Final Environmental Assessment
and
Finding of No Significant Impact

Deployment of Up to Four F-16C Aircraft to the 133rd Airlift Wing for Air Sovereignty Alert Operations

The 934th Airlift Wing
Minneapolis-St. Paul International Airport Air Reserve Station
Minnesota

November 2007

Report Documentation Page

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14. ABSTRACT

The 148 FW may be ordered by higher headquarters to deploy up to four F-16C aircraft to the 133 AW at MSPIA Air Reserve Station, Minnesota for Air Sovereignty Alert Operations. These deployment orders are not optional for either the 148 FW or 133 AW. The action is needed to fulfill the Air Sovereignty Alert duty and to contribute to the mission of homeland defense. The mission of homeland defense often dictates that air defense assets be repositioned as close as possible to critical assets and potential terrorist targets. When directed by higher headquarters, the aircraft would operate from the proposed alert hangar (current Air National Guard Museum; building 670) of the 133 AW, and would use existing runways at the MSPIA. The aircraft may fly routine training missions from the same location. The duration of deployments may be from several days to several months, depending on the deployment orders received. The aircraft pilots would provide 24-hour, seven-day week alert support as directed, and launch in response to higher headquarters directions. Support personnel for the temporary operation would stay in housing at the MSPIA Air Reserve Station. The proposed alert hangar has space to contain four aircraft and would only require minor interior renovations to the structure. No new infrastructure would be constructed, and the existing roadways and utility lines in the area of the proposed alert hangar would remain unchanged. The following environmental resources were identified for study in this EA: noise, land use, air quality, safety, socioeconomic resources, cultural resources, hazardous materials and waste geological resources, water resources, and biological resources. The Proposed Action would have no disproportionately high and adverse impacts on minority or low-income populations and no adverse impacts on socioeconomics, cultural resources, and geological resources. There would be minimal impacts to noise, air quality, land use, safety, hazardous materials and wastes, water resources, and biological resources. There would be positive impacts to the safety of the Minneapolis-St. Paul area related to a decrease in threat from terrorism-related activities.

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FINDING OF NO SIGNIFICANT IMPACT

FINAL ENVIRONMENTAL ASSESSMENT
DEPLOYMENT OF UP TO FOUR F-16C AIRCRAFT TO THE 133RD AIRLIFT WING FOR AIR SOVEREIGNTY ALERT OPERATIONS

MINNEAPOLIS-ST. PAUL INTERNATIONAL AIRPORT AIR RESERVE STATION

AGENCY: 934th Airlift Wing, Minneapolis-St. Paul International Airport Air Reserve Station

BACKGROUND: This Finding of No Significant Impact (FONSI) was prepared in accordance with the National Environmental Policy Act (NEPA) of 1969; Council on Environmental Quality (CEQ) regulations for implementing the procedural provisions of NEPA, 40 Code of Federal Regulations (CFR) 1500-1508; and Environmental Impact Analysis Process, 32 CFR 989. The decision in this FONSI is based upon information contained in the Environmental Assessment (EA) for the deployment of up to four F-16C aircraft to the 133rd Airlift Wing (133 AW) at Minneapolis-St. Paul International Airport Air Reserve Station. The purpose of the EA was to determine the extent of environmental impact that may result from the proposed deployment and alternatives and to evaluate whether these impacts, if any, would be significant. The purpose of the Proposed Action is to fulfill the Air Sovereignty Alert duty and to contribute to the mission of homeland defense. The mission of homeland defense often dictates that air defense assets be repositioned as close as possible to critical assets and potential terrorist targets.

DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES: The alternatives that have been analyzed to accomplish the action include the Proposed Action or preferred alternative (deployment of alert aircraft) and the No Action Alternative. The No Action Alternative has been carried forward for analysis in accordance with NEPA 40 CFR § 1502.14 (d).

PROPOSED ACTION: The 148th Fighter Wing (148 FW) may be tasked in the future and on an as needed basis to deploy up to four F-16C fighter aircraft to the 133 AW for the purpose

of fulfilling Air Sovereignty Alert duties. When directed by higher headquarters, the aircraft would operate from the proposed alert hangar (current Air National Guard Museum; building 670) of the 133 AW, and would use existing runways at the Minneapolis-St. Paul International Airport (MSPIA). The duration of deployments may be from several days to several months, depending on the deployment orders received. The aircraft pilots would provide 24-hour, seven-day week alert support as directed, and launch in response to higher headquarters directions. The proposed alert hangar has space to contain four aircraft and would only require minor interior renovations to the structure. No new infrastructure would be constructed, and the existing roadways and utility lines in the area of the proposed alert hangar would remain unchanged.

NO ACTION ALTERNATIVE: Under the no action alternative, the F-16C aircraft would remain at the 148 FW and Duluth International Airport. This alternative would involve launching missions from the 148 FW. The 148 FW normally maintains 24-hour alert at its home station in Duluth, Minnesota. However, the mission of homeland defense often dictates that air defense assets be repositioned as close as possible to critical assets and potential terrorist targets. The 133 AW is located within the Minneapolis-St. Paul metropolitan area and is often the ideal location for positioning of alert aircraft in response to credible terrorist threats. Therefore, the No Action Alternative does not fulfill the purpose and need for the action.

SUMMARY OF FINDINGS: Based on the findings of the EA, the 148 FW has decided to proceed with the proposed deployment of up to four F-16C fighter aircraft to the 133 AW. The potential impacts to the human and natural environment were evaluated relative to the existing environment. Resources and issues evaluated within the EA included noise, land use, air quality, socioeconomic resources, safety, cultural resources, hazardous materials and wastes, geological resources, water resources, and biological resources. For each environmental resource or issue, anticipated direct, indirect, and cumulative impacts were assessed, considering both short-term and long-term project impacts.

Implementation of the Proposed Action would not significantly impact the human and natural environment. The Proposed Action would have minor adverse impacts on noise from operation of the F-16C aircraft. These impacts, however, are not considered significant based on FAA guidance due to the small increase in cumulative noise exposure at the MSPIA that would result from the Proposed Action. The Proposed Action would displace the existing Air National Guard Museum, which would be relocated once a suitable site for the Museum is determined. The Proposed Action would have unavoidable minor adverse impacts on air quality from operation and maintenance of the F-16C aircraft. Based on the conformity analysis conducted as part of this EA, the Proposed Action would not cause an exceedance of the National Ambient Air Quality Standards (NAAQS) or limits established in a State Implementation Plan (SIP), and therefore, these impacts are not considered significant.

The Proposed Action would result in minor increases to safety risks to military personnel in the vicinity of the alert aircraft related to the presence of explosives within aircraft weapon systems; however, the risks would be minimized through the use of land use controls and building improvements, such as the installation of glass and door reinforcements. The Proposed Action would have minor adverse impacts to the management of hazardous waste by requiring the waste paint and paint-related filters, strainers, and paper that are currently stored at the hazardous waste satellite accumulation point at the proposed alert hangar to be stored at a different location. Minor adverse impacts to water resources associated with the potential increase in stormwater pollutants from an increase in vehicle use and refueling activities would be mitigated through the use of best management practices (BMPs) and spill prevention, control and countermeasure (SPCC) procedures. Minor adverse impacts to biological resources from an increase in wildlife strike hazard would be expected; however, the use of pyrotechnics and altitude and flying pattern adjustments would minimize these impacts.

Under the Proposed Action, installation activities would result in beneficial impacts to safety. The safety of the Minneapolis-St. Paul metropolitan area related to national defense is expected to significantly increase, since alert aircraft would have the ability to operate near critical assets and potential terrorist targets and have a quick response time to the Minneapolis-St. Paul

metropolitan area. The Proposed Action would not adversely impact socioeconomic resources, minorities, low-income populations, children, cultural resources, or geological resources. The cumulative impacts of implementing the Proposed Action along with other past, present, and foreseeable future projects around the Minneapolis-St. Paul International Airport Air Reserve Station and the surrounding community were also assessed. No significant cumulative impacts were identified.

Overall, the analysis for this EA indicates that the Proposed Action would not result in, or contribute to, significant negative cumulative impacts to the resources in the region.

DECISION: Based on my review of the facts and analysis contained in this EA, which are incorporated herein, I conclude the implementation of the Proposed Action would not have a significant impact either by itself or considering cumulative impacts. Accordingly, the requirements of NEPA, regulations promulgated by the President's CEQ, and Air Force Instruction (AFI) 32-7061 are fulfilled and an environmental impact statement is not required.

Date: 10 Dec 07

TIMOTHY E. TARCHICK, Colonel, USAFR
Commander
934th Airlift Wing
Minneapolis-St. Paul International Airport Air Reserve Station,
Minnesota

COVER SHEET

Responsible Agency: Air Force Reserve Command, Air Force Center for Engineering and the Environment, 934th Airlift Wing (934 AW), Minneapolis-St. Paul International Airport (MSPIA) Air Reserve Station

Proposed Action: Deployment of Up to Four F-16C Aircraft for Air Sovereignty Alert Operations to the 133rd Airlift Wing (133 AW) at MSPIA Air Reserve Station, Minnesota

Point of Contact: Doug Yocum, 934 AW, 612-713-1955 and Lt Col Steve Wabrowetz, 148th Fighter Wing (148 FW), 218-788-7475.

Report Designation: Environmental Assessment (EA)

Abstract: The 148 FW may be ordered by higher headquarters to deploy up to four F-16C aircraft to the 133 AW at MSPIA Air Reserve Station, Minnesota for Air Sovereignty Alert Operations. These deployment orders are not optional for either the 148 FW or 133 AW. The action is needed to fulfill the Air Sovereignty Alert duty and to contribute to the mission of homeland defense. The mission of homeland defense often dictates that air defense assets be repositioned as close as possible to critical assets and potential terrorist targets.

When directed by higher headquarters, the aircraft would operate from the proposed alert hangar (current Air National Guard Museum; building 670) of the 133 AW, and would use existing runways at the MSPIA. The aircraft may fly routine training missions from the same location. The duration of deployments may be from several days to several months, depending on the deployment orders received. The aircraft pilots would provide 24-hour, seven-day week alert support as directed, and launch in response to higher headquarters directions. Support personnel for the temporary operation would stay in housing at the MSPIA Air Reserve Station. The proposed alert hangar has space to contain four aircraft and would only require minor interior renovations to the structure. No new infrastructure would be constructed, and the existing roadways and utility lines in the area of the proposed alert hangar would remain unchanged.

The following environmental resources were identified for study in this EA: noise, land use, air quality, safety, socioeconomic resources, cultural resources, hazardous materials and waste, geological resources, water resources, and biological resources. The Proposed Action would have no disproportionately high and adverse impacts on minority or low-income populations and no adverse impacts on socioeconomics, cultural resources, and geological resources. There would be minimal impacts to noise, air quality, land use, safety, hazardous materials and wastes, water resources, and biological resources. There would be positive impacts to the safety of the Minneapolis-St. Paul area related to a decrease in threat from terrorism-related activities.

Final Environmental Assessment

Deployment of Up to Four F-16C Aircraft to the 133rd Airlift Wing for Air Sovereignty Alert Operations

November 2007

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TABLE OF CONTENTS

TABLE OF CONTENTS (continued)

APPENDICES

ACRONYM LIST

133 AW	133rd Airlift Wing
934 AW	934th Airlift Wing
148 FW	148th Fighter Wing
ACM	asbestos containing material
ADC	Air Defense Command
AFI	Air Force Instruction
AGE	Aerospace Ground Equipment
AGL	Above Ground Level
ANG	Air National Guard
AQCR	Air Quality Control Regions
ARPA	Archaeological Resources Protection Act
AT/FP	Anti-Terrorism/Force Protection
AW	Airlift Wing
BASH	Bird-Aircraft Strike Hazard
BMP	Best Management Practice
CAA	Clean Air Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO	Carbon Monoxide
CWA	Clean Water Act
CY2007	Calendar Year 2007
dB	Decibel
dBA	A-weighted Decibel
DoD	Department of Defense
EA	Environmental Assessment
EIAP	Environmental Impact Analysis Process
EIS	Environmental Impact Statement
EO	Executive Order
EPCRA	Emergency Planning and Community Right-to-Know Act
ERP	Environmental Restoration Program
ESA	Endangered Species Act
^{o}F	Degrees Fahrenheit
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FONSI	Finding of No Significant Impact
GOV	Government Owned Vehicle
HAP	High Accident Potential
HWMP	Hazardous Waste Management Plan
Hz	Hertz
IBD	Inhabited Building Distance
IICEP	Interagency and Intergovernmental Coordination for Environmental Planning
INM	Integrated Noise Model
DNL	Day-Night Average Sound Level
L_{eq}	Equivalent Noise Level
L_{max}	Maximum Sound Level
m^3	Cubic meter
MAC	Metropolitan Airports Commission
MDNR	Minnesota Department of Natural Resources
MNANG	Minnesota Air National Guard
MOU	Memorandum of Understanding
MPCA	Minnesota Pollution Control Agency
MSPIA	Minneapolis-St. Paul International Airport
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NLR	Noise Level Reduction
NO_2	Nitrogen Dioxide
NOx	Nitrogen Oxides
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
O_3	Ozone
Pb	lead
PL	Public Law
PM	Particulate Matter
POL	Petroleum, Oils, and Lubricants
POV	Privately Owned Vehicle
PPA	Pollution Prevention Act
ppm	Parts per Million
PSD	Prevention of Significant Deterioration
PTR	Public Traffic Route
RCRA	Resource Conservation and Recovery Act
ROD	Record of Decision
SAGE	Semi-Automatic Ground Environment
SARA	Superfund Amendments and Reauthorization Act
SEL	Sound Exposure Level
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SO_2	Sulfur Dioxide
SPCC	Spill Prevention, Control and Countermeasure
SWPPP	Storm Water Pollution Prevention Plan
tpy	Tons per Year
USACE	United States Army Corps of Engineers
USAF	United States Air Force
USC	United States Code
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
UST	Underground Storage Tank
VA	Veteran's Administration
VOC	Volatile Organic Compound
WCA	Wetland Conservation Act

CHAPTER 1
PURPOSE OF AND NEED FOR ACTION

This chapter includes seven sections: statement of the purpose of and need for action, a description of jurisdictions and responsibilities, a description of the location of the Proposed Action, identification of the decision to be made, a description of the scope of the environmental review, identification of applicable regulatory requirements, and an introduction to the organization of the document.

This environmental assessment (EA) was prepared in accordance with the National Environmental Policy Act (NEPA), the Council on Environmental Quality (CEQ) Regulations, 40 Code of Federal Regulations (CFR) Parts 1500-1508, 32 CFR 989 Environmental Impact Analysis Process (EIAP), and Air Force Instruction (AFI) 32-7060, Interagency and Intergovernmental Coordination for Environmental Planning (IICEP).

1.1 Purpose Of and Need for Action

The 148th Fighter Wing (148 FW) may be ordered by higher headquarters to deploy up to four F-16C aircraft to the 133rd Airlift Wing (133 AW) at MSPIA Air Reserve Station, Minnesota for Air Sovereignty Alert Operations. These deployment orders are not optional for either the 148 FW or 133 AW. The action is needed to fulfill the Air Sovereignty Alert duty and to contribute to the mission of homeland defense. The mission of homeland defense often dictates that air defense assets be repositioned as close as possible to critical assets and potential terrorist targets. The primary environmental concern is the possible impacts on the surrounding community from aircraft noise as the F-16C produces much greater noise levels than civilian aviation aircraft or the C-130 military aircraft that routinely operate at the Minneapolis-St. Paul International Airport (MSPIA).

Given that the deployment of these aircraft would be directed at emergency threats, there is no time to conduct an environmental analysis each time these aircraft need deployment. This is why an Environmental Assessment is being conducted to cover all possible deployments over the next five years.

Several alternatives were considered but eliminated from consideration. Inclusion of the no action alternative is required per the CEQ regulations and serves as a benchmark against which the Proposed Action can be evaluated. Chapter 2 describes the No Action Alternative, the Proposed Action, and the alternative actions eliminated from consideration.

1.2 Jurisdiction and Responsibilities

The 133 AW is one of two prime units of the Minnesota Air National Guard (MNANG). The second unit, the 148 FW, operates out of Duluth, Minnesota. The 133 AW is a tenant of the 934th Airlift Wing (934 AW) of the Air Force Reserve Command. The Army Reserve, Marine Corps, and U.S. Coast Guard are all housed on the Fort Snelling federal property located adjacent to the 133 AW. The 133 AW maintains and flies eight C-130H cargo aircraft to provide trained and equipped units to protect life and property and preserve peace and order. The 133 AW supports this mission through the airlift of troops, cargo, passengers, and medical patients for both wartime and peacetime operations. The 148 FW currently flies the F-16C aircraft for federal and state missions. The unit's federal mission is general purpose and involves air-to-ground combat. In times of peace, the state mission is to respond to state and local emergencies at the request of the governor (MNANG 2006).

1.3 Location of Proposed Action

The 133 AW occupies 140 acres at MSPIA, located in Hennepin County, Minnesota (Figure 1-1). Fort Snelling, a county division of Hennepin County, is located to the north and east of the 133 AW. The 934 AW is located to the west of the 133 AW, and MSPIA is located to the south of the 133 AW (Figure 1-2). The MSPIA and Fort Snelling are surrounded by the city of Richfield to the west; Minneapolis to the north; St. Paul, Mendota Heights, and Eagan to the east; and Bloomington to the south.

