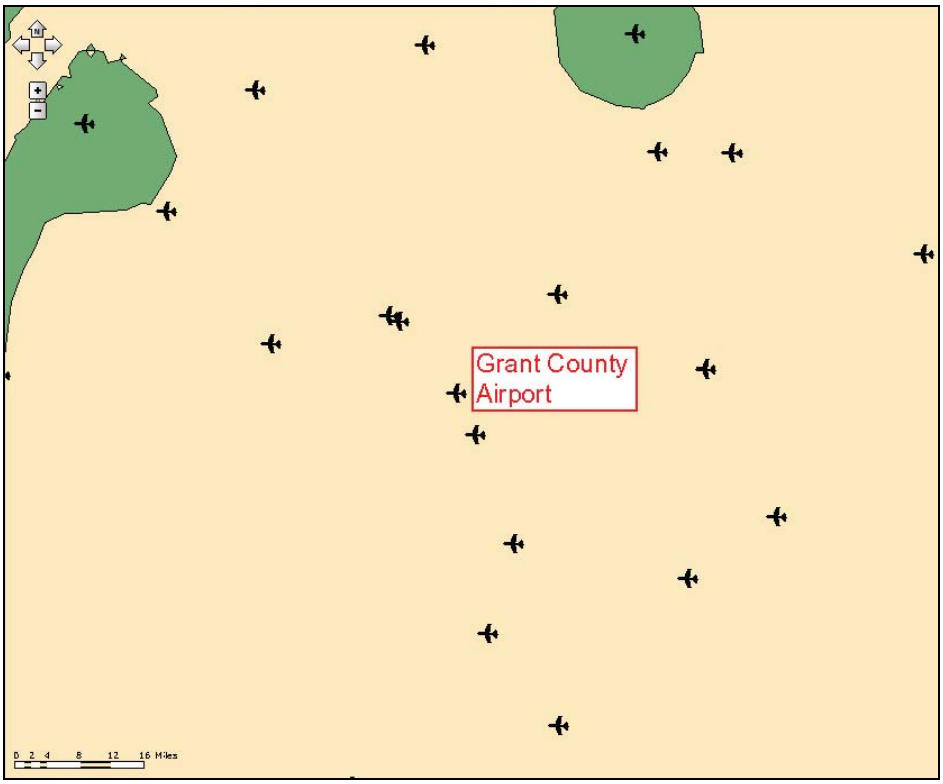
Source: AHAS, 2011

Figure D-2. February Bird Avoidance Model



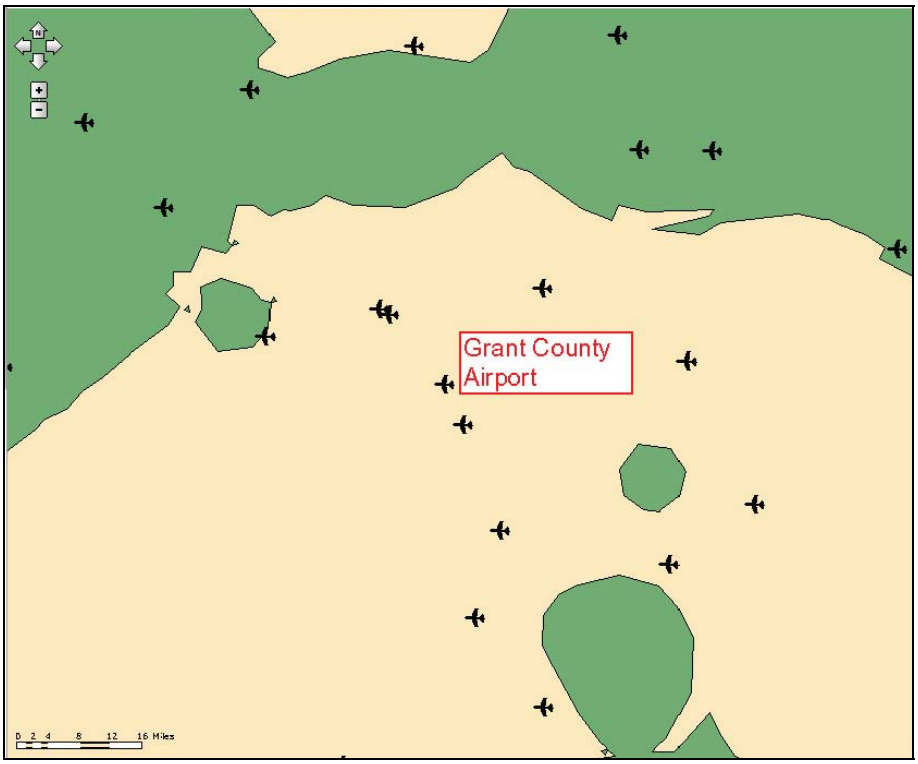
Source: AHAS, 2011

Figure D-3. March Bird Avoidance Model



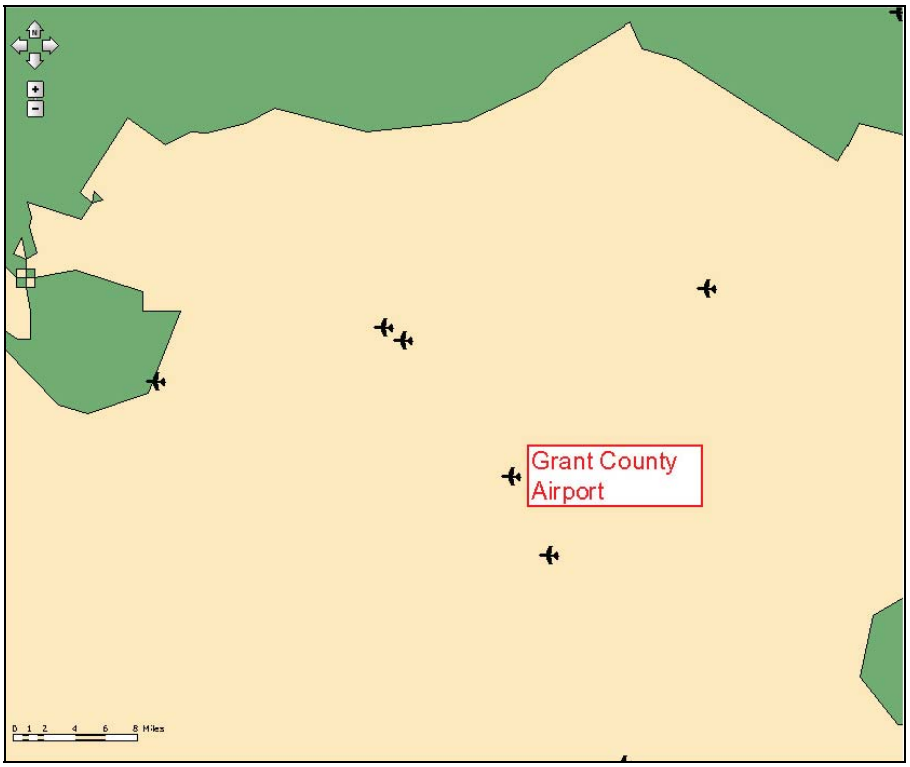
Source: AHAS, 2011

Figure D-4. April Bird Avoidance Model



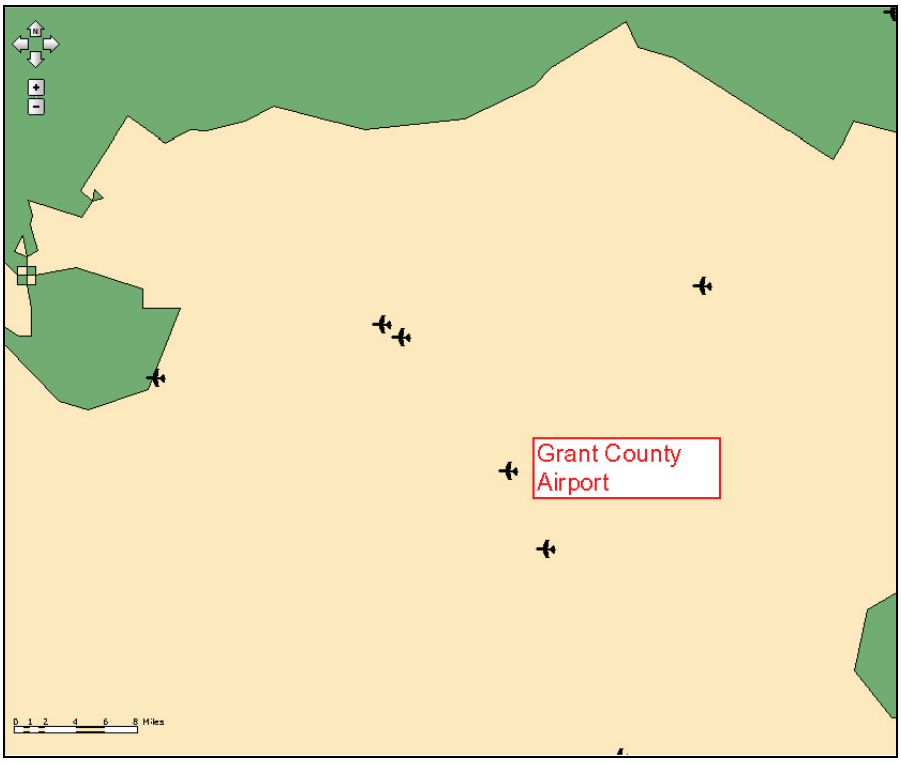
Source: AHAS, 2011

Figure D-5. May Bird Avoidance Model



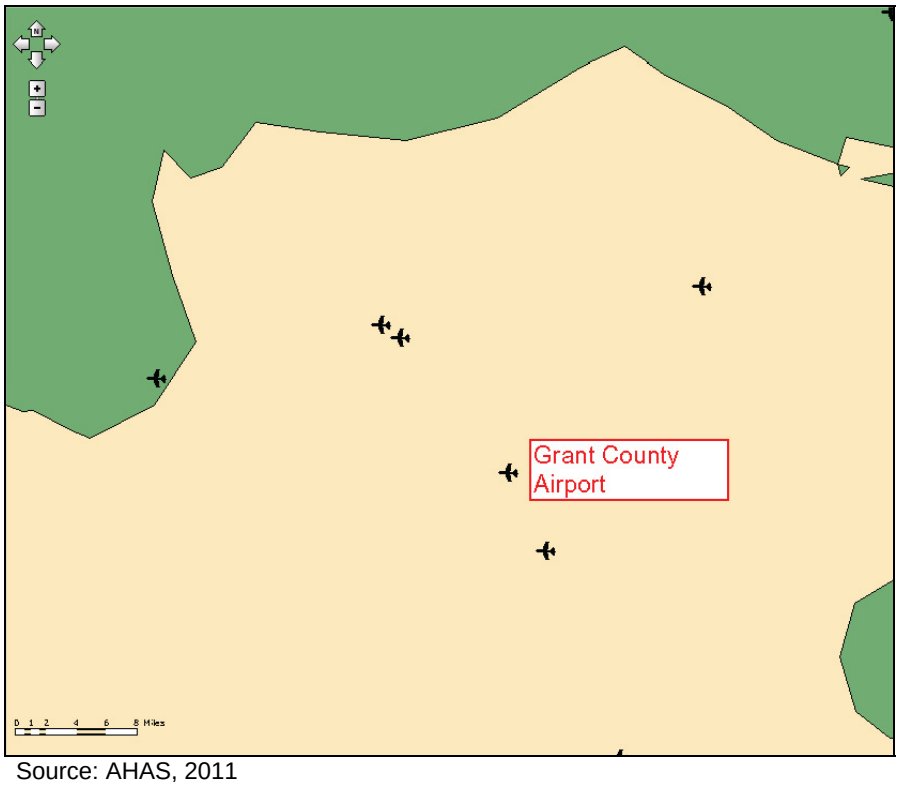
Source: AHAS, 2011

Figure D-6. June Bird Avoidance Model