1.4 Decision to Be Made

This EA documents analyses of the potential environmental impacts of the No Action Alternative and the Proposed Action. Additional alternatives were considered but eliminated from consideration (see Section 2.3 of this report). Based on the information presented in this EA, the Air Force will determine whether to prepare a Finding of No Significant Impact (FONSI) or to prepare an Environmental Impact Statement (EIS). A FONSI would be appropriate if the analyses presented in the EA indicate that implementation of the Proposed Action would not result in significant environmental impacts. If significant environmental issues arise that cannot be mitigated to insignificance, an EIS would be required. As required by NEPA and its implementing regulations, preparation of an environmental document must precede final decisions regarding the proposed project, and be available to inform decision-makers and the public of the potential environmental impacts of selecting the No Action Alternative and the Proposed Action.

1.5 Scope of the Environmental Review

Congress passed NEPA (Public Law (PL) 91-190) in 1969. The primary purpose of NEPA was to ensure that federal agencies consider the effects of federal funding on certain environmental resources and allow for public involvement in the decision-making process. Under NEPA, federal agencies are required to systematically assess the environmental consequences of their proposed actions before making a final decision on the proposed action. The CEQ was established under NEPA to issue regulations and guidance regarding NEPA compliance and oversee the efforts of federal agencies to implement NEPA programs. The CEQ issued NEPA implementation regulations in 1978. These regulations are included in Title 40 CFR Parts 1500-1508.

This EA describes and evaluates the potential environmental impacts associated with deployment of up to four F-16C fighter aircraft to the 133 AW. As appropriate, the affected environment and environmental consequences of the action may be described in terms of a regional overview or a site-specific description. Although mitigation measures are not required, this EA identifies operating procedures that could be implemented to further minimize environmental impacts. Calendar Year 2007 (CY2007) or the most current information was used as the baseline condition. The resource areas that were identified for the assessment include:

- Noise;
- Land use;
- Air quality;
- Socioeconomic resources;
- Safety;
- Cultural resources;
- Hazardous materials and wastes;
- Geological resources;
- Water resources; and
- Biological resources.

Executive Order (EO) 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, was issued by the President on February 11, 1994. In the EO, the President instructed each Federal Agency to make "achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations." Adverse is defined by the Federal Interagency Working Group on Environmental Justice as "having a deleterious effect on human health or the environment that is significant, unacceptable, or above generally accepted norms." Based on the analyses of impacts in this EA, a

determination on the significance of impacts will be made in a decision document. If impacts would be significant, the Air Force would either prepare an EIS or not implement the proposal. If impacts would not be significant, a FONSI would be prepared. Accordingly, Environmental Justice will be addressed either in a FONSI or in a Record of Decision (ROD) based on an EIS.

The assessment of potential impacts in the EA will take into consideration possible cumulative impacts from other actions expected to be ongoing during the Proposed Action, either at or near MSPIA. The CEQ defines a cumulative impact in 40 CFR 1508.7 as the "impact on the environment which results from the incremental impacts 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." The environmental impacts of actions currently underway at MSPIA have been analyzed in separate NEPA documents. Environmental impacts of future foreseeable actions at MSPIA will be evaluated in the context of potential cumulative impacts, if any. Based on an analysis of planning and environmental documents for programs and projects in the vicinity of MSPIA, the continuous increase in aircraft activity and expansion of facilities at the MSPIA (including the Runway 4/22 Development Program, Noise Mitigation Program, Taxiway C/D Complex Construction, Airfield Rehabilitation Program, Runway Rehabilitation Program, Lindbergh Terminal Rehabilitation and Development Program, Landslide Rehabilitation and Repair Program, Reliever Airport Program, Reliever Airport Utility Extension Program, Miscellaneous Field and Runway Program, Miscellaneous Landslide Program, New Projects Program, and 2020 Development Program) would be ongoing in the local community while the Proposed Action is being implemented.

1.6 Applicable Regulatory Requirements

This EA complies with NEPA, the CEQ regulations, 32 CFR 989, EIAP, AFI 32-7061, and IICEP. This EA considers all applicable laws and regulations, including but not limited to the following:

- National Historic Preservation Act (NHPA)
- Archaeological Resources Protection Act (ARPA)
- Clean Air Act (CAA)
- AFI 32-7040, Air Quality Compliance
- Clean Water Act (CWA)
- Endangered Species Act (ESA)
- Pollution Prevention Act (PPA)

Table 1-1 presents potentially required federal permits, licenses, and entitlements.

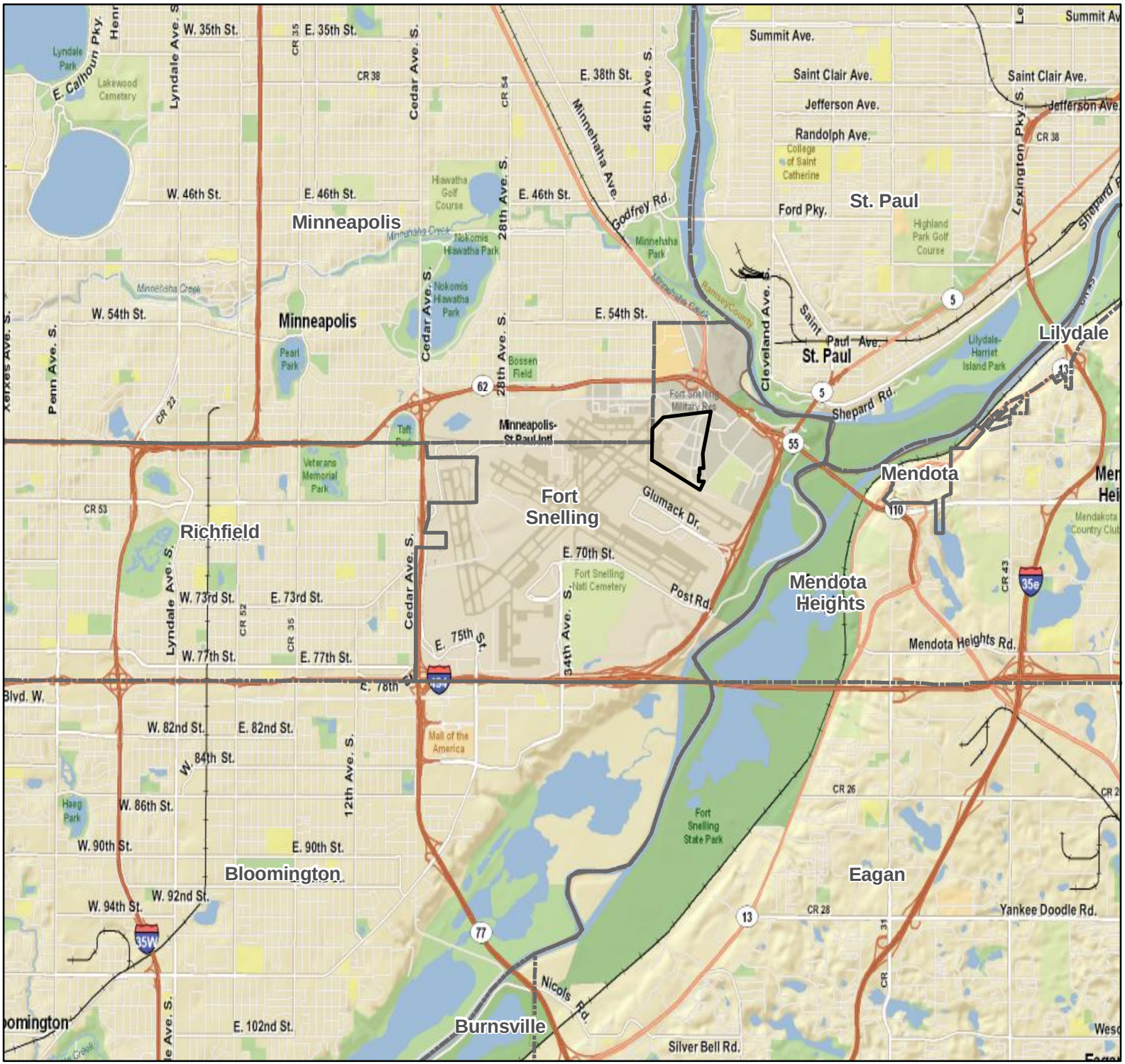
Table 1-1 Potentially Required Federal Permit, License, or Entitlement

Federal Permit, License, or Entitlement	Typical Activity, Facility, or Category of Persons Required to Obtain the Federal Permit, License, or Entitlement	Authority	Regulatory Agency
Title V permit under the CAA	Sources subject to the Title V permit program include: Any major source: (1) A stationary source that emits or has the potential to emit 100 tons per year (tpy) of any pollutant (major source threshold can be lower in non-attainment areas), or (2) A major source of air toxics regulated under Section 112 of Title III (sources that emit or have the potential to emit 10 tpy or more of a hazardous air pollutant or 25 tpy or more of any combination of hazardous air pollutants). Any "affected source" as defined in Title IV (acid rain) of the CAA. Any source subject to New Source Performance Standards under Section 111 of the CAA. Sources required to have new source or modification permits under Parts C (Prevention of Significant Deterioration [attainment areas] or D {New Source Review [non-attainment areas]}) of Title I of the CAA. Any source subject to standards, limitations, or other requirements under Section 112 of the CAA. Other sources designated by U.S. Environmental Protection Agency (USEPA) in the regulations.	Title V of CAA, as amended by the 1990 CAA Amendments	USEPA
National Pollutant Discharge Elimination System permit	Discharge of pollutant from any point source into navigable waters of the U.S. and/or construction on sites >5 acres, or on sites >1 acre if part of a larger common plan of development.	§ 402 of CWA, 33 USC 1342, 40 CFR 112	USEPA
ARPA	Excavation and/or removal of archaeological resources from public lands or American Indian lands and carrying out activities associated with such excavation and/or removal.	ARPA of 1979, 16 USC 470AA et seq.	U.S. Department of the Interior - National Park Service
NHPA	Federal undertakings which have the potential to adversely affect properties included in or eligible for inclusion in the National Register of Historic Places (NRHP).	§106 of NHPA	Minnesota Historical Society
ESA	Taking endangered or threatened wildlife species; engaging in certain commercial trade of endangered or threatened plants or removing such plants on property subject to federal jurisdiction.	Section 10 of ESA, 16 USC 1539. 50 CFR 17 Subparts C, D, F, and G	U.S. Fish and Wildlife Service (USFWS)
CWA	Discharge of dredged or fill materials, toxic constituents in wastewater, and storm water into the waters of the U.S. (to include wetlands).	33 USC 1251 et seq.	USEPA and USACE

ARPA = Archaeological Resources Protection Act
CAA = Clean Air Act
CWA = Clean Water Act
ESA = Endangered Species Act
NHPA = National Historic Preservation Act
NRHP = National Register of Historic Places
tpy = tons per year
USACE = United States Army Corps of Engineers
USC = United States Code
USEPA = United States Environmental Protection Agency
USFWS = United States Fish and Wildlife Service

1.7 Introduction to the Organization of the Document

This EA is organized into seven chapters. Chapter 1 contains a statement of the purpose of and need for action, a description of jurisdictions and responsibilities, a description of the location of the Proposed Action, identification of the decision to be made, a summary of the scope of the environmental review, identification of applicable regulatory requirements, and a description of the organization of the EA. Chapter 2 describes the No Action Alternative, provides a detailed description of the proposed and alternative actions, identifies alternatives eliminated from consideration, summarizes other actions planned for the MSPIA and the surrounding community, identifies the preferred alternative, and discusses the mitigation measures and best management practices (BMPs) that could reduce the potential for impacts. Chapter 3 contains a general description of the current conditions of the environmental resources that potentially could be affected by the Proposed Action. Chapter 4 includes an analysis of the environmental consequences. Chapter 5 lists the preparers of this document. Chapter 6 describes the public review process, the agencies and individuals that received the Draft EA, and the comments received during the process. Chapter 7 includes a list of source documents relevant to the preparation of this EA.



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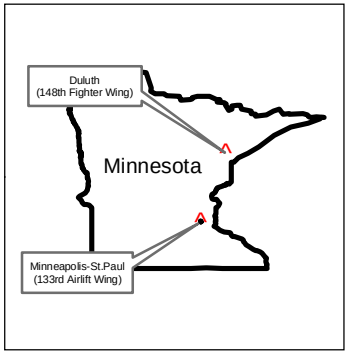

Legend

- 133rd Airlift Wing
- Municipal Boundary

Reference

SOURCE OF BASE MAP DATA: ESRI ArcGIS Online Street Map Service
Data is projected in NAD83 UTM Zone 15.

Figure 1-1
Vicinity Map

Minneapolis-St. Paul International Airport
Air Reserve Station
Minnesota

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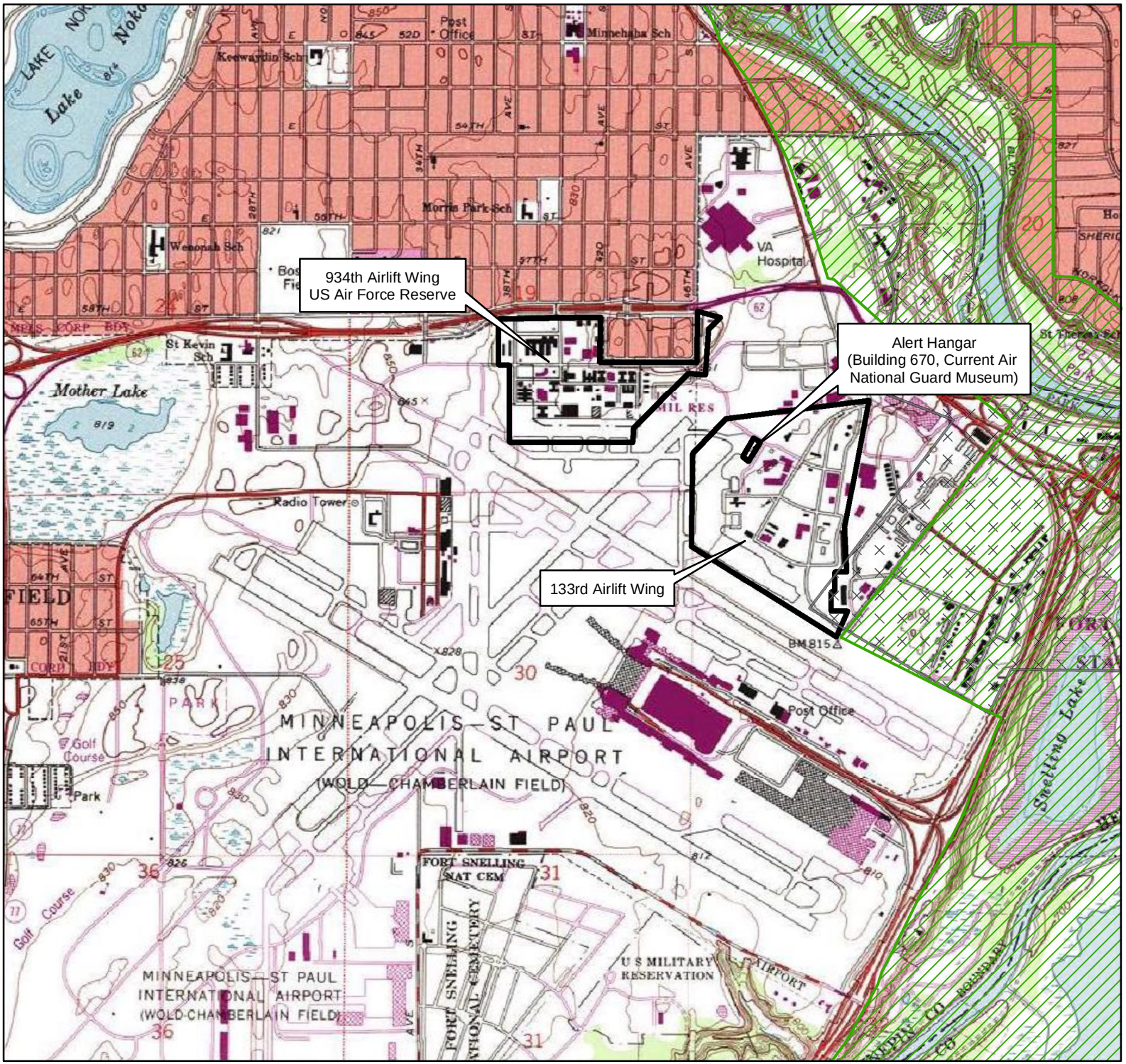

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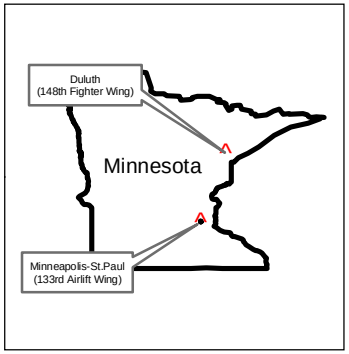

Legend

- Areas of Interest
- Mississippi River Critical Area/ Mississippi National River and Recreation Area
- Fort Snelling National Historic District

Reference

Base map comprised of U.S.G.S. 7.5 minute topographic maps, "Minnesota South, MN.", "Hennepin, MN." , "Dakota, MN." and "Bloomington, MN." Image is referenced to GCS_WGS_1984
MRCA/MNRRA acquired from the Metropolitan Council.