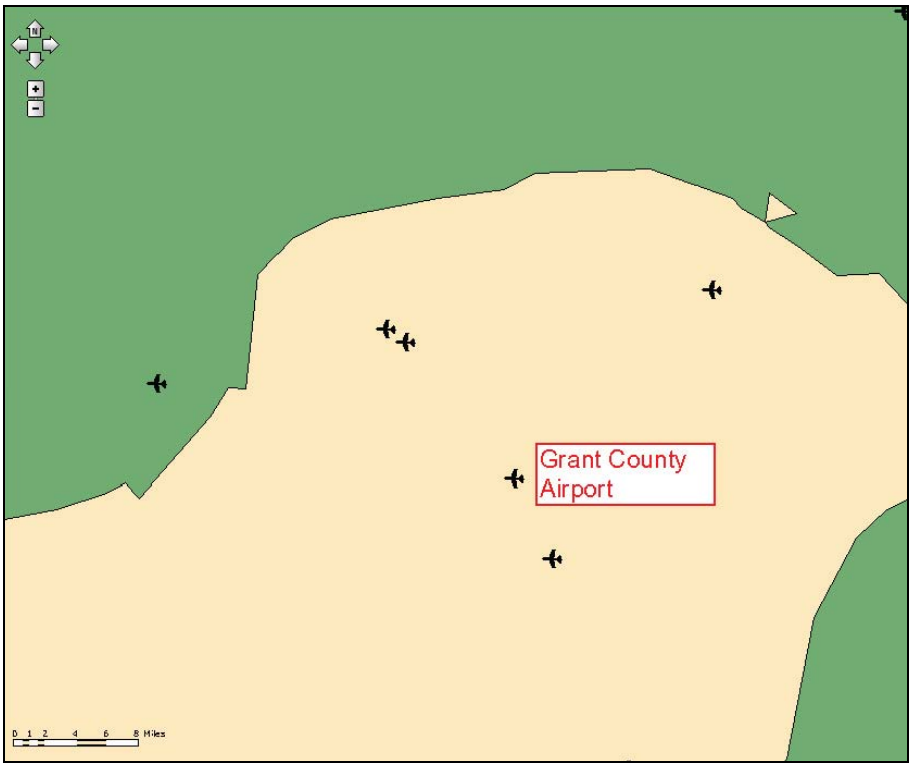
Source: AHAS, 2011

Figure D-7. July Bird Avoidance Model



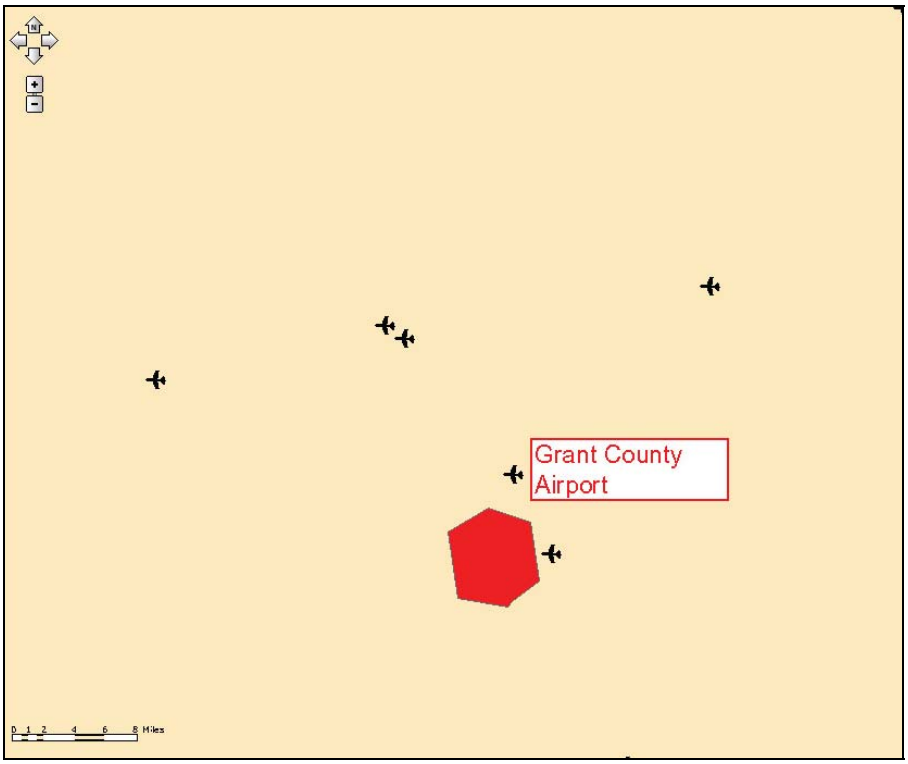
Source: AHAS, 2011

Figure D-8. August Bird Avoidance Model



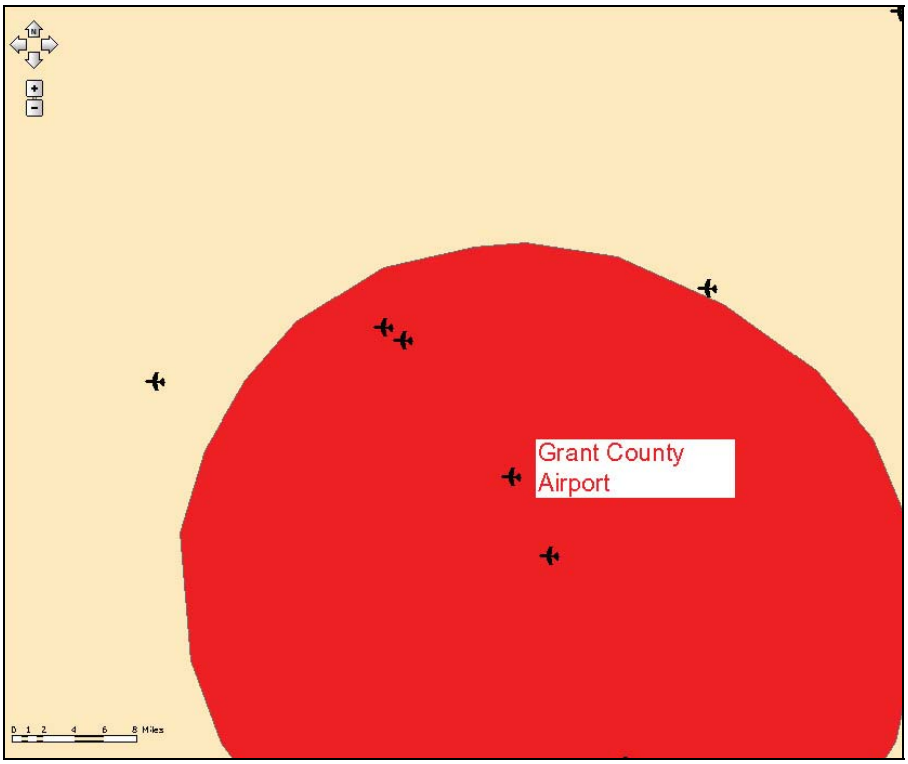
Source: AHAS, 2011

Figure D-9. September Bird Avoidance Model



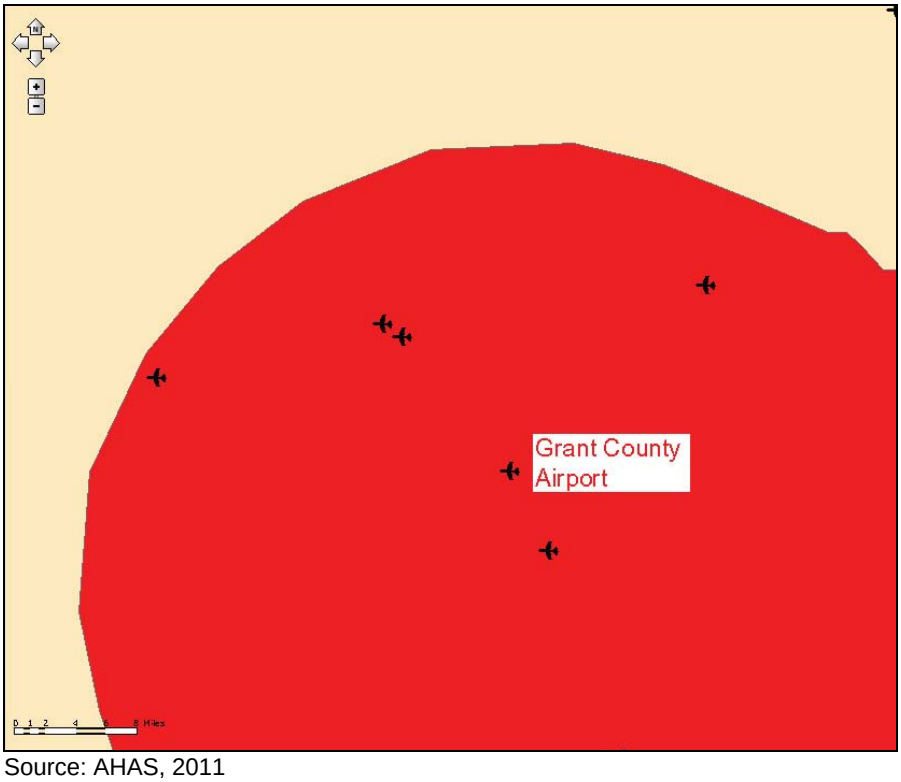
Source: AHAS, 2011

Figure D-10. October Bird Avoidance Model



Source: AHAS, 2011

Figure D-11. November Bird Avoidance Model



Source: AHAS, 2011

Figure D-12. December Bird Avoidance Model