Figure 1-2
Location Map

Minneapolis-St. Paul International Airport
Air Reserve Station
Minnesota

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CHAPTER 2
DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

This chapter is composed of six sections: a description of the No Action Alternative and the Proposed Action, a brief description of alternatives considered but eliminated from further consideration, identification of other proposed actions planned for the Minneapolis-St. Paul International Airport (MSPIA) and the surrounding community, identification of the preferred alternative, and a discussion of mitigation measures.

2.1 Description of the No Action Alternative (Home-Station Alert Alternative)

Under the no action alternative, the F-16C aircraft would remain at the 148th Fighter Wing (148 FW) and Duluth International Airport. This alternative would involve launching missions from the 148 FW. The 148 FW normally maintains 24-hour alert at its home station in Duluth, Minnesota. However, the mission of homeland defense often dictates that air defense assets be repositioned as close as possible to critical assets and potential terrorist targets. The 133rd Airlift Wing (133 AW) is located within the Minneapolis-St. Paul metropolitan area and is often the ideal location for positioning of alert aircraft in response to credible terrorist threats. In the event higher headquarters directives mandate relocation of 148 FW aircraft to the 133 AW, there is no alternative to that directive. Therefore, the No Action Alternative does not fulfill the purpose and need for the action.

2.2 Detailed Description of Proposed Action

The 148 FW may be tasked in the future and on an as needed basis to deploy up to four F-16C fighter aircraft to the 133 AW for the purpose of fulfilling Air Sovereignty Alert duties. When directed by higher headquarters, the aircraft would operate from the proposed alert hangar (current Air National Guard Museum; building 670) of the 133 AW and would use existing runways at the MSPIA. The aircraft may fly routine training missions from the same location. The duration of deployments may be from several days to several months, depending on the deployment orders received. The aircraft pilots would provide 24-hour, seven-day week alert support as directed and launch in response to higher headquarters directions. Support personnel for the temporary operation would stay in housing at the MSPIA Air Reserve Station. The proposed alert hangar has space to contain four aircraft and would only require minor interior renovations to the structure. Two aircraft display shells located outside the museum would be moved. No new infrastructure would be constructed, and the existing roadways and utility lines in the area of the proposed alert hangar would remain unchanged.

Although the possibility exists that the 148 FW would not be ordered by higher headquarters to deploy F-16C aircraft to the 133 AW and that the Proposed Action may not be implemented, a potential scenario of the most intense action was developed for the purpose of environmental analysis. This scenario is known as the worst-case scenario and is detailed below.

- Four F-16C fighter aircraft would be deployed from the 148 FW in Duluth to the 133 AW at the MSPIA.
- Sixteen training sorties (32 flight operations) with the F-16C aircraft at the 133 AW would occur per month. This includes two alert jets airborne simultaneously during eight training flights. The duration of these flights would be 1.5 to 2.0 hours, and no low approaches or touch-and-gos would occur. The other two alert jets would remain on standby within the alert hangar.
- A typical mission would include a scramble start, taxi, and takeoff and then landing and taxi to the alert hangar. A typical mission would include two F-16C aircraft.
- When the aircraft are carrying a large amount of stores (fuel and weaponry), afterburners would be used during takeoff.
- Refueling would occur only within the alert hangar. Each F-16C aircraft would contain 12,700 pounds of jet fuel. The existing C-130 aircraft use the same type of jet fuel as the F-16C aircraft, and fuel storage capacity at the 133 AW would not increase as a result of the temporary deployment.
- The F-16C aircraft would use canisters of hydrazine, which would be stored in 15-pound quantities within sealed canisters within the aircraft. The canisters would be sealed until they are used as an emergency fuel source for an onboard generator when the jets are airborne. Hydrazine is a toxic substance and is not currently used at the 133 AW.
- Aircraft system checks would occur on Mondays and Fridays and include engine starts with 10 minutes of running time.
- Two hours per month of F-16C engine runs would be required for maintenance purposes.
- Since the alert hangar is heated, deicing of the F-16C would not occur.
- The deployments would require a total of 45 personnel to be temporarily relocated from the 148 FW to the 133 AW. This would include four personnel for operations, nine personnel for services, three personnel for aerospace ground equipment, 13 personnel for security, 15 personnel for maintenance, and one personnel for communications.

- The deployments would require a total of 34 vehicles to be temporarily relocated from the 148 FW to the 133 AW. This would include two operation vehicles, three service vehicles, one communications vehicle, one security vehicle, two maintenance vehicles, and 25 personal vehicles.
- The F-16C aircraft would use weapons that contain explosives. Minor renovations to the proposed alert hangar and nearby structures may occur. This could include applying protective film onto windows and installing blast windows and doors to reduce the hazards from an explosive accident.
- Cracks within the taxiways and runways may be resealed.

2.3 Alternatives Considered but Eliminated from Further Consideration

Under NEPA, reasonable alternatives to a Proposed Action must be considered in an environmental assessment. To warrant detailed evaluation, an alternative must be reasonable and feasible and must meet the purpose of and the need for the action. For this environmental review, an alternative would be considered reasonable and feasible and able to fulfill the purpose and need described above, if it fulfills the following criteria:

- Military organizations and homeland defense agencies need to be capable of maintaining maximum proficiency to accomplish their missions.
- The F-16C aircraft must have the ability to operate near critical assets and potential terrorist targets and must have a quick response time to the Minneapolis-St. Paul metropolitan area.

Alternative - Relocate to Another Department of Defense Facility

This alternative would not be applicable as no other Department of Defense (DoD) facilities in the mission area are available that would 1) provide protective hangars for F-16C aircraft, 2) have sufficient runway length, 3) have appropriate refueling support, and 4) have immediate adjacent housing for on-duty personnel.

Other Alternative Locations

Relocate F-16C aircraft to a nearby civilian airport. There are other airports in the Minnesota and Wisconsin area. However, these locations do not provide1) protective hangars for the F-16 aircraft, 2) sufficient runway length, 3) appropriate refueling support, 4) immediately adjacent housing for on-duty personnel, 5) the security required for aircraft on Air Sovereignty Alert duty, and 6) the required aircraft arresting barriers for F-16C aircraft. Most importantly, the other airports are not in the immediate vicinity of the Minneapolis-St. Paul metropolitan area.

Based on the above, these alternatives were not carried forward in this environmental review.

2.4 Other Actions Planned for MSPIA Air Reserve Station and Surrounding Community

Other actions planned for the surrounding community were identified based on information from the following sources:

- Metropolitan Airports Commission;
- MSPIA, 2020 Vision; and
- General Plan for MSPIA Air Reserve Station, 1996.

Based on those sources, the following information highlights other actions or trends that could affect the surrounding community:

1. The MSPIA has experienced rapid expansion and improvement under the $3.1 billion program following the MSP 2010: Building a Better Airport. This includes the recent completion of a new north-to-south runway (17/35). Continued growth of the MSPIA is expected to occur according to the MSPIA 2020 Vision.
2. Several programs and construction projects are expected to occur within the next few years under the Metropolitan Airport's Capital Improvement Program (CIP) and are outlined in Table 2-1.

Table 2-1 2007 2013 Capital Improvement Program

Program	Schedule	Description
Runway 4/22 Development Program	2009	Upgrade to existing Minnesota River North drainage system with pond expansion and outfall improvements.
Noise Mitigation Program	2008-11	Sound insulation for residential properties.
Taxiway C/D Complex Construction	2007-09	Reconstruct and reconfigure taxiways C and D between Runway 12L/30R and runway 12R/30L.
Airfield Rehabilitation Program	2007-13	Asphalt and pavement repair, joint sealing, and rehabilitation.
Runway Rehabilitation Program	2007-08	Pavement rehabilitation.
Lindbergh Terminal Rehabilitation and Development Program	2007	Improvements to the International Arrivals Facility.
Landslide Rehabilitation and Repair Program	2007-13	Reconstruction of roadways and parking lots.

Table 2-1 2007 2013 Capital Improvement Program (Continued)

Program	Schedule	Description
Reliever Airport Program	2007-13	Various development and rehabilitation projects at six reliever airports.
Reliever Airport Utility Extension Program	2008-09	Plan wash and restroom facilities and sanitary sewer extensions at three reliever airports.
Miscellaneous Field and Runway Program	2007-12	Miscellaneous airfield construction.
Miscellaneous Landslide Program	2007, 2009	Alarm and monitoring equipment installation and parking structure expansion.
New Projects Program	2007-13	Various projects including concession development, roof replacement, highways signs, etc.
2020 Development Program	2008-13	Various projects including interior rehabilitation, relocation of air traffic control tower, terminal expansions and modifications, etc.

Source: MAC Seven-Year Capital Improvement Program, 2007-2013

3. An approximate 3% per annum forecasted growth in airport civilian passenger capacity is expected to occur into the foreseeable future, and over 60% growth in airport passenger capacity is expected to occur by 2020. Table 2-2 displays information on civilian passenger capacity.

Table 2-2 Civilian Capacity of Passengers at MSPIA

Year	Annual Passengers (million)
2004	33
2010	42
2020	55

Source: MSPIA, 2020 Vision

4. Based on the "high" forecast displayed within the MSPIA Dual Track Planning Process Final Environmental Impact Statement, the MSPIA had approximately 575,000 aircraft operations in 2005 and is expected to have 603,800 and 640,200 aircraft operations in 2010 and 2020, respectively (MAC 2003).

Aircraft activity at the MSPIA is expected to increase into the near and distant future. This is a result of planned expansions and increased use of the airport as a large hub airport serving a wide region including parts of North and South Dakota, Iowa, Wisconsin and all of Minnesota. This increased use of MSPIA for aircraft operations could potentially result in cumulative impacts to the community surrounding the MSPIA.

These actions are not directly related to the Proposed Action evaluated in this EA, but are additional actions announced for the surrounding community. This EA addresses the environmental impacts of these other actions, based on available information, only in the context of potential cumulative impacts, if any.

2.5 Identification of the Preferred Alternative

The preferred alternative is to deploy up to four F-16C fighter aircraft to the 133 AW as described in Section 2.2 of this document.

2.6 Mitigation Measures

Based on the analysis of potential environmental effects, it is anticipated that some noise abatement measures may be necessary for the Proposed Action as a means to further minimize environmental impacts. These mitigation measures are further discussed throughout Chapter 4.

CHAPTER 3
AFFECTED ENVIRONMENT

This chapter describes the human, physical, biological, and cultural environment that could be affected by implementation of the Proposed Action. The affected environment is a baseline for each discipline and describes the current conditions prior to and in the absence of the Proposed Action. The baseline conditions presented in this chapter are described to the level of detail necessary to support the analysis of potential impacts, presented in Chapter 4, "Environmental Consequences."

In compliance with National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) guidelines, and 32 Code of Federal Regulations (CFR) Part 989, the description of the affected environment focuses on those resources and conditions potentially subject to impacts. These resources and conditions include noise, land use, air quality, socioeconomic resources, safety, cultural resources, hazardous materials and wastes, geological resources, water resources, and biological resources.

Description of the Affected Environment

3.1 Noise

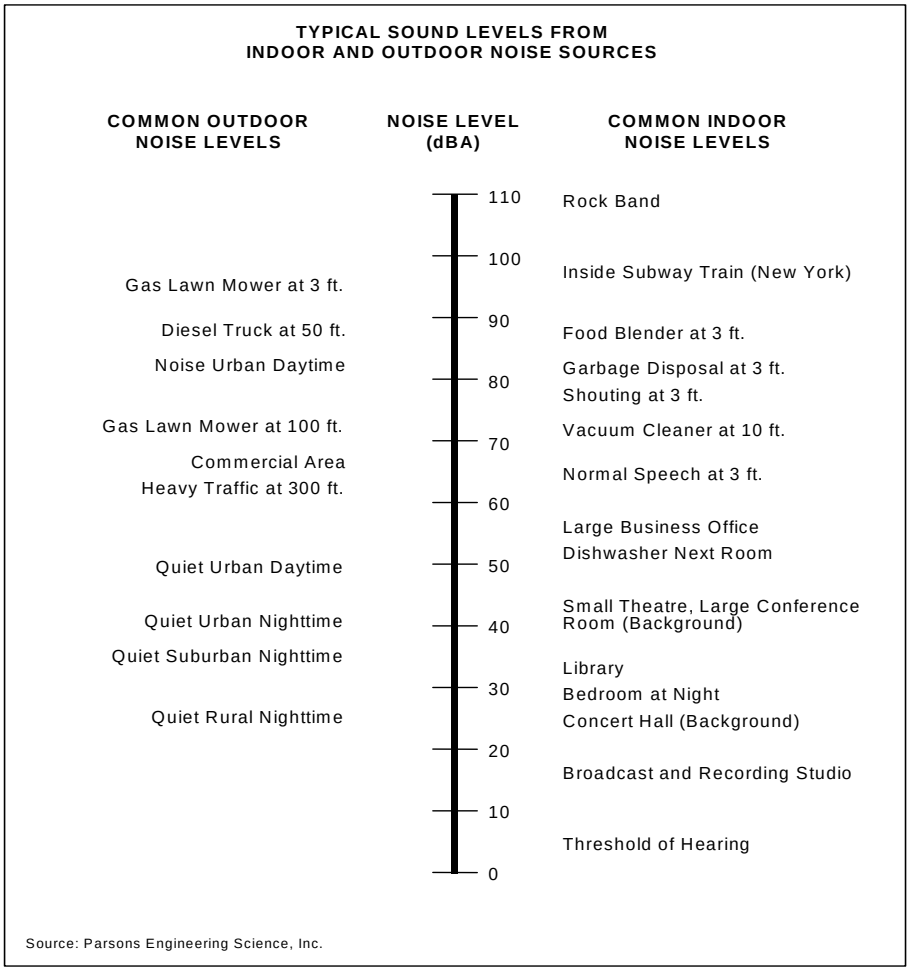
Background Information

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

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

senses louder noise. The unit used to measure the intensity of sound is the decibel (dB). Decibels are measured using a logarithmic scale. A sound level of 0 dB is approximately the threshold of human hearing and is barely audible under extremely quiet listening conditions. Normal speech has a sound level of approximately 60 dB. Sound levels above about 120 dB begin to be felt inside the human ear as discomfort and eventually as pain at still higher levels. The minimum change in the sound level of individual events that an average human ear can detect is about 3 dB. The average person perceives a change in sound level of about 10 dB as a doubling (or halving) of the sound's loudness; this relation holds true for sounds of any loudness. Sound levels of typical noise sources and environments are provided in Table 3-1.

Table 3-1 Typical A-Weighted dBA Sound Pressure Noise Levels



Because of the logarithmic nature of the decibel unit, sound levels cannot be added or subtracted directly and are somewhat cumbersome to handle mathematically. Some simple

rules are useful, however, in dealing with sound levels. First, if a sound's intensity is doubled, the sound level increases by 3 dB, regardless of the initial sound level. Thus, for example, 60 dB + 60 dB = 63 dB, and 80 dB + 80 dB = 83 dB.

The frequency of sound is measured in cycles per second, or hertz (Hz). This measurement reflects the number of times per second the air vibrates from the acoustic energy. Low frequency sounds are heard as rumbles or roars, and high frequency sounds are heard as screeches. Sound from a tuning fork (a pure tone) contains a single frequency; however, most sounds that one hears in the environment do not consist of a single frequency but a broad band of frequencies differing in sound level. The method commonly used to quantify environmental sounds consists of evaluating all of a sound's frequencies according to a weighting system that reflects the fact that human hearing is less sensitive at low frequencies and extremely high frequencies than at mid range frequencies. This is called "A" weighting, and the decibel level measured is called the A weighted sound level (dBA). In practice, the level of a noise source is conveniently measured using a sound level meter that includes a filter corresponding to the dBA curve.

The duration of a noise event and the number of times noise events occur are also important considerations in assessing noise impacts.

The word "metric" is used to describe a standard of measurement. As used in environmental noise analysis, there are many different types of noise metrics. Each metric has a different physical meaning or interpretation and each metric was developed by researchers attempting to represent the effects of environmental noise.

The metrics supporting the assessment of noise from aircraft operations from the proposals assessed in this document are the maximum sound level (L_{max}), the sound exposure level (SEL), and time-averaged sound levels. Each metric represents a "tier" for quantifying the noise environment and is briefly discussed below.

Maximum Sound Level

The L_{max} metric defines peak noise levels. L_{max} is the highest sound level measured during a single noise event (e.g., an aircraft overflight) and is the sound actually heard by a person on the ground. 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 as the aircraft recedes into the distance. Maximum sound level is important in judging a noise event's interference with conversation, sleep, or other common activities.

Sound Exposure Level

L_{max} alone may not represent how intrusive an aircraft noise event is because it does not consider the length of time that the noise persists. The SEL metric combines intensity and duration into a single measure. It is important to note, however, that SEL does not directly represent the sound level heard at any given time, but rather provides a measure of the total exposure of the entire event. Its value represents all of the acoustic energy associated with the event, as though it was present for one second. Therefore, for sound events that last longer than one second, the SEL value will be higher than the L_{max} value. The SEL value is important because it is the value used to calculate other time-averaged noise metrics.