D4. NOISE

Different sounds have different frequency contents. Because the human ear is not equally sensitive to sound at all frequencies, a frequency-dependent adjustment, called A-weighting, was developed to measure sound similar to the way the human hearing system responds. The adjustments in amplitude, established by the American National Standards Institute (ANSI, 1983), are applied to the frequency content of the sound.

Figure D-13 depicts typical A-weighted sound pressure levels (dBA) for various sources. As indicated in the figure, 65 dBA is equivalent to normal speech at a distance of three feet.

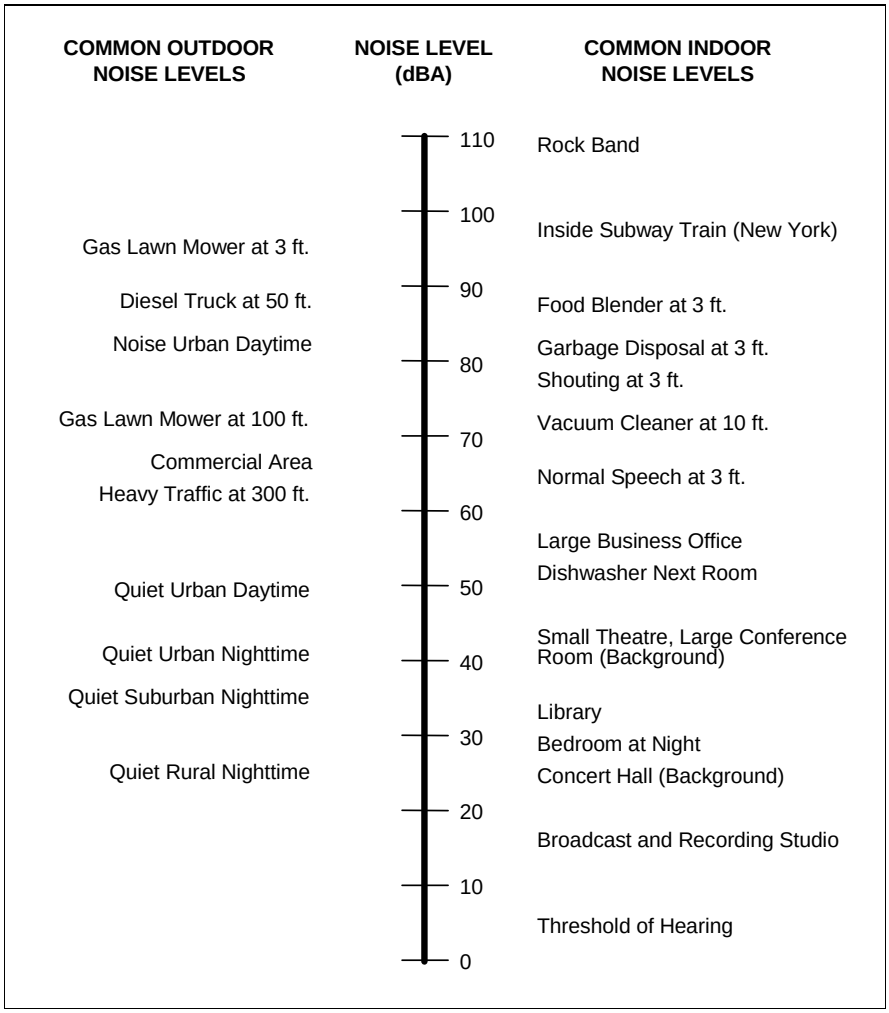


Figure D-13. Typical A-Weighted Indoor and Outdoor Noise Levels

D4.1 Noise Metrics

A variety of metrics may be used to assess the impacts of noise. Depending on the specific situation, appropriate analysis may include single event or averaged metrics. Single event metrics are used to assess the potential impacts of noise on structures and animals, and are sometimes used in the assessment of human effects. Averaged noise metrics are useful in characterizing the overall noise environment and are primarily used to analyze community (population) exposure to noise. Averaged sound exposure is expressed as the Day-Night Average Sound Level (DNL) metric. The United States Environmental Protection Agency (USEPA) selected DNL as the uniform descriptor of averaged sound exposure. Subsequently, federal agencies, including the Department of Defense (DoD), adopted DNL for expressing averaged sound.