Time-Averaged Cumulative Noise Metrics

The number of times noise events occur during given periods is also an important consideration in assessing noise impacts. The "cumulative" noise metrics supporting the analysis of multiple time-varying noise events are the day-night average sound level (DNL) and the equivalent noise level (L_{eq}).

The DNL metric sums the individual noise events and averages the resulting level over a specified length of time. Thus, it is a composite metric that considers the maximum noise levels, the duration of the events, the number of events that occur, and the time of day during which they occur. This metric adds 10 dB to those events that occur between 10 p.m. and 7 a.m. to account for the increased intrusiveness of noise events that occur at night when ambient noise levels are normally lower than during the day time. This cumulative metric does not represent the variations in the sound level heard. Nevertheless, it does provide an excellent measure for comparing environmental noise exposures when there are multiple noise events to be considered.

The L_{eq} metric also sums all of the individual noise events and averages them over a specified time period. Common averaging times are 8- and 24-hour periods ($L_{eq(8)}$ and $L_{eq(24)}$). This metric assigns no penalty for the time of the noise event; however, if no noise events occur at night, calculations of DNL and L_{eq} would be identical.

Community Annoyance

Ignoring the night-time penalty, DNL may be thought of as the continuous or cumulative dBA which would be present if all of the variations in sound level that occur over the given period were smoothed out so as to contain the same total sound energy. While DNL does provide a single measure of overall noise impact, it is fully recognized that it does not provide specific information on the number of noise events or the specific individual sound levels which occur. For example, an DNL of 65 dB could result from a very few noisy events,

or a large number of quieter events. Although it does not represent the sound level heard at any one particular time, it does represent the total sound exposure. Scientific studies and social surveys have found the DNL to be the best measure to assess levels of community annoyance associated with all types of environmental noise; therefore, its use is endorsed by the scientific community and governmental agencies (ANSI 1980, 1988; USEPA 1974; Federal Aviation Administration, Federal Interagency Committee on Aviation Noise, 1992, Federal Interagency Committee on Urban Noise 1980; Federal Interagency Committee on Noise 1992).

Public annoyance is the most common concern associated with exposure to elevated noise levels. When subjected to DNL levels of 65 dBA, approximately 12 percent of the persons exposed will be "highly annoyed" by the noise. At levels below 55 dBA, the percentage of annoyance is significantly lower (less than 3 percent), and at levels above 70 dBA, it is significantly higher (greater than 25 percent; Finegold et al. 1994). Table 3-2 shows the percentage of the population expected to be highly annoyed at a range of noise levels.

Table 3-2 Percentage of Population Highly Annoyed by Elevated Noise Levels

Noise Exposure (DNL dBA)	Percent Highly Annoyed
< 65	< 12
65 - 70	12 - 21
70 - 75	22 - 36
75 - 80	37 - 53
80 - 85	54 - 70
> 85	> 71

Source: Finegold et al. 1994

Aircraft Activity

The following terms are defined to provide a better understanding of how data are developed for input to the various noise models used to calculate noise.

Aircraft operations are categorized as takeoffs, landings, or closed patterns (which could include activities referred to as touch-and-gos or low approaches). Each takeoff or landing constitutes one operation. A closed pattern occurs when the pilot of the aircraft approaches the runway as though planning to land, but then applies power to the aircraft and continues to fly as though taking off again. The pilot then flies a circular or rectangular track around the airfield, and again approaches for landing. In some cases, the pilot may actually land on the runway before applying power, or in other cases, the pilot simply approaches very

close to the ground. In either event, since a closed pattern operation essentially consists of a landing and a takeoff, it is considered as two operations.

Table 3-3 shows L_{max} values and SEL values associated with typical civilian aircraft operating at the Minneapolis-St. Paul International Airport (MSPIA).

Table 3-3 Representative Maximum Sound Levels of Civilian Aircraft at MSPIA

Aircraft Type	L_{max} Values (dBA)	SEL Values (dBA)
Airbus A310	77.4	86.1
Airbus A319	81.8	88.8
Airbus A320	81.5	88.4
Avro RJ85	82.9	89.4
Boeing 717-200	78.1	84.9
Boeing 727	78.0	86.8
Boeing 737	81.3	90.7
Boeing 747	98.3	105.2
Boeing 757	85.1	92.2
Canadair Regional Jet 100	78.5	85.3
Canadair Regional Jet 200	80.1	87.3
McDonald Douglas DC 9	85.1	91.5
McDonald Douglas DC 10	93.5	99.8
McDonald Douglas MD 80	83.5	89.8
Saab 340	78.4	85.2
Beechcraft 18 Twin	70.6	79.2
Gulfstream IV	70	81.1

Source: Metropolitan Airport's Commission – Noise Monitoring Program Web Site (Accessed 2/13/2006)

Under current conditions, MSPIA supports military and civil aviation activity. During the calendar year of 2006, MSPIA supported 467,488 aviation operations. This equates to 1,280 daily operations. According to the MSPIA Part 150 Update Study (Table 3.18, Forecast General Aviation and Military Aircraft Operations by Day/Night Split and Stage Length), the average number of C-130 operations per day in 2007 was forecasted to be 3.98, while the number of F-16 aircraft operations was forecasted to be 0.05 per day (which equates to 1.5 aircraft operations per month). According to the MSPIA Part 150 Update Study (Table 3.3, Historic Air Carrier Departures by Aircraft Type), the number of Boeing 747 operations that occurred in 2002 was 177.

Figure 3-1 shows noise contours surrounding the MSPIA. The noise contour map includes the noise contours for Runway 17/35, which was constructed in 2005. The contours have not yet been approved by the Federal Aviation Administration (FAA) and are still considered to be in draft form; however, according to the Metropolitan Airports Commission (MAC), the noise contours on Figure 3-1 are the most accurate contours available for distribution.

According to noise analysis conducted for C-130s at the 133rd Airlift Wing (133 AW), at 30 feet in front of the aircraft, noise levels measured 105 dBA with all four engines running. Noise levels measured at the fence line of the flightline were not above 85 dBA. Noise levels have not been measured above 108 dBA at the installation. F-16C or other fighter aircraft are not permanently stationed at the 934th Airlift Wing (934 AW) or 133 AW, nor do they routinely fly from the MSPIA. The SEL for the F-16C aircraft is 109 dBA at 1,000 feet from the aircraft (MNANG 2005b).

Ground-Based Activity

Some additional noise results from day-to-day activities associated with operations, maintenance, and the industrial functions associated with the operation of MSPIA, other commercial activities around the airport, and associated military operations. These noise sources include the operation of ground-support equipment and other transportation noise from vehicular traffic. However, this noise is generally localized in industrial areas on or near the airfield, or on established lines of transportation supporting traffic to and from the airfield. Noise resulting from aircraft operations remains the dominant noise source in the airfield region.

Existing Noise Levels

MSPIA has an airport noise monitoring system that continuously monitors aircraft and community noise levels in the airport environs. The system consists of thirty-nine remote microphones that transmit noise level data to a central computer. The microphone locations are shown in Figure 3-1. The system also receives radar tracking and aircraft identification data. The software correlates noise level data to specific aircraft over-flights. Aircraft operations are the dominant noise source in the airfield region; therefore, the existing noise contour maps of MSPIA represent the existing noise levels in the region of influence. The region of influence for the noise assessment is the area around MSPIA that is exposed to elevated noise levels caused by aviation-related noise in the region. Figure 3-2 shows the existing DNL noise contours of MSPIA including the 133 AW.

DNL data from the MSPIA noise monitoring system at each of the remote microphones was obtained for analysis. The data represents the aircraft noise exposure at these locations during calendar year 2006. These data include all aircraft operations occurring at MSPIA during this period including transient F-16 operations. These values are shown in Table 3-4.

Table 3-4 Calendar Year 2006 Annual DNL

RMT	2006 Annual DNL
1	57.7
2	59.2
3	64.5
4	62.2
5	71.6
6	72.2
7	62.8
8	59.4
9	42.3
10	47.1
11	44.2
12	36
13	56
14	63.9
15	57.6
16	67.1
17	48.4
18	55.7
19	52.3
20	47.8
21	52.2
22	57.7
23	64.7
24	61.5
25	53.4
26	57.6
27	58.9
28	60.4
29	55.7
30	60.8
31	46.5
32	44.6
33	49.2
34	45.2
35	51.8

Table 3-4 (continued) Calendar Year 2006 Annual DNL

RMT	2006 Annual DNL
36	52.3
37	46.8
38	48.4
39	47.1

3.2 Land Use

Land use is the way in which, and the purposes for which, human beings employ the land and its resources. Land use includes natural conditions or human-modified activities occurring at a particular location. Natural land uses include forest land, grass lands, coastal areas, undisturbed wetlands, etc. Human-modified land use categories include residential, commercial, industrial, transportation, communications and utilities, agricultural, institutional, recreational, and other developed use areas. Management plans and zoning regulations determine the type and extent of land use allowable in specific areas and are often intended to protect specially designated or environmentally sensitive areas. This section describes the existing land uses and aesthetics for the airport property and areas surrounding MSPIA. The region of influence for land use resources for the proposed project includes the 133 AW, the MSPIA, and the land surrounding the MSPIA.

The proposed alert hangar at the 133 AW is currently used as the Air National Guard (ANG) Museum. The inside of the building contains war museum pieces, and several empty aircraft shells are located outside the building. The empty shells are on display to military personnel and do not contain engines or other internal systems. The ANG Museum is run by the Minnesota Air Guard Museum, a nonprofit organization with a mission to inform the community of the history and ongoing missions of Minnesota Air National Guard (MNANG) units.

According to the Hennepin County Land Use Map, the 133 AW installation is designated as public/semi-public land. The 133 AW installation is completely developed supporting industrial, administrative, and aircraft parking areas. The layout of facilities on the 133 AW installation has responded not only to functional needs but also constraints such as property size and to safety and security clear zones (e.g., object-free areas around the airfield, safety clear zones around munitions storage areas, and security zones around facilities).

MSPIA is a public airport and joint-use airfield for commercial services and military operations, including the 133 AW. Land use surrounding the airport includes residential areas, parks, and recreation to the north and west; public and semi-public land (i.e., Fort Snelling) to the northeast and southeast; parks, recreation and open water (i.e., Mississippi River) to the east; and commercial to the south (Figure 3-2).

3.3 Air Quality

Air Quality Standards and Regulations

The air quality of an area is determined by the concentration of certain "criteria pollutants," the surface topography, the size of the air basin, and the prevailing meteorological conditions. The Federal Clean Air Act (CAA) 42 United States Code (USC), passed in 1970, created a national program to control damaging effects from air pollution. The CAA Amendments of 1990 went further to ensure that the air is safe to breathe. The CAA does not specify how clean air must be attained, but rather delegates the responsibility to the United States Environmental Protection Agency (USEPA). The resulting rules that ultimately govern emissions are written and promulgated by USEPA. USEPA developed primary and secondary National Ambient Air Quality Standards (NAAQS) for criteria pollutants that have been determined to impact human health and the environment. These primary and secondary NAAQS are numerical concentration-based standards. Primary NAAQS define air quality levels for each criteria pollutant necessary to protect public health, including the health of sensitive populations such as people with asthma, children, and the elderly. Secondary NAAQS define air quality levels for each criteria pollutant necessary to protect against decreased visibility and damage to animals, crops, vegetation, or buildings. The CAA air quality standards also set emission limits for certain air pollutants from specific sources, set new source performance standards based on best demonstrated technologies, and establish national emission standards for hazardous air pollutants.

NAAQS are currently established for seven criteria air pollutants including: ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter (PM) equal to or less than 10 microns (or micrometers) in diameter (PM_{10}), PM equal to or less than 2.5 microns in diameter ($PM_{2.5}$), and lead (Pb). O_3 is not emitted directly from stationary, mobile, or area pollution sources; rather, it is a product of photochemically reactive compounds such as NO_2 and volatile organic compounds (VOCs) that are emitted from various sources. These compounds are inventoried and quantified as precursors of O_3. Thus, emissions of nitrogen oxides (NO_X) and VOCs are commonly reported instead of O_3. NAAQS are defined in terms of concentration (e.g., parts per million [ppm] or micrograms per cubic meter [$\mu g/m^3$]) determined over various periods of time (averaging periods). Short-term standards (1-hour, 8-

hour, or 24-hour periods) were established for pollutants with acute health effects and may not be exceeded more than once a year. Long-term standards (annual periods) were established for pollutants with chronic health effects and may never be exceeded.

The USEPA classifies the air quality within an Air Quality Control Region (AQCR) according to whether the region meets federal primary and secondary air quality standards. An AQCR or portion of an AQCR may be classified as in attainment, nonattainment, or unclassified with regard to the air quality standards for each of the seven criteria pollutants. "In attainment" describes a condition in which standards for one or more of the seven pollutants are being met in an area. The area is considered an "in attainment" area for only those criteria pollutants for which the national standards are being met. "Nonattainment" describes a condition in which standards for one or more of the seven pollutants are not being met in an area. "Unclassified" indicates that air quality in the area cannot be classified and the area is treated as in attainment. An area may have any of the three classifications for different criteria pollutants. Upon achieving attainment, areas are considered to be in maintenance status for a period of 10 or more years. Areas are designated as unclassifiable for a pollutant when there is insufficient ambient air quality data for USEPA to form a basis of attainment status. For the purpose of applying air quality regulations, unclassifiable areas are treated similar to areas that are in attainment of NAAQS.

The Minnesota Pollution Control Agency (MPCA) is responsible for implementation of the CAA and has developed state ambient air quality standards as well. The state ambient air quality standards are included in Section 7009.0080 of the Minnesota Rules. A summary of the federal and state ambient air quality standards that apply to the 133 AW are presented in Table 3-5.

Table 3-5 National and State Ambient Air Quality Standards

Pollutant	National Standards		State Standards	
	Primary	Secondary	Primary	Secondary
Carbon Monoxide (CO)				
8-hour Average	9 ppm[1] (10 mg/m^3)	--	9 ppm[1] (10 mg/m^3)	9 ppm[1] (10 mg/m^3)
1-hour Average	35 ppm[1] (40 mg/m^3)	--	30 ppm[1] (35 mg/m^3)	30 ppm[1] (35 mg/m^3)
Nitrogen Dioxide (NO_2)				
Annual Arithmetic Mean	0.053 ppm (100 µg/m^3)	0.053 ppm (100 µg/m^3)	0.05 ppm (100 µg/m^3)	0.05 ppm (100 µg/m^3)

Table 3-5 National and State Ambient Air Quality Standards (Continued)

Pollutant	National Standards		State Standards	
	Primary	Secondary	Primary	Secondary
Lead (Pb)				
Quarterly Average	1.5 µg/m^3	1.5 µg/m^3	(1.5 µg/m^3)[8]	(1.5 µg/m^3) [8]
Particulate (PM)				
Annual Geometric Mean	--	--	75 µg/m^3	60 µg/m^3
24-hour Average	--	--	(260 µg/m^3)[1]	(150 µg/m^3)[1]
Particulate ≤ 10 micrometers (PM_{10})				
Annual Arithmetic Mean	Revoked[2]	Revoked[2]	(50 µg/m^3)[9]	(50 µg/m^3) [9]
24-hour Average	(150 µg/m^3)[3]	(150 µg/m^3)[3]	(150 µg/m^3)[10]	(150 µg/m^3) [10]
Particulate ≤ 2.5 micrometers ($PM_{2.5}$)				
Annual Arithmetic Mean	(15.0 µg/m^3)[4]	(15.0 µg/m^3)[4]	(15.0 µg/m^3) [9]	(15.0 µg/m^3) [9]
24-hour Average	(35.0 µg/m^3)[5]	(35.0 µg/m^3)[5]	(35.0 µg/m^3)[11]	(35.0 µg/m^3) [11]
Sulfur Dioxide (SO_2)				
Annual Arithmetic Mean	0.03 ppm	--	0.03 ppm (80 µg/m^3)	0.02 ppm (60 µg/m^3)
24-hour Average	0.14 ppm[1]	--	0.14 ppm[1] (365 µg/m^3)	0.14 ppm[1] (365 µg/m^3)
3-hour Average		0.50 ppm[1] (1300 µg/m^3)	--	0.50 ppm[1, 12] (1300 µg/m^3)
1-Hour Average	--	--	0.50 ppm[1] (1300 µg/m^3)	--
Ozone (O_3)				
8-hour Average	0.08 ppm[6]	0.08 ppm[6]	0.08 ppm[13]	0.08 ppm[13]
1-hour Average	0.12 ppm[7] (applies only in limited areas)	0.12 ppm[7] (applies only in limited areas)	--	--
Hydrogen Sulfide (H_2S)				
½-Hour Average	--	--	0.05 ppm (70 µg/m^3)[14]	--
½-Hour Average	--	--	0.03 ppm[14] (42 µg/m^3)	--

Sources: USEPA, 2007 and MPCA 2007

Notes:
ppm = parts per million; mg/m^3 = milligrams per cubic meter; µg/m^3 = micrograms per cubic meter
[1] Not to be exceeded more than once per year.
[2]Effective December 17, 2006, the annual PM_{10} standard was revoked.
[3] Not to be evaluated more than once per year on average over 3 years.
[4]To attain this standard, the 3-year average of the weighted annual mean $PM_{2.5}$ concentrations from single or multiple community-oriented monitors must not exceed 15.0 µg/m^3.
[5]To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 µg/m^3.
[6]To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.08 ppm.

[7]The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is less than or equal to 1. As of June 15, 2005 EPA revoked the 1-hour ozone standard in all areas except the fourteen 8-hour ozone nonattainment Early Action Compact Areas.
[8]Averaged over a calendar quarter.
[9]The standard is attained when the expected annual arithmetic mean concentration is less than or equal to the value of the standard.
[10]The standard is attained when the expected number of days per calendar year exceeding the value of the standard is equal to or less than one.
[11]The standard is attained when the 98th percentile 24-hour concentration is less than or equal to the standard.
[12]For Air Quality Control Region Nos. 128, 131, and 133.
[13]The standard is attained when the average of the annual fourth-highest daily maximum 8-hour average ozone concentration is less than or equal to the standard.
[14]Minnesota has established two standards for H_2S: H_2S emissions may not exceed 0.05 ppm more than twice a year, nor 0.03 ppm more than twice in five consecutive days.

States are required to develop a State Implementation Plan (SIP) to ensure compliance with the NAAQS. A SIP is a compilation of regulations, strategies, schedules, and enforcement actions designed to move the state into compliance with all NAAQS. The SIP and any revisions to the SIP require approval by the USEPA. The MPCA has been delegated authority by USEPA to ensure compliance with the NAAQS.

CAA §176(c) prohibits federal agencies from undertaking projects that do not conform to a USEPA-approved SIP in nonattainment areas. In 1993, USEPA developed the General Conformity Rule, which specifies how federal agencies must determine CAA conformity for sources of nonattainment pollutants in designated non-attainment and maintenance areas. This rule and all subsequent amendments may be found in 40 CFR 51 Subpart W and 40 CFR 93 Subpart B. Through the Conformity Determination process specified in the final rule, any federal agency must analyze increases in pollutant emissions directly or indirectly attributable to a Proposed Action, and may need to complete a formal evaluation that may include modeling for NAAQS impacts, obtaining a commitment from the state regulatory agency to modify the SIP to account for emissions from the Proposed Action, and/or providing a provision for mitigation for any significant increases in nonattainment pollutants. If a Federal action does not meet or exceed the *de minimis* thresholds contained in 40 CFR 93.153 and is not considered regionally significant, then a full Conformity Determination is not required.

The CAA also includes Prevention of Significant Deterioration (PSD) provisions, which address resource protection through the establishment of ceilings on emissions increases over baseline levels in attainment areas, the protection of air quality of Class I areas, and prevention of further degradation of visibility of Class I areas. Class I areas include national parks which exceed 6,000 acres and national wilderness areas which exceed 5,000 acres if these areas were in existence on August 7, 1977. Determination of the significance of an

activity on visibility in a Class I area is typically associated with the evaluation of stationary source contributions.

Air quality management at Air Force installations is established in Air Force Instruction (AFI) 32-7040, Air Quality Compliance. AFI 32-7040 requires installations to achieve and maintain compliance with all applicable federal, state, and local standards for air quality compliance. The applicable federal standard is 42 USC 7401. If compliance requirements for air quality are more protective under state and local standards, the more protective requirement must be followed. Air quality compliance involves prevention, control, abatement, documentation, and reporting of air pollution from stationary sources and mobile sources. Maintaining compliance with air quality regulations may require reduction or elimination of pollutant emissions from existing sources and control of new pollution sources.

Existing Conditions

The climate in St. Paul, Minnesota, is characterized by extreme variation in monthly temperatures. Average monthly temperatures range from 12 degrees Fahrenheit (°F) in January to nearly 74ºF in July. Average daily minimum and maximum temperatures, respectively, are 3ºF and 21ºF in January and 63ºF and 84ºF in July. Average annual precipitation is 28.3 inches, with one to four inches of rainfall in each month of the year. June is the wettest month, with an average of four inches of precipitation. Snowfall begins in October and typically continues through April. Average winds in St. Paul are 9 to 12 miles per hour (Climate Zone 2003).

The potential influence of emissions on regional air quality would typically be confined to the air basin in which the emissions occur. Therefore, the region of influence for the Proposed Action is the Minneapolis-St. Paul Intrastate AQCR (AQCR 131), which includes Anoka County, Carver County, Dakota County, Hennepin County (in which the 133 AW installation is located), Ramsey County, Scott County, and Washington County. A review of federally published attainment status for Minnesota in 40 CFR §81.324 indicated that this region is designated as attainment (i.e., meeting national standards) for NO_2, PM_{10}, $PM_{2.5}$, O_3, and Pb and designated as attainment maintenance for CO and SO_2.

No mandatory federal PSD Class I areas are located within the region of influence. The nearest PSD Class I areas are the Boundary Waters Canoe Area and Voyageurs National Park, which are each located approximately 402 kilometers (250 miles) north of Minneapolis, along Minnesota's northern border.

Regional Air Emissions

The NEPA process must consider impacts from indirect emissions produced by both stationary and mobile sources related to the project, some of which occur outside of the 133 AW installation (for example, new employees commuting to and from the facility). For comparison purposes, Table 3-6 lists countywide emissions for Hennepin County and for AQCR 131 (which includes Hennepin County) as compiled for the Minnesota Criteria Pollutant Emission Inventory, which was last updated in 2002. The statewide emissions inventory, which is used by the USEPA's National Emissions Inventory, contains estimates of annual emissions for stationary and mobile sources of air pollutants in each county, on an annual basis.

Table 3-6 Air Emission Inventory, Hennepin County, Minnesota, and AQCR 131 Calendar Year 2002

	Sources	CO	VOC	NOx	SO_2	PM_{10}
Hennepin County	Stationary	14,411	29,834	35,050	18,550	6,011
	Mobile	340,665	25,740	44,197	1,495	1,319
AQCR 131	Stationary	61,462	78,337	119,229	71,143	27,847
	Mobile	817,882	68,947	112,509	4,1,61	3,585

Pollutants in tons per year
Source: MPCA 2006
Note: The emissions from AQCR 131 were calculated as the sum of emissions from the seven counties that make up AQCR 131. See Appendix C for the emissions by county. The stationary source emissions were calculated as the sum of the point source and area source emissions, and the mobile source emissions were calculated as the sum of the on-road and off-road mobile source emissions.

Emissions at the 133 AW Installation

Air emissions at the 133 AW installation include those from stationary and mobile sources. The stationary sources include combustion sources, such as heating units fired by heating oil and natural gas generators fired by diesel fuel, and aircraft engine tests conducted in the engine test cell. The 133 AW installation also has fuel storage/transfer and operational stationary sources, such as chemical usage and painting operations. The mobile sources include vehicle and aircraft operations as well as diesel-, gasoline-, and jet petroleum (JP)-8-fired Aerospace Ground Equipment (AGE). Vehicle operations at the 133 AW consist of both on- and off-road government vehicles and privately owned vehicles. Flying operations at the 133 AW include landings and takeoffs and trim and power checks of assigned and transient aircraft. Baseline emissions for the 133 AW are presented in Table 3-7.

Table 3-7 Baseline Emissions in Tons Per Year at 133 AW, St. Paul, Minnesota, Calendar Year 2005

Pollutant	Stationary	Mobile
CO	1.3	56.7
NOx	2.8	25.2
PM_{10}	0.3	4.0
SO_2	0.3	3.4
VOC	7.6	5.6
HAPs	1.0	1.2
$PM_{2.5}$	0.3	3.9

Source: USAF 2006

MPCA issued an Option D Registration Permit to 133 AW in May 1996, allowing the base to operate as a synthetic minor source under the Title V program. The 133 AW recently conducted an analysis of potential stationary source emissions, which concluded that the annual potential stationary source emissions from the site were less than MPCA air permitting thresholds. As such, in January 2007 the 133 AW requested the MPCA rescind the application for the Option D Registration Permit.

3.4 Socioeconomic Resources

Socioeconomic resources are defined as the basic attributes associated with the human environment, particularly population and economic activity. Population is described by the change in magnitude, characteristics, and distribution of people. Economic activity is typically composed of employment distribution, personal income, and business growth. Any impact on these two fundamental socioeconomic indicators can have ramifications for secondary considerations, like housing availability and public service provision.

The ANG's implementing regulation for NEPA is 32 CFR Part 989, et seq. *Environmental Impact Analysis* (formerly known as AFI 32-7061). To comply with NEPA, the planning and decision-making process for actions proposed by federal agencies involves a study of other relevant environmental statutes and regulations, including Executive Order (EO) 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, which was issued by President Clinton on February 11, 1994. The essential purpose of EO 12898 is to ensure the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment means that no group of people, including racial, ethnic, or socioeconomic groups,

should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of federal, state, tribal, and local programs and policies.

Because children may suffer disproportionately from environmental health risks and safety risks, EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, was introduced in 1997 to prioritize the identification and assessment of environmental health risks and safety risks that may affect children, and to ensure that federal agency policy, programs, activities, and standards address environmental risks and safety risks to children. These risks are defined as "risks to health or to safety that are attributable to products or substances that the child is likely to come in contact with or ingest." This section identifies the distribution of children and locations where the number of children in the affected area may be proportionately high (e.g., schools, child care centers, etc.).

The socioeconomic and environmental justice analysis that follows is paramount to NEPA compliance. Socioeconomic data are presented for the region of influence of Hennepin County as well as the state of Minnesota and the nation. Baseline trends for this region are analyzed in comparison to those at the state and national scale. Consequently, various data in this section are presented for the region of influence, state, and national levels. Existing conditions for environmental justice were analyzed through demographic characterization, particularly ethnicity and poverty status for the region of influence.

Population and Income

Table 3-8 presents the population for the region of influence of Hennepin County, the State of Minnesota, and the United States.

Table 3-8 Population

Geographic Area	1990 Population Count	2000 Population Count	2010 Population Projection
Hennepin County	1,032,431*	1,116,200**	1,149,290***
Minnesota	4,375,099*	4,919,479**	5,446,530***
United States	248,709,873 *	281,421,906 **	308,936,000****

*Source: * 1990 Census SF1 Profile*
*** 2000 Census SF1 Profile*
**** Minnesota State Demographic Center, Projected Minnesota Populations*
***** U.S. Census Bureau 2004*

Table 3-9 presents the changes and projected changes in population from 1990 to 2010. The population of Hennepin County increased 8% from 1990 to 2000 and is expected to only increase 3% from 2000 to 2010. These increases are much less than the actual and expected increases for the State of Minnesota and the United States.

Table 3-9 Population Change

Geographic Area	1990-2000 Change	2000-2010 Change
Hennepin County	8%	3%
Minnesota	12%	11%
United States	13%	10%

Table 3-10 presents the per capita income for Hennepin County, the State of Minnesota, and the United States. Hennepin County has a higher per capita income than the other geographic areas.

Table 3-10 Income

Geographic Area	2000 Per Capita Income
Hennepin County	28,789
Minnesota	23,198
United States	21,587

Source: 2000 SF1 Profile

Economy

Employment information by community from the Metropolitan Council was used to generate Table 3-11. This table includes information for Hennepin County and cities surrounding the MSPIA.

Table 3-11 Employment

Geographic Area	2000	2003	2004	2005	2006	2000-06 Change	2000-06 % Change
Hennepin County	877,693	826,116	827,606	835,242	843,188	-34,505	-3.9
Bloomington	104,548	91,015	92,619	93,059	88,574	-15,974	-15.3
Eagan	42,750	48,339	49,063	49,496	49,677	6,927	16.2
Mendota	266	247	101	99	107	-159	-59.8
Mendota Heights	8,549	10,034	10,225	10,267	10,447	1,898	22.2
Minneapolis	308,127	288,265	286,726	287,023	296,205	-11,922	-3.9
Richfield	11,762	14,758	14,497	14,494	16,834	5,072	43.1
St. Paul	188,124	182,286	180,569	180,072	181,205	-6,919	-3.7

Source: 2000-2006 Employment by Community, Metropolitan Council

The cities of Richfield, Mendota Heights, and Eagan were the only geographic areas to experience employment growth from 2000 to 2006, while the other geographic areas, including Hennepin County, experienced a decline in employment. Most of the declines occurred between the years 2000 and 2003 and are related to overall economic decline experienced by the United States during that time.

The 934 AW provided over $40 million in salaries and $24 million in construction, services, supplies, equipment, travel, and per diem during 2003. The 934 AW has an estimated $90 million economic effect annually onto the Twin Cities area (i.e., Minneapolis and St. Paul) (MSPARS 2005).

Temporary lodging for military personnel is available at the North Country Lodge, which is part of the 934 AW. Private hotels are also under contract with the 934 AW to provide lodging when space is not available at the North Country Lodge. It is probable that the personnel from the 148 FW deployed to the 133 AW would be residing in the North County Lodge.

Environmental Justice

In order to provide a thorough environmental justice evaluation, this Environmental Assessment (EA) gives particular attention to the distribution of race, poverty, and legal status (under age 18) in areas potentially impacted by implementation of the Proposed Action. Table 3-12 displays the demographics for the region of influence of Hennepin County, the state of Minnesota, and the United States.

Table 3-12 Profiles of Demographic Characteristics

Geographic Area	One Race						Two or More Races
	White	Black Or African American	American Indian and Alaska	Asian	Native Hawaiian and Other Pacific Islander	Other Race	
Hennepin County	898,921 (0.4%)	99,943 (0.3%)	11,163 (0.5%)	53,555 (0.5%)	531 (0.1%)	23,045 (0.2%)	29,041 (0.4%)
Minnesota	4,400,282 (2%)	171,731 (0.5%)	54,967 (2.2%)	141,968 (1.4%)	1,979 (0.5%)	65,810 (0.4%)	82,742 (1.2%)
United States	211,460,626	34,658,190	2,475,956	10,242,998	398,835	15,359,073	6,826,228

Source: 2000 Census SF1 Profile
Percent of race for Hennepin County and Minnesota as compared to the total for race in the United States is shown in parentheses below each count.

Table 3-13 presents the numbers of individuals in the region of influence that live below the poverty level. The percent of the number of individuals that live below the poverty level is lower in Hennepin County and Minnesota than across the nation.

Table 3-13 Populations Below the Poverty Level

Geographic Area	Individuals Living Below the Poverty Level	Percent of Population Living Below the Poverty Level
Hennepin County	90,384	5
Minnesota	380,476	7.9
United States	33,899,812	12.4

Source: 2000 Census SF1 Profile

Protection of Children from Environmental Health Risks and Safety Risks

There is no resident population at the 133 AW. No schools or childcare centers exist and no families are living at the 133 AW installation; therefore, no children under the age of 18 are expected to be present at the 133 AW facility. Additionally, no children would be moved from Duluth/148 FW as part of the Proposed Action.

3.5 Safety

This section addresses ground, explosive, and flight safety associated with activities conducted at the 133 AW. Ground safety considers issues associated with human activities, and operations and maintenance activities that support unit operations. A specific aspect of

ground safety addresses anti-terrorism/force protection (AT/FP) considerations. Explosive safety discusses the management and use of ordinances or munitions associated with installation operations and training activities. Flight safety considers aircraft flight risks such as aircraft accidents. The region of influence for safety is the 133 AW installation.

Ground Safety

Day-to-day operations and maintenance activities conducted by the 133 AW are performed in accordance with applicable Air Force safety regulations, published Air Force Technical Orders, and standards prescribed by Air Force Occupational Safety and Health requirements. The MAC fire department responds to aircraft accidents on the 133 AW installation. If increased response is required, the MAC has an agreement with local fire departments to assist. All required emergency response equipment is available.

Hydrazine is not used on the C-130 aircraft operated at the 133 AW, and hydrazine is not currently stored at the 133 AW installation. Under the Proposed Action, the alert aircraft would use canisters of hydrazine, which would be stored in 15-pound quantities within sealed canisters. The canisters would only be unsealed if the hydrazine was needed as fuel to power an onboard generator during an in-flight emergency. Hydrazine is a toxic substance. However, exposure to support personnel working close to the aircraft from the exhaust of alert aircraft after using hydrazine is not expected since hydrazine would be completely consumed and would pose no safety hazard.

Potential maintenance activities involving the handling of hydrazine are limited, and would consist primarily of removal and replacement of the canister on an aircraft following an in-flight emergency. All major maintenance and servicing requirements are accomplished at Springfield, Ohio, at an environmentally and safety approved hydrazine storage and processing facility. Sealed canisters are transported over-land by truck. Personnel who transport the hydrazine are fully trained in handling and safety processes, are equipped with proper protective clothing and spill-response equipment, and carry detailed Hazardous Material Safety Data Sheets with them during transport.

Anti-Terrorism/Force Protection

As a result of terrorist activities, the Department of Defense (DoD) and the United States Air Force have developed a series of AT/FP guidelines for military installations. These guidelines address a range of considerations that include access to the installation, access to facilities on the installation, facility siting, exterior design, interior infrastructure design, and landscaping. The intent of this siting and design guidance is to improve security, minimize fatalities, and limit damage to facilities in the event of a terrorist attack.

Many military installations, such as the 133 AW facilities, were developed before such considerations became a critical concern. Thus, under current conditions, many units are not able to comply with all present AT/FP standards; however, as new construction occurs, it would incorporate these standards, and as facilities are modified, AT/FP standards would be incorporated to the maximum extent practicable.