Single Event Sound Metrics

Although the highest dBA level measured during an event (*i.e.*, maximum sound level, L_{max}) is the most easily understood descriptor for a noise event, alone it provides little information. Specifically, it provides no information concerning either the duration of the event or the amount of sound energy. Thus, sound exposure level (SEL), which is a measure of the physical energy of the noise event and accounts for both intensity and duration, is used for single event noise analysis. Additionally, numerous studies that evaluated the impacts of noise on wildlife have used SEL as the metric. Subjective tests indicate that human response to noise is a function not only of the maximum level, but also of the duration of the event and its variation with respect to time. Evidence indicates that two noise events with equal sound energy will produce the same response. For example, a noise at a constant level of 85 dBA lasting for 10 seconds would be judged to be equally as annoying as a noise event at a constant level of 82 dBA and duration of 20 seconds (*i.e.,* 3 dBA decrease equals one half the sound energy but lasting for twice the time period). This is known as the "equal energy principle."

Sound exposure levels values should not be confused with either the average noise (L_{eq}) or L_{max} associated with a specific event. SEL accounts for both the maximum sound level and the length of time a sound lasts. SEL does not directly represent the sound level heard at any given time. Rather, it provides a measure of the total sound exposure for an entire event averaged over 1 second. The L_{eq} is the constant level that has the same A-weighted sound energy as that contained in the time-varying sound. L_{max} is the highest sound level measured during a single, noise-producing event. For an observer, the noise level starts at the ambient noise level, rises up to the maximum level as the aircraft flies closest to the observer, and returns to the ambient level when the aircraft recedes into the distance. When an event lasts longer than one second, the SEL value will be higher than the L_{max} from the event. The L_{max} would typically be 5 to 10 dBA below the SEL value for aircraft overflight. Figure D-2 presents the relationship of SEL, L_{max}, and L_{eq} to the time history for a noise event from aircraft overflight.

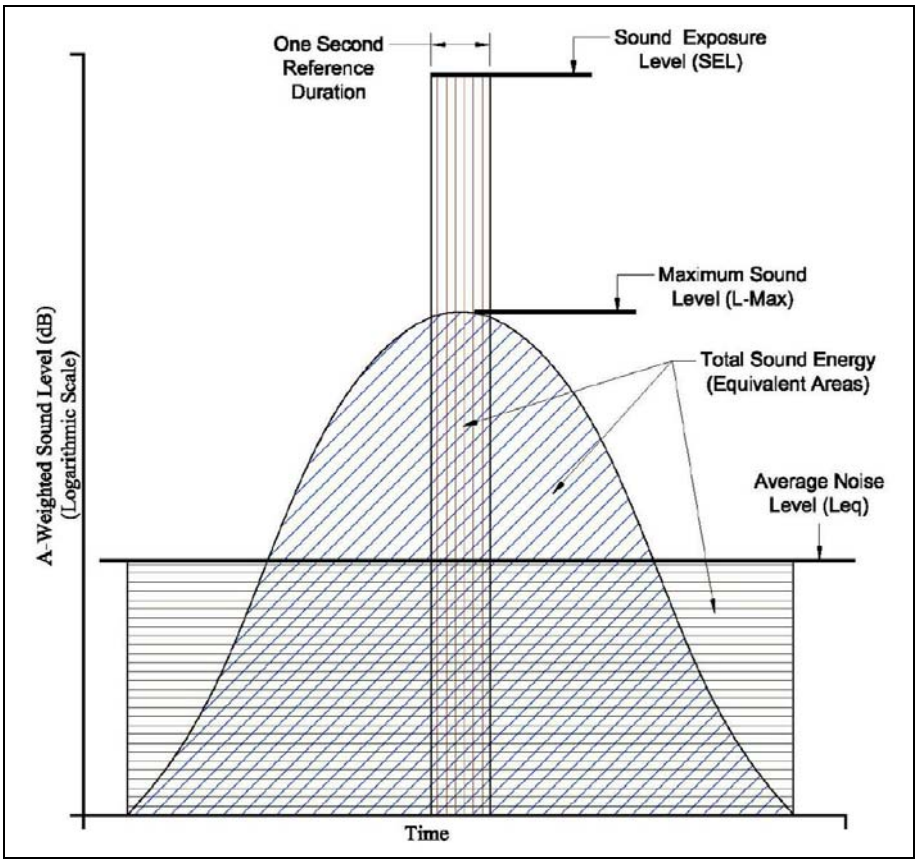


Figure D-14. Sound Exposure Level, Maximum Noise Level, and Average Noise Level Comparison to Aircraft Noise Time History

Maximum sound level (*i.e.*, L_{max}), SEL, and L_{eq} noise used in this EA were calculated by using the Flyover Noise Calculator (USAF, 2002).

Averaged Noise Metrics

Single event analysis has a major shortcoming; single event metrics do not describe the overall noise environment. DNL is the measure of the total noise environment and averages the sum of all aircraft noise producing events over a 24-hour period, with a 10-dBA upward adjustment added to the environmental nighttime events (between 10:00 p.m. and 7:00 a.m.).

Figure D-15 depicts the relationship of the single event, the number of events, the time of day, and DNL. This adjustment is an effort to account for increased human sensitivity to environmental nighttime noise events. The summing of sound during a 24-hour period does not ignore the louder single events, it actually tends to emphasize both the sound level and number of those events. The logarithmic nature of the dB unit causes sound levels of the loudest events to control the 24-hour average.