Explosives Safety

The 133 AW stores, maintains, and uses a range of munitions required for performance of its mission. All ordinances are handled and stored in accordance with U.S. Air Force explosive safety directives (AFI 91-201), and all munitions maintenance is carried out by trained, qualified personnel using USAF-approved technical procedures. Munitions used by the 133 AW are currently stored in buildings 617 and 631, which are located away from the proposed alert hangar near the southeast corner of the 133 AW installation (Figure 3-3).

The proposed alert F-16C aircraft would be considered an explosives loaded aircraft, so an Explosive Site Plan was created by the 133 AW in accordance with the Air Force Manual 91-201, Explosive Safety Standards dated 18 October 2001 and DoD Standard 6055.9, DoD Ammunition and Explosives Safety Standards. The location of the proposed F-16C aircraft would require an Inhabited Building Distance (IBD) of 400 feet, Public Traffic Route (PTR) distance of 240 feet, intraline to a related facility distance of 56 feet, and an inter-magazine distance of 10 feet.

Explosive safety criteria with respect to missile separation and inter-magazine distance would be met for the Proposed Action. The IBD clear zone surrounding the proposed alert hangar encompasses buildings of the 133 AW, property owned by the U.S. Army Reserve, and property owned by the MAC. The only building currently inhabited within the IBD would be the maintenance hangar (building 680). An explosives safety waiver would be in effect for the Proposed Action. The maintenance hangar, used primarily for maintenance and inspections, is located 298 feet south of the proposed alert hangar. The 133 AW operates this building, and 130 military personnel typically work at this location.

Uninhabited buildings in close proximity to the proposed alert hangar include two paint storage facilities (buildings 672 and 681), three non-critical storage buildings (buildings 664, 665, and 673), water pump house (building 660), an aboveground earth-covered cistern (building 661), fuel foam storage building (building 667), and a back-up generator facility (building 671). The water pump house supplies water for the fire deluge system for building 685 and the maintenance hangar (building 680). Building 685 is a hangar located greater than 400 feet south of the proposed alert hangar. If the pump house is destroyed from an explosives

mishap, water could be redirected from the St. Paul water system on the southeast side of the 133 AW or from the above ground cistern. It would take between 8 and 48 hours to redirect water. The base fire chief has determined there is an adequate supply of water for fire fighting without the water pump house facility. The back-up generator facility provides back-up power to building 670. Based on the usage and manning of the buildings and the distance to the proposed alert hangar, damage to the uninhabited buildings would not adversely affect the mission of the 133 AW.

The only 133 AW personnel that would be working near the proposed alert hangar and F-16C aircraft are the fuel delivery truck drivers, who would be exposed to the increased risk for only a brief time during delivery of fuel. All other personnel working in the immediate vicinity of the proposed alert hangar and F-16C aircraft would be those temporarily deployed from the 148 FW in Duluth.

Flight Safety

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

Aircraft Mishaps

The USAF defines four categories of aircraft mishaps: Classes A, B, C, and High Accident Potential (HAP). Class A mishaps result in a loss of life, permanent total disability, a total cost in excess of $1 million, destruction of an aircraft, or damage to an aircraft beyond economical repair. Class B mishaps result in total costs of more than $200,000, but less than $1 million, or result in permanent partial disability or inpatient hospitalization of three or more personnel, but do not result in fatalities. Class C mishaps involve reportable damage of more than $20,000, but less than $200,000; or a lost workday involving 8 hours or more away from work beyond the day or shift on which it occurred; or occupational illness that causes loss of work at any time. HAP represents minor incidents not meeting any of the criteria for Class A, B, or C. Class C mishaps and HAP, the most common types of accidents, represent relatively unimportant incidents because they generally involve minor damage and injuries, and rarely affect property or the public. This EA focuses on Class A mishaps because of their potentially catastrophic results.

Based on historical data of mishaps at all installations and under all conditions of flight, the military services calculate Class A mishap rates per 100,000 flying hours for each type of

aircraft in the inventory. These mishap rates do not consider combat losses due to enemy action. In evaluating this information, it should be emphasized that data presented are only statistically predictive. The actual causes of mishaps are due to many factors, not simply the amount of flying time of the aircraft.

The 133 AW began operating C-130H cargo aircraft in 1971. Based on 2002 information, C-130 aircraft had flown more than 15,832,323 hours. During that time, C-130 aircraft had experienced 148 Class A mishaps. The C-130 data reflect a Class A mishap rate per 100,000 flying hours of 0.93 (Flying Safety 2003). The 133 AW has experienced two Class A mishaps since the unit began flying these aircraft. The Proposed Action would deploy F-16 aircraft, which, as of 2002, flew 6,997,039 hours with a Class A mishap rate per 100,000 flying hours of 4.19 (Flying Safety 2003). Based on the above information, F-16 aircraft are four times more likely than C-130 aircraft to experience a Class A aircraft mishap. However, F-16 aircraft mishaps are more likely to occur during training at ranges or in air combat maneuvers, neither of which is in the vicinity of the airport.

F-16C aircraft carry a small quantity of hydrazine in a sealed canister that is designed to withstand crash impact damage. As previously noted, hydrazine is a highly volatile propellant that contains toxic elements. It is carried on the F-16C as part of the aircraft's emergency power unit. When used for this purpose, hydrazine is completely consumed, and poses no safety hazard. In any crash that is severe enough to rupture the canister, it is most likely that fire will also be involved. In this case, the hydrazine will also burn and be completely decomposed. In the unlikely event that the hydrazine should be released, but not consumed by fire, impacts on soils and groundwater would likely be of minor consequence. Hydrazine absorbs water at room temperature. It is incombustible in solution with water at concentrations of 40 percent or less, and it evaporates at any given temperature at a rate slightly slower than water. Movement of hydrazine through natural soils has been shown to be slow and limited. Due to its absorption and natural decomposition processes, the probability of released hydrazine significantly contaminating groundwater is considered extremely low. Furthermore, the likelihood of a 15-pound canister reaching a surface water body in a concentration high enough to cause a significant impact on aquatic life is also very low.

Bird-Aircraft Strike Hazards

Bird-aircraft strikes constitute a safety concern because of the potential for damage to aircraft or injury to aircrews or local populations if an aircraft crash should occur in a populated area. Although aircraft may encounter birds up to altitudes of 30,000 feet mean sea level, most birds fly closer to the ground. Over 94 percent of reported bird strikes occur below 3,000 feet above ground level (AGL). Approximately 50 percent of bird strikes happen in the

airport environment, and almost 15 percent occur away from airports during low-altitude flight training and use of weapons ranges (USAF BASH Team 2005).

Migratory waterfowl (e.g., ducks, geese, and swans) are the most hazardous birds to low-flying aircraft because of their relatively large size and their propensity for migrating in large flocks over a variety of elevations and at all times of day. Waterfowl vary considerably in size, from one to two pounds for ducks, five to eight pounds for geese, and up to 20 pounds for swans. There are two normal migratory seasons: fall and spring. Waterfowl are usually only a hazard during migratory seasons. These birds typically migrate at night and generally fly between 1,500 to 3,000 feet AGL during the fall migration and from 1,000 to 3,000 feet AGL during the spring migration.

Raptors, shorebirds, gulls, herons, and songbirds also pose a hazard. In considering severity, the results of bird-aircraft strikes in non-airport low level training areas show that strikes involving raptors result in the majority of Class A and Class B mishaps related to bird-aircraft strikes.

Raptors of greatest concern are vultures and red-tailed hawks. Peak migration periods for raptors are from October to mid-December and from mid-January to the beginning of March. In general, flights above 1,500 feet AGL would be above most migrating and wintering raptors.

Songbirds are small birds, usually weighing less than one pound. During nocturnal migration periods, they navigate along major rivers, typically between 500 and 3,000 feet AGL. The potential for bird-aircraft strikes is greatest in areas used as migration corridors (i.e., flyways) or where birds congregate for foraging or resting (e.g., open water bodies, rivers, and wetlands).

While any bird-aircraft strike has the potential to be serious, many result in little or no damage to the aircraft, and only a minute portion result in a Class A mishap. From 1985 to 2004, the USAF Bird-Aircraft Strike Hazard (BASH) Team documented 62,536 bird strikes. Of these, 25 resulted in Class A mishaps where the aircraft was destroyed; however, not all aircraft mishaps occur in the vicinity of an airport. These occurrences constituted approximately 0.04 percent of all reported bird-aircraft strikes (USAF BASH Team 2005).

A bird strike hazard does exist at the 133 AW installation. A large number of birds have been observed on and around the MSPIA. Birds at the airport are dispersed by the use of pyrotechnics. Additionally, pilots often adjust altitudes as needed to avoid bird strikes. The C-

130 aircraft currently operated at the 133 AW have a larger wing and fuselage area as compared to the F-16C, which suggests that F-16C aircraft are less likely than C-130 aircraft to experience bird-aircraft strikes.

3.6 Cultural Resources

Regulations and Criteria

Cultural resources are defined as prehistoric or historic districts, sites, buildings, structures, or objects considered important to a culture, subculture, or community for scientific, traditional, religious, or other purposes. They include archaeological resources, historic architectural or engineering resources, and traditional resources.

Cultural resources that are eligible for listing in the National Register of Historic Places (NRHP) are called historic properties. Historic properties are evaluated for potential adverse impacts from an action. Architectural/engineering resources generally must be more than 50 years old to be considered for inclusion in the NRHP; however, more recent structures, such as those dating from the Cold War era, may warrant protection if they manifest "exceptional significance" or the potential to gain significance in the future. In addition, some cultural resources, such as American Indian sacred sites or traditional resources may not be historic properties but they are also evaluated under NEPA for potential adverse effects from an action. These resources are identified through consultation with appropriate American Indian Tribes or other interested groups. On 21 November 1999, the DoD promulgated its American Indian and Alaska Native Policy, emphasizing the importance of respecting and consulting with Tribal governments on a government-to-government basis. The policy requires an assessment, through consultation, of the effects of proposed DoD actions that may have the potential to significantly affect protected Tribal resources, Tribal rights, and Indian lands before decisions are made by the services.

The National Historic Preservation Act (NHPA) of 1966 provided for a network of historic preservation offices in every state to spearhead state preservation initiatives and help carry out the nation's historic preservation program. Minnesota's State Historic Preservation Office (SHPO) was created by state statute in 1969 to provide statewide leadership. The director of the Minnesota Historical Society serves as State Historic Preservation Officer. Located in the Society's Historic Preservation Field Services and Grants Department, the SHPO fulfills its mission to preserve and promote Minnesota history by working to do the following:

- Identify, evaluate, register, and protect Minnesota's historic and archaeological properties;

- Encourage the development of local history organizations and activities; and
- Assist government agencies in carrying out their historic preservation responsibilities.

Historical Context

The following excerpts were taken from the Cultural Resources Survey Report prepared for the 934 AW (SAIC 1995).

The prehistory of the project area can be divided into four broad periods: PaleoIndian, Archaic, Woodland, and Oneota and Plains Village. In general, there was a gradual change over time from small, nomadic groups to larger, more politically complex villages. This change is particularly striking in the Minnesota River region, since it contains numerous and abundant resources in its sloughs, rivers, floodplains, and terraces. It was also used as a major transportation route throughout prehistory and history (SAIC 1995).

The PaleoIndian period (11,000 to 8,500 years ago) is primarily defined by the presence of well-made, fluted projectile points, usually found on the surface with few associated artifacts. For this reason, little is understood about this period; however, it did occur during a period of dramatic climate change from cold, glacial conditions with tundra vegetation to a warmer climate with deciduous forests. PaleoIndian sites may be located on the bluffs above the Minnesota River, but it is unlikely that occupations within present day floodplains and slopes have survived to the present (SAIC 1995).

The Archaic period (8,500 to 3,000 years ago) has been identified as a time of broad spectrum resource use. People during this period were hunters and gatherers who relied on a large assortment of plants and animals. Artifacts associated with this period include notched projectile points and assorted ground stone artifacts, such as adzes and axes. Sites dating to this period are most likely to be found along the tributary streams and at the edges of bluffs (SAIC 1995).

The Woodland period (3,000 to 1,000 years ago) is characterized by the development of regional differences in artifact styles, use of local resources, and an increase in population. The most distinctive characteristics are the appearance of pottery and earthen mounds. The latter were usually built on bluffs above major rivers. In other ways, however, it appears to be similar to the Archaic period in its use of a variety of plant and animal resources. Sites from this period tend to be located in floodplains (SAIC 1995).

The Oneota and Plains Village period (1,000 to 300 years ago) is characterized by sedentary farming villages, usually located in floodplains of major rivers and tributaries. Occupations during this period were year-round and involved larger groups of people. In many areas, these groups were involved in long distance exchange of resources. Like the Woodland period, Oneota groups built earthen mounds, which were usually located on bluffs above major rivers (SAIC 1995).

The portion of Hennepin County in which the project area is located was initially settled by the Dakota and Chippewa Indians. These historic tribes were characterized by large, semi-permanent villages, whose inhabitants survived on both farming and hunting. The region was first explored by the French in the late 17th century, when Father Louis Hennepin, a Franciscan missionary, traveled to the Northwest Wilderness and named the waterfall above present-day Minneapolis the Falls of St. Anthony. He was followed by both French and British fur trappers who traded with the Indians.

In 1805, Zebulon Pike, exploring the confluence of the Minnesota and Mississippi Rivers, bought the land from the Dakota as a site for a fort, established by 1825 as Fort Snelling. Fur trapping and the timber industry were the most important industries at this time. Since 1820, various settlers had illegally established sawmills at the base of St. Anthony Falls around Fort Snelling. Franklin Steele claimed the site in 1847 and began a settlement around his sawmill. In 1852, the land was opened up for farming and lumbering through a treaty with the Indians. Wheat became the major crop. Hennepin County was established and the name Minneapolis chosen for its major town, situated near St. Anthony Falls (SAIC 1995).

In this period from 1860 to the 1900s, Minneapolis experienced rapid growth and industrialization. With the need to ship flour and lumber to markets, local entrepreneurs developed railroad connections to the north, to the Great Lakes at Duluth, and to the east coast. Railroad access in turn opened the area for immigration, particularly after the Civil War. Settlers came from Scandinavia, Germany, Canada, and Ireland, and, with the benefit of the Homestead Act, were able to purchase farmland (SAIC 1995).

Richfield, a town adjacent to Minneapolis, developed following a cession of Indian lands in 1852. Incorporated in 1858, the same year Minnesota became a state; Richfield originally included not only Fort Snelling but also parts of the Minnesota and Mississippi Rivers, prairie, timberland, lakes, and streams. Wheat, the main farm crop, was transported to St. Paul and from there to St. Louis and the east coast, as well as being sent to the flour mills in Minneapolis. The city limits of Richfield now form the western boundary of MSPIA (SAIC 1995).

The presence of the early automobile and aviation industries determined the future growth and development of Richfield, changing its farmland into what today is the site of MSPIA. In 1915, a group of investors built a 2.5-mile concrete track in a large field and named it the Twin City Speedway. Meant to become the "Indianapolis of the North," this track was used only a few times before being closed in 1917. The site was reactivated a few years later, this time as a landing field under the jurisdiction of the Twin City Aero Corporation, which built a wood-frame hangar adjacent to it. In 1921, three more hangars were built at the north edge of the field to house the 109th Observation Squadron, America's first ANG unit. The airport, known initially as "Speedway Field" was formally named Wold-Chamberlain Field in 1923 to honor two local pilots killed in World War I. In 1928, the City of Minneapolis bought Wold-Chamberlain Field from the Aero Corporation and expanded it under the responsibility of the Minneapolis Park Board. Between 1928 and 1930, the former speedway track was removed, a main terminal was constructed, and new hangars built. Over the next decade, more hangars were constructed, the terminal was enlarged, and the runways were paved with concrete (SAIC 1995).

Fort Snelling served as the northernmost outpost of a series of forts and Indian agencies designed to aid in American settlement of the Northwest Territory. By 1851, the frontier had moved farther west, and Fort Snelling became merely a supply depot. At the time of Minnesota's statehood in 1858, the fort was sold to developers who planned to plat a town on the site. With the advent of the Civil War, however, the state of Minnesota used the fort once again for military purposes, this time as a training center for the Union soldiers. At the close of the war in 1866, the Army retained the fort as a headquarters for the Department of Dakota, a military land area extending from the Mississippi River to the Rocky Mountains. Soldiers from Fort Snelling fought in Indian wars and the Spanish-America War of 1898. During World War I, a number of new barracks, officers' quarters, and storehouses were built, replacing earlier buildings, and the fort was used as a recruiting and training center and general hospital (SAIC 1995).

After World War I, Fort Snelling continued to serve as a summer and winter training site, and as home to the 3rd Infantry. In the summer training camp west of the main post, headquarters buildings, mess halls, and latrines were constructed, as well as concrete floors for tents serving as barracks. A number of improvements were made to the fort in 1938 using Works Progress Administration funds (SAIC 1995).

Between 1917 and 1919, the Dunwoody Naval Training School was established in Minneapolis, as one of three in the United States to train naval pilots. During these two years,

over 5,000 men were ground trained. In 1928, a Naval Reserve Aviation Base was founded at the north side of the Wold-Chamberlain Field. By 1936, the Naval Reserve Aviation Base had become one of the principal sites for preliminary training; pilots from the Naval Reserve Aviation Base were given 30-day tryouts which, if they passed, qualified them for further training at Pensacola, Florida Naval Air Station (SAIC 1995).

During World War II, Fort Snelling served as an Army recruiting and induction center as well as a training base. With the introduction of the Selective Service Act in 1940, designed to expand the Armed Forces to meet wartime needs, Army volunteers and draftees were called to enlist by the thousands. By the war's end, 300,000 personnel had been inducted into the Army through Fort Snelling. After the war, Fort Snelling was closed as an Army post. Soon after, it was transferred to the Army's Veteran's Administration. The 300 permanent buildings were torn down for the expansion of MSPIA. Runways and hangars are now in their place (SAIC 1995).

133 AW Installation

The Cold War era saw the transfer of the area where the 133 AW is currently located from the Veteran's Administration to the Air Force in 1951. In 1952, the Air Defense Command (ADC) assumed jurisdiction of the area, leveled the existing buildings, and constructed an Air Force base on the site in 1953. Its initial mission was air defense of the Duluth Air Defense Sector, using fighter/interceptor aircraft. This mission was shared with Duluth Air Force Base which had, in addition to fighter/interceptor aircraft, a semi-automated ground environment system (SAGE). In 1953, the Air Force began constructing the base, laying out streets in an elongated triangle pattern (SAIC 1995).

The first facilities for the mission, constructed between 1952 and 1953, were the alert hangar (building 670) and taxiway. Two pilots were stationed on alert in the alert hangar; facilities included an airman's card room, kitchen, and bunk areas. When the klaxon blew to indicate an alert posture, the specially weighted hangar doors would open automatically, the control tower would clear the runway of commercial aircraft, and the pilots would "scramble" to get into the air as soon as possible to pursue and identify any unknown aircraft flying within the assigned sector. The alert mission under the 109th FIS lasted only one year. Since its inception, the Air Force base faced criticism from the commercial airport as well as the surrounding neighborhoods concerning the noise of military jet aircraft. This incompatibility of civilian/military uses of the airport may have been the reason why the Air Defense Command (ADC) mission lasted so few years. It was also the reason why the defense mission of the 109th FIS came to an early halt at the end of 1960, when the F-89 jets were replaced by

conventional Boeing C-97 cargo aircraft. Building 670 houses the Minnesota Air Guard Museum maintained by the MNANG Historical Foundation (SAIC 1995).

In 1955 and 1956, additional buildings to support the mission were added, including the rocket assembly storage building (building 659), the operations and readiness building (building 684), a maintenance hangar (building 685), and a readiness hangar (building 680). Approximately 50 other buildings typical of such an Air Force base were also added during these years (SAIC 1995).

Existing Conditions

A Cultural Resources Survey was conducted for the 934 AW in 1995 (SAIC 1995). Archaeological surveys were conducted in two areas near the 934 AW installation. These areas are located on the southeast side of MSPIA. The 133 AW was not within the area surveyed. No archaeological resources were found in the areas surveyed. According to the Cultural Resources Survey report (SAIC 1995), the 133 AW base was not surveyed for archaeological resources because the installation is almost entirely developed. According to the Natural Resource Conservation Service, soils on the 133 AW have been altered due to development, and natural map units are no longer present at the site.

The Fort Snelling National Historic District is located to the northeast and east of the 133 AW base. The district is approximately 3,000 acres and consists of 50 buildings. The Fort Snelling National Cemetery is located on the southeastern side of MSPIA. The cemetery was first established in 1805 and is approximately 436 acres (NCA 2006).

The proposed alert hangar (building 670), currently known as the ANG Museum, was examined during the Cultural Resources Survey for NRHP eligibility as a Cold War facility. The alert hangar was determined to have retained its integrity of location, design, setting, materials, workmanship, feeling, and association. However, the mission at Wold-Chamberlain AFB was brief because of its poor location as part of a civilian field, that it is not considered a significant base, particularly when compared to the Air Force base in Duluth. That base remained on alert from 1953 to 1975 and also had a SAGE system connected with it. Because its mission was short, this alert hangar's mission is not considered exceptionally important in comparison with other Defense Sector alert facilities. Building 670, a standard hangar, contains large weights that enable the four doors to open rapidly for quick take-off of aircraft during an alert operation. However, this system does not appear to be exceptional or unique. Accordingly, the alert hangar was determined during the Cultural Resources Survey to not be eligible for the NRHP.

No cultural resources exist within the 133 AW installation.

3.7 Hazardous Material and Hazardous Waste

This section describes the affected environment associated with hazardous materials and petroleum products, hazardous and petroleum wastes, Environmental Restoration Program (ERP) sites, and solid waste at the construction, renovation, and demolition areas. The ERP is an Air Force program to identify, characterize, and remediate environmental contamination from past activities at Air Force installations. The terms "hazardous materials" and "hazardous waste" refer to substances defined as hazardous by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act (RCRA). In general, hazardous materials include substances that, because of their quantity, concentration, or physical, chemical, or infectious characteristics, may present substantial danger to public health or the environment when released into the environment. Hazardous wastes that are regulated under RCRA are defined as any solid, liquid, contained gaseous, or semisolid waste, or any combination of wastes that either exhibit one or more of the hazardous characteristics of ignitability, corrosivity, toxicity, or reactivity, or are listed as a hazardous waste under 40 CFR Part 261. Petroleum products include petroleum-based fuels, oils, and their wastes.

Issues associated with hazardous material and waste typically center around waste streams, underground storage tanks (USTs), aboveground storage tanks, and the storage, transport, use, and disposal of pesticides, fuels, lubricants, and other industrial substances. When such materials are improperly used in any way, they can threaten the health and well being of wildlife species, habitats, and soil and water systems, as well as humans. This section also considers solid waste.

The management of hazardous materials and hazardous waste is governed by specific environmental statutes. The key regulatory requirements include the following:

- *Comprehensive Environmental Response, Compensation and Liability Act of 1980* (42 USC 9601–9675) as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986. CERCLA/SARA regulates the prevention, control, and compensation of environmental pollution.
- *Community Environmental Response Facilitation Act of 1992* (42 USC 9620). This act amended CERCLA to require that, prior to termination of federal activities on any real property owned by the federal government, agencies must identify real property where hazardous substances were stored, released, or disposed of.
- *Emergency Planning and Community Right-to-Know Act* (EPCRA) of 1986 (42 USC 11001–11050). EPCRA requires emergency planning for areas where

hazardous materials are manufactured, handled, or stored and provides citizens and local governments with information regarding potential hazards to their community.

- *Resource Conservation and Recovery Act of 1976* (42 USC 6901–6992). RCRA established standards and procedures for handling, storage, treatment, and disposal of hazardous waste.
- *Federal Facility Compliance Act of 1992* (Public Law [P.L.] 102-426). This act provides for a waiver of sovereign immunity on the part of federal agencies with respect to federal, state, and local requirements relating to RCRA solid and hazardous waste laws and regulations.
- *Federal Insecticide, Fungicide, and Rodenticide Act* (FIFRA) of 1996 (7 USC 136 et seq.). FIFRA provides federal control of pesticide distribution, sale, and use. It also provides certification criteria for pesticide applicators, including contractors.
- *Pollution Prevention Act of 1990* (42 USC 13101–13109). This act encourages minimization of pollutants and waste through changes in production processes.
- *USEPA Regulation on Identification and Listing of Hazardous Waste* (40 CFR Part 261). This regulation identifies solid wastes subject to regulation as hazardous and to notification requirements under RCRA.
- *USEPA Regulation on Standards for the Management of Used Oil* (40 CFR Part 279). This regulation delineates requirements for storage, processing, transport, and disposal of oil that has been contaminated by physical or chemical impurities during use.
- *USEPA Regulation on Designation, Reportable Quantities, and Notification* (40 CFR Part 302). This regulation identifies reportable quantities of substances listed in CERCLA and sets forth notification requirements for releases of those substances. It also identifies reportable quantities for hazardous substances designated in the Clean Water Act (CWA).

The region of influence for hazardous materials, hazardous waste, and petroleum products encompasses areas that could be exposed to an accidental release of hazardous substances from the maintenance of the proposed F-16C aircraft. Therefore, the region of influence for this section is defined as the boundary of the 133 AW installation.

Existing Conditions

This section describes the existing management of hazardous materials and petroleum products, hazardous and petroleum wastes, ERP sites, and solid wastes within the region of influence. The Hazardous Waste Management Plan (HWMP; MNANG 2005) is an installation-developed document that provides guidance to personnel who work with hazardous

waste and sets local management procedures for managing hazardous wastes and preventing pollution. The plan incorporates current ANG, USEPA, Occupational Safety and Health Administration, state, and local requirements regarding the management of hazardous wastes as they relate to environmental protection and worker safety during operations conducted at this installation.

As a result of the 133 AW mission, a variety of hazardous material and wastes are generated at locations throughout the facility. To effectively track these, the HWMP details the locations of all generation points, satellite accumulation points, central accumulation point, and storage areas as well as inventories and describes each waste stream generated at the facility. Under the assumption of "cradle to grave" responsibility, it is critical for all 133 AW personnel to manage hazardous waste effectively from its point of origin or generation. It is the responsibility of the generating organization to make a determination as to whether the waste generated is hazardous as defined in 40 CFR 261. Subsequent to generation, the hazardous waste must be immediately transferred to an initial (satellite) accumulation point, a central accumulation point, or a permitted storage area. Waste cannot be accumulated or stored at the generation point unless the area has been designated as an approved accumulation area by the Environmental Management Office. The maximum volume of each hazardous waste permitted at a satellite accumulation point is 55 gallons per waste or one quart of acute hazardous waste on the P-List (40 CFR 261.33; MNANG 2005).

The HWMP identifies the proposed alert hangar (building 670) as a hazardous waste satellite accumulation point. The wastes identified at this accumulation point include waste paint and paint-related filters, strainers, and paper (MNANG 2005).

The major industrial operations at the 133 AW installation include corrosion control, flight line maintenance, propulsion work, aerospace ground equipment maintenance, nondestructive inspection labs, and vehicle maintenance. From 1943 to 1971, wastes were commingled and stored in 55-gallon drums outside the buildings where they were generated. Some of the contaminated fuels were used as supplemental fuel at the heating plant in the current Air Force Reserve area. The remaining drums were transported off the installation for disposal.

From 1957 to 1975, waste oils, spent solvents, and some contaminated fuels were generally commingled during collection and stored in 55-gallon drums. Wastes from the motor pool were stored in a 250-gallon UST located outside of building 614. Building 614 is located near the southeast corner of the 133 AW installation. From 1970 to 1975, the commingled wastes were collected in drums and then transferred to a 5,000-gallon UST located at the

extreme northwest corner of the 133 AW installation. The commingled wastes were then pumped out and transported offsite for disposal.

From 1975 to 1983, waste oils and PD 680 (petroleum distillate used as a cleaning solvent) were kept separate from other spent solvents. The Motor Pool stored waste oil in a 250-gallon UST at its new facility at building 662, which is located at the north-central part of the 133 AW installation. Other waste oils were stored in 55-gallon drums prior to being transported off the installation for disposal.

Storage Tanks and Oil-Water Separators

All USTs within the boundary of the 133 AW installation have been removed. There are 10 aboveground storage tanks (ASTs) within the boundary of the 133 AW installation. Nine of these are active and one is not in service. Table 3-14 provides details regarding these tanks. None of these tanks are located within the proposed alert hangar (building 670).

Table 3-14 Aboveground Storage Tanks

Tank Number	Building Number	Tank Capacity (gallons)	Tank Contents	Installation Date	Status
1191-1507-5	Fuel Point (1507)	6,000	Unleaded Gasoline	Nov 1994	Active
1192-1507-2	Fuel Point (1507)	6,000	Diesel	Nov 1994	Active
1193-1507-1	Fuel Point (1507)	1,500	JP-8	Nov 1994	Active
1402-640	640	2,000	Fuel Oil	Oct 1994	Active
6211-662	662	1,000	Used Oil	Feb 1995	Active
1876-687-1	687	2,000	Fuel Oil	Sept 1993	Active
1877-1516	RAMP	2,500	JP-8	June 1992	Active
1878-687-1	687	2,000	Used Oil	July 1998	Active
6212-613	Power Plant	2,000	Diesel	Not in Service	Not In Service
6213-613	Power Plant	3,200	Diesel	Nov 1994	Active

There are seven oil/water separators on base, including the following: three in building 614, one in building 612, one in building 687, and two in building 662. There are no oil/water separators within or adjacent to the proposed alert hangar (building 670).

Herbicides and Pesticides

Herbicides and pesticides are used at the 133 AW installation to control weeds and nuisance insect species. The base uses small quantities of brodifacoum, biferenthrin, chlopyrifos, N-ethyl perflouooctane, glyphosate, dimethylamine slat, oxadiazon-2 butyl-4, and prodiamine. In 2004, a total of 10.76 pounds of herbicides and pesticides were used.

Environmental Restoration Program

There are five former ERP sites and one non-ERP spill site located on the 133 AW installation. The 133 AW does not have any active ERP sites, and none of the ERP sites occurred in the near vicinity of the proposed alert hangar. The non-ERP was described as being located near the proposed alert hangar. There is currently no evidence of any leaks or spills on the installation.

The reported use of an area (non-ERP site) near building 670, ANG Museum (proposed alert hangar) for disposal of used aircraft engine oil for road dust control and releases associated with Stoddard storage for engine parts degreasing, led to an investigation of this site during the winter of 1992. Based on the results of this preliminary investigation, no further response action is planned for the site pertaining to these issues; however, the investigation did identify a petroleum release associated with two 50,000-gallon USTs adjacent to the site. When these tanks were removed in the summer of 1993, contamination was encountered. Soils were stockpiled and treated, and MNANG conducted a groundwater investigation. Groundwater was found to be contaminated with petroleum–related VOCs. The groundwater contamination was determined to be associated with the release from the two USTs. The Minnesota Pollution Control Agency (MPCA) issued a Minnesota Decision Document which a) required no further action at the Museum Site, and b) transferred regulatory oversight of the release from its Site Response Section to its Tanks and Spills Section. MPCA leak file closure finally occurred in October 1996. No further response action is planned for this site.

Asbestos

Asbestos was once widely used in building materials for fireproofing, insulation, siding, roofing, floor tiles, and adhesives. Asbestos containing material (ACM) poses a serious health risk if it is disturbed so as to create dust or other debris. When hazardous asbestos fibers become airborne, they may be inhaled and lead to lung cancer and other diseases. The MNANG has completed an Asbestos Management Plan, which covers the 133 AW and proposed alert hangar. According to that plan, the proposed alert hangar was constructed in 1953 with a total floor space of 23,163 square feet. The transite wallboard found throughout the building is considered ACM since 15% of it is composed of chrysotile asbestos (ANG 2004). Should demolition, reconstruction, and/or renovation activities occur, asbestos remediation/management must be considered. Additionally, any asbestos waste generated from the subject properties must be managed in accordance with all local, state, and federal regulations.

3.8 Geological Resources

An area's geological resources typically consist of surface and subsurface materials and their inherent properties. Principal factors influencing the ability of geological resources to support structural development are seismic properties (i.e., potential for subsurface shifting, faulting, or crustal disturbance), soil stability, and topography. The term soil generally refers to unconsolidated materials overlying bedrock or other parent material. Soils play a critical role in both the natural and human environment. Soil depth, structure, elasticity, strength, shrink-swell potential, and erodibility determine a soil's ability to support manmade structures and facilities. Soils typically are described in terms of their series or association, slope, physical characteristics, and relative compatibility or constraints in regard to particular construction activities and types of land use. The region of influence for geological resources in this EA includes the 133 AW installation.

The geologic setting of the Minneapolis-St. Paul area is characterized by a thick sequence of sedimentary bedrock units overlain by unconsolidated glacial deposits and more recent alluvium. The bedrock formations of the Minneapolis-St. Paul area are composed of early Paleozoic marine sedimentary rocks that form the uppermost bedrock in a unique local geologic structure referred to as the Twin Cities Basin (Liesch 1992). As much as 1,000 feet of sedimentary rocks occur in this basin structure, which was formed as a small structure and depositional basin along the northeastern margin of the much larger Hollandale Embayment (Liesch 1992). The margins of the Twin City Basin are comprised of a variety of geologic features, including the Belle Plaine Fault along the southern margin, the Vermillion and Hudson-Afton Anticlines along the eastern margin, and depositional on-lap of younger sediments and structural movement along the northern margin (Liesch 1992).

The Paleozoic bedrock is blanketed by varying thicknesses of unconsolidated sediments deposited as a result of the last glaciation, the late Wisconsin (about 25,000 to 10,000 years ago). Older pre-late Wisconsin glacial sediments have also been identified in the area, although these deposits are relatively minor and occur at depth (Liesch 1992). The glacial deposits are categorized by the method of depositional or geologic origin and include glacial till, outwash, ice-contact deposits, and lake-laid sediments. Glacial till is deposited directly by glacial ice and consists of an unsorted mixture of earth materials ranging in size from clay and silt to cobbles and boulders (Liesch 1992). Glacial outwash and ice-contact deposits are deposited by glacial meltwater flowing from the glacier or in contact with glacial ice. These water-born sediments consist primarily of well-sorted accumulations of sand and gravel. Lake-laid or lacustrine sediments are composed primarily of fine-grain deposits of silt, clay, and fine sand (Liesch 1992).