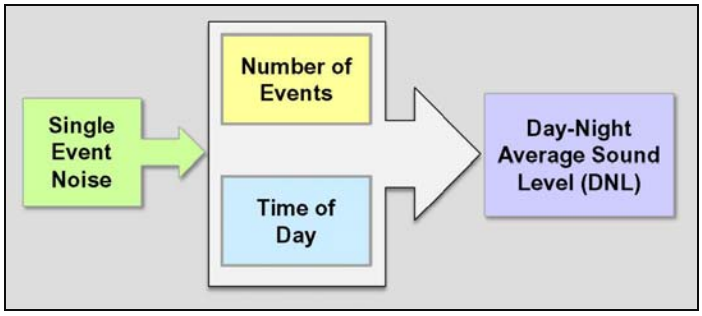


Figure D-15. Day-Night Average A-Weighted Sound Level

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

NOISEMAP noise model, version 7.352, was used to develop the noise contours and DNL values from aircraft operations for this EA.

D4.2 Noise Analysis Methods

NOISEMAP is a suite of computer programs developed by the Air Force to predict noise exposure in the vicinity of an airfield, landing zone, or drop zone due to aircraft flight, maintenance, and ground run-up operations. Data describing flight tracks and flight profile use, power settings, ground run-up information by type of aircraft/engine, and meteorological variables are assembled and processed for input into NOISEMAP. The model uses this information to calculate DNL values at points on a regularly spaced grid surrounding the airfield. A plotting program generates contour lines connecting points of equal DNL values in a manner similar to elevation contours shown on topographic maps. Contours are typically generated as five dB intervals. The contours produced by NOISEMAP are used in the averaged noise analysis sections in this EA.

While there is no technical reason why a lower level cannot be measured or calculated for comparison purposes, DNL 65 dBA:

- was adopted by the DoD, USEPA, FAA, and United States Department of Housing and Urban Development (HUD) as the threshold for comparing and assessing community noise effects; and,
- represents a noise exposure level normally dominated by aircraft noise and not other community or nearby highway noise sources.

DNL 55 dBA is established as the level "...requisite to protect the public health and welfare with an adequate margin of safety" (USEPA, 1974).

D4.3 Noise Effects

Effects of Noise on Communication

The sound level of speech outdoors decreases with increased distance between the speaker and listener. Table D-1 presents the distances between the speaker and listener for satisfactory outdoor speech intelligibility at two levels of vocal effort at steady background noise levels. The levels for normal and raised voice satisfactory conversation presented in the table permit sentence intelligibility of 95 percent at each distance. This level of intelligibility usually permits reliable communication. If the noise levels in Table 3-4 are exceeded, the speaker and listener must either move closer together or expect reduced intelligibility (USEPA, 1974). Based on the data in the table, listeners in normal communication at a distance of 10 ft in a steady background noise of L_{eq} 56 dB and who experience an increase in a background noise to L_{eq} 66 dB would have to move to about 3 ft apart to maintain the same intelligibility or raise their voices. Their speech intelligibility would decrease considerably if they remain at 10 ft of separation.

Table D-1. Steady A-Weighted Sound Levels (dBA) that Allow Communication with 95 Percent Intelligibility over Distances Outdoors for Different Voice Levels

	Distance (ft)					
	1.5	**3**	**6.5**	**10**	**13**	**16**
Normal Voice	72	66	60	56	54	52
Raised Voice	78	72	66	62	60	58

Note: Values reflect average noise levels (L_{eq}) and dBA
Source: USEPA, 1974

The discussion in the preceding paragraph relates to steady background noise conditions. Time varying environmental noise in which the magnitude varies with time (*e.g.*, aircraft overflight), but has the same L_{eq} as a steady background noise, would lead to better intelligibility than the steady background noise condition. Speech interference where the magnitude varies with time tends to decrease as the fluctuations of the noise become more extreme (USEPA, 1974). Greater difference between the sound exposure level (*i.e.*, SEL) during the event and the steady state noise of the event (*i.e.*, L_{eq}) reduces the duration of speech intelligibility during the event.

Nonauditory Health Effects

Nonauditory health effects of long-term noise exposure, where noise may act as a risk factor, were never found to occur at levels below those protective against noise-induced hearing loss. Most studies attempting to clarify such health effects found that noise exposure levels established for hearing protection would also protect against any potential nonauditory health effects, at least in workplace conditions. The best scientific summary of these findings is contained in the lead paper at the National Institute of Health Conference on Noise and Hearing Loss, held on 22-24 January 1990 in Washington, D.C.

The nonauditory effects of chronic noise exposure, when noise is suspected to act as one of the risk factors in the development of hypertension, cardiovascular disease, and other nervous disorders, have never been proven to occur as chronic manifestations at levels below these criteria (an average of 75 dBA for complete protection against hearing loss for an 8-hour day). At the 1988 International Congress on Noise as a Public Health Problem, most studies attempting to clarify such health effects did not find them at levels below the criteria protective of noise-induced hearing loss, and even above these criteria, results regarding such health effects were ambiguous. Consequently, one comes to the conclusion that establishing and enforcing exposure levels protecting against noise-induced hearing loss would not only solve the noise-induced hearing loss problem but also any potential nonauditory health effects in the work place" (Von Gierke, 1990).

Although these findings were directed specifically at noise effects in the work place, they are equally applicable to aircraft noise effects in the community environment. Research studies regarding the nonauditory health effects of aircraft noise are ambiguous, at best, and often contradictory. Yet, even those studies, which purport to find such health effects, use time-average noise levels of 75 dBA and higher for their research.

Hearing Loss

Table D-2 contains at-ear noise exposure levels that produce negligible hearing loss of no more than 5 dB for both an eight-hour and 24-hour exposure on a yearly and working day basis. The eight-hour data assume the remaining 16 hours of the day are spent in relative quiet (USEPA, 1974). According to USEPA (1974), changes in hearing levels of 5 dB are generally not considered noticeable or significant. As shown in Figure D-2, the average noise (L_{eq} in Table D-2) from a noise-producing event is less than the L_{max} or SEL from the event.

Table D-2. At-Ear Exposure Levels that Produce No More than 5 dB Noise-Induced Hearing Damage over a 40-Year Period

Exposure	Steady (continuous) Noise	Intermittent Noise	With Margin of Safety
L_{eq} 8-Hour			
250 days per year	73.0	78.0	--
365 days per year	71.4	76.4	75.0
L_{eq} 24-Hour			
250 days per year	68.0	73.0	70.0
365 days per year	66.4	71.4	--

Source: USEPA, 1974

Sleep Interference

Noise from low-flying aircraft operating at night may cause sleep disturbance. DNL incorporates consideration of sleep disturbance by assigning a 10 dBA penalty to the SELs of environmental nighttime noise events (10:00 p.m. to 7:00 a.m.). However, single noise events, not average sound levels, correlate better with sleep disturbance.

Studies have estimated the percentage of awakenings that may be experienced by people exposed to different SELs. The Federal Interagency Committee on Aviation Noise (FICAN, formed in 1993 as recommended by the Federal Interagency Committee on Noise [FICON]), based on field studies, recommends a dose-response curve for predicting sleep awakening. Figure D-16 compares the FICAN recommendation of 1997 to the 1992 FICON recommendation for predicting sleep awakening.

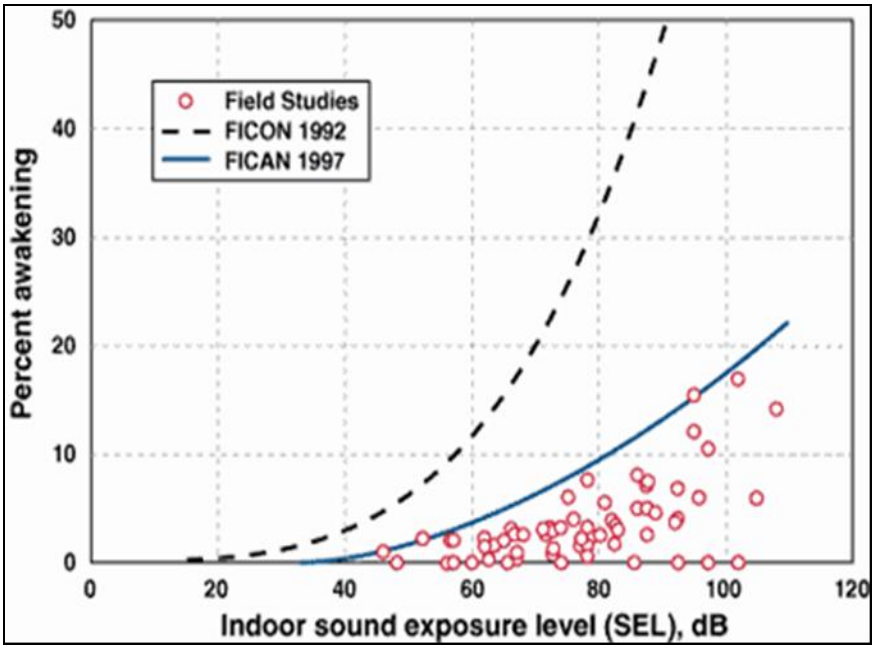


Figure D-16. Recommended Sleep Disturbance Dose Response Relationship

FICAN takes the conservative position that, because the adopted curve represents the upper limit of the data presented, it should be interpreted as predicting the maximum percentage of the exposed population expected to be awakened. Based on the updated position, it is estimated that outdoor SELs of 80 to 100 dBA could result in 4 to 10 percent awakenings in the exposed population. Noise must penetrate the residence to disturb sleep. Interior noise levels are lower than exterior levels due to the attenuation of the sound energy by the structure. The amount of attenuation provided by the building is dependent on the type of construction and whether the windows are open or closed. The approximate national average attenuation factors are 15 dBs for open windows and 25 dBs for closed windows. Twenty dBA is conservatively used to estimate attenuation for a typical dwelling unit (USEPA, 1974).

Effect of Noise on Structures

Some building materials are more sensitive than others to external pressures and induced vibrations. Windows with large panes of glass are most vulnerable, with plastered walls and ceilings being less vulnerable. Plaster walls in frame buildings are susceptible to cracking. Components that are least likely to experience damage are masonry walls of stone, concrete block, adobe, or brick. An evaluation of the peak sound pressures impinging on the structure is normally sufficient to determine the possibility of damage. Sounds lasting more than one second above a sound level of 127 dB are potentially damaging to structural components (NAS, 1977). Research has not proven categorically that old buildings are more vulnerable to vibration than newer buildings, but prudence dictates special consideration be given to unique structures of historical significance.

Noise induced structural vibration may also cause “rattle” of objects within a dwelling. Window panes may vibrate when exposed to high levels of airborne noise. In general, such noise-induced vibrations occur at sound levels of 110 dB or greater.

D5. REFERENCES CITED

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