MSPIA and the 133 AW installation are underlain by the complete section of Paleozoic bedrock units found in the Twin Cities Basin and a variety of glacial sediments (Liesch 1992). Units found under MSPIA include Decorah Shale, Platteville Formation, Glenwood Formation, St. Peter Sandstone, Prairie du Chien Group, Jordan Sandstone, and St. Lawrence Formation. Naturally occurring soils near the 133 AW installation include Dakota, Hubbard, and Estherville series. These natural soil types are loamy and well drained. Development of the 133 AW has altered the soils to the point that the Natural Resource Conservation Service has determined that no natural map unit can be described for the site.

3.9 Water Resources

Water resources analyzed in this EA include surface water and groundwater quantity and quality. Surface water resources include lakes, rivers, and streams and are important for a variety of reasons, including economic, ecological, recreational, and human health considerations. Groundwater includes the subsurface hydrologic resources of the physical environment and is an essential resource. Groundwater properties are often described in terms of depth to aquifer or water table, water quality, and surrounding geologic composition.

Other issues relevant to water resources include the downstream water and watershed areas affected by runoff characteristics and flood hazards associated with 100-year floodplains. Floodplains are regulated by EO 11988, Floodplain Management, which define them as "the lowland and relatively flat areas adjoining inland and coastal waters including flood-prone areas of offshore islands, including at a minimum, the area subject to a one percent or greater chance of flooding in any given year" (i.e., that area inundated by a 100-year flood). Floodplain functions include natural attenuation of floods, water quality maintenance, groundwater recharge, and habitat for many plant and animal species. In 1969, the Minnesota Legislature enacted the State Floodplain Management Act (Minnesota Statutes, Chapter 103F). This act and sound floodplain management principles stress the need for a comprehensive approach to solving flood problems by emphasizing nonstructural measures, such as floodplain zoning regulations, flood insurance, flood-proofing, and flood warning and response planning.

The region of influence for water resources comprises the area of the 133 AW installation and airfield, underlying aquifers, and their downstream drainages.

Surface Water

There are 81 major watersheds in Minnesota with approximately 5,600 minor watersheds that comprise these major watersheds. Major watersheds in Minnesota generally

discharge to the following three major receiving waters: Hudson Bay in Canada, the Atlantic Ocean, and the Gulf of Mexico.

The Minnesota and Mississippi Rivers are the major rivers in the vicinity of the 133 AW installation. The Mississippi River is designated a Wild and Scenic River under the National and the State Wild and Scenic Rivers Acts. The Mississippi River is also designated as a Critical Area and a National River and Recreation Area. The proposed alert hangar is approximately one-quarter mile outside of the boundaries of the Mississippi River Critical Area and Recreation Area. The Minnesota River discharges into the Mississippi River east of the 133 AW installation. There are no permanent surface water resources located on the 133 AW installation.

Storm water from the southwest area of the base flows to the southwest outfall, which discharges to the Minnesota River through the MSPIA storm sewer system. Storm water from the northeast area of the base flows to the northeast outfall, which discharges to the Mississippi River through a Minneapolis storm sewer.

MPCA issued the 133 AW installation a National Pollutant Discharge Elimination System (NPDES) storm water permit and State Disposal System Permit in March 2005. The NPDES permit regulates storm water discharges and expires in 2010. The 133 AW Stormwater Pollution Prevention Plan (SWPPP) is an engineering and management strategy prepared specifically for the 133 AW to improve the quality of storm water runoff and thereby improve the quality of the receiving waters. The SWPPP consists of a series of steps and activities to identify potential sources of storm water pollution or contamination and to implement best management practices (BMPs). BMPs are processes, procedures, schedules of activities, prohibitions on practices, and other management practices that could prevent or reduce the amount of pollutants in storm water runoff.

Groundwater

Groundwater occurs in virtually every geologic unit beneath the 133 AW installation. A perched water table exists in the Platteville Limestone and unconsolidated sediments, and an unconfined water table exists beneath the Glenwood Shale in the St. Peter Sandstone. Shallow groundwater (5 to 25 feet below grade) exists in the fractured Platteville Limestone plateau. Deeper groundwater in the St. Peter Sandstone flows to the south and east, discharging to the Minnesota River.

Floodplains

Under state law, the floodplain is considered to be the land adjoining lakes and rivers that is covered by the 100-year or regional flood. This flood is considered to be a flood that

has a 1 percent chance of occurring in any given year. Floods of this magnitude occurred throughout the state in 1965, 1969, 1997, and 2001, and in various parts of the state in 1972, 1975, 1978, 1979, 1987, and 1993. The natural floodplain is an important part of the water system. It affects storm runoff, water quality, vegetative diversity, wildlife habitat, and aesthetic qualities of our rivers and lakes. According to 1996 Federal Emergency Management Agency (FEMA) maps, the 133 AW installation is not located within 100-year or 500-year floodplains (FEMA 1996).

Coastal Zone Management

The coastal boundary of Minnesota runs along the shoreline of the north shore of Lake Superior. The goal of Minnesota's Lake Superior Coastal Program is to preserve, protect, develop, and where possible, restore or enhance coastal resources along Minnesota's North Shore of Lake Superior. The 133 AW installation is not located within the Coastal Zone of Minnesota.

3.10 Biological Resources

Biological resources consist of native or naturalized plants and animals and their habitats. These resources provide aesthetic, recreational, and socioeconomic benefits to society. The 133 AW installation is almost completely developed. A few small open areas, consisting mostly of landscaped turf-grass and a few landscaped shrubs and trees, are scattered throughout the installation. Landscaped trees and shrubs line some streets and are planted around the buildings. Due to highly developed nature of the base, wildlife on the base is limited to birds and small mammals such as squirrels.

Threatened and Endangered Species

For the purpose of this assessment, sensitive biological resources are defined as those plant and animal species listed by U.S. Fish and Wildlife Service (USFWS) or the Minnesota Department of Natural Resources (MDNR) as species of concern. Three categories of protection status are included in this section including federally listed threatened and endangered species, state listed threatened and endangered species, and other sensitive species (i.e., federal candidate, proposed threatened, and proposed endangered species).

The Endangered Species Act (ESA) of 1973 provides protection to species federally listed as endangered or threatened. Endangered species are those species that are at risk of extinction in all or a significant portion of their range. Threatened species are those that could be listed as endangered in the near future.

The state of Minnesota protects state endangered and threatened animal and plant species through MDNR under Minnesota Statutes, Section 84.0895, and Minnesota Rules, Chapters 6134 and 6212.

Other sensitive species are those federally listed as candidate, proposed endangered, and proposed threatened species. Candidate species are those for which USFWS has sufficient information on biological vulnerability and threats to support proposals to list them as endangered or threatened, but issuance of proposed rules for these species is precluded by higher priority listing actions. Proposed endangered and threatened species are those proposed for listing as endangered and threatened, respectively, and for which formal ruling is in progress. At present, none of those species receive legal protection under the ESA.

The only species listed as endangered or threatened by the federal government and occurring within Hennepin County is the Higgins eye pearlymussel (*Lampsilis higginsi*). This mollusk is listed as endangered and has habitat that includes the Mississippi River (USFWS 2007). Species addressed by Minnesota's endangered species law are listed in Appendix B. Based upon the highly developed nature of the installation, there are no known occurrences of threatened and endangered species on the 133 AW installation.

Migratory Birds

EO 13186, Responsibilities of Federal Agencies to Protect Migratory Birds (2001), recognizes the ecological and economic importance of migratory birds. It requires federal agencies to evaluate the effects of their actions and plans on migratory birds (with an emphasis on species of concern) in NEPA documents. Species of concern are those identified in (1) the report, Migratory Non-game Birds of Management Concern in the United States (USFWS 1995), (2) priority species identified by established plans such as those prepared by Partners in Flight, or (3) listed species in 50 CFR 17.11, Endangered and Threatened Wildlife. A wildlife strike hazard does exist at the 133 AW installation. A large number of birds have been observed on and around the MSPIA.

Wetlands

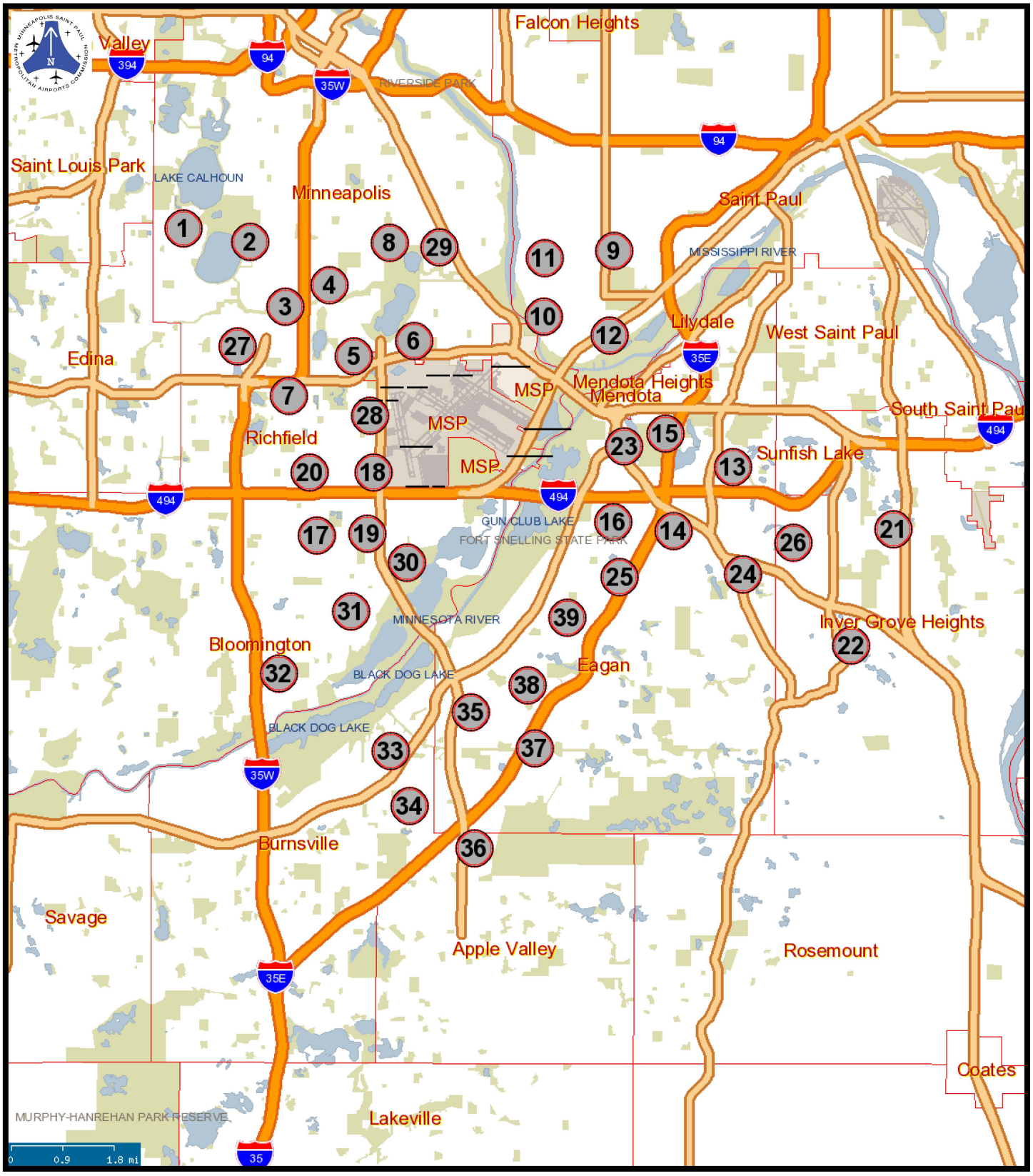
Wetlands are defined by the U.S. Army Corps of Engineers (USACE) and USEPA as "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include marshes, bogs, and similar areas" (33 CFR 328.3[b]; 1984). Wetlands provide a variety of functions including groundwater recharge and discharge, flood attenuation, sediment stabilization, sediment and toxicant retention, nutrient removal and transformation, aquatic and

terrestrial diversity and abundance, and aesthetic values. The following three criteria are necessary to define wetlands: vegetation (hydrophytes), soils (hydric), and hydrology (frequency of flooding or soil saturation). Jurisdictional wetlands are those subject to regulatory authority under Section 404 of the CWA and EO 11990, Protection of Wetlands.

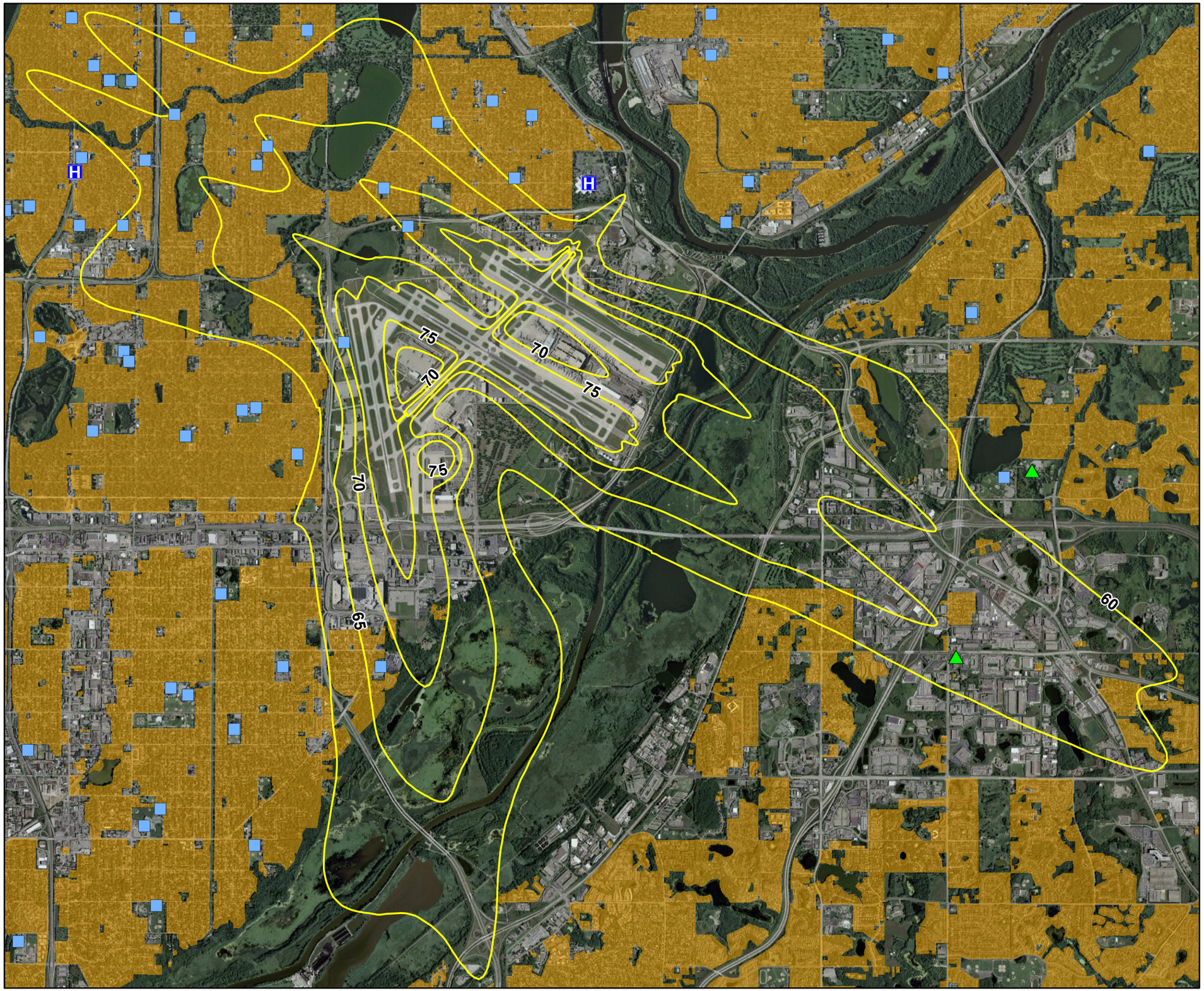
Wetlands in Minnesota are regulated under state authorities found in Minnesota Statute 103 and promulgated in administrative rules Parts 6115 and 8420. These authorities regulate the draining and filling of wetlands within the state. Wetland resources in the state are protected, managed, and restored through a multi-program approach administered by MDNR, the Board of Water and Soil Resources, MPCA, and local government units. The enactment of the Wetland Conservation Act (WCA) of 1991 provided for a variety of innovations in wetland protection including tax incentives, easement acquisition programs, a statewide wetland banking program, and local comprehensive wetland protection and management planning.

There are approximately 9.3 million acres of wetlands in Minnesota, including bogs or peatlands, marshes, prairie potholes, swamps, seasonal basins or flats, and wet meadows. Seasonal basins or flats are found throughout Minnesota including Fort Snelling State Park. Approximately 52 percent of the original wetlands in Minnesota have been lost to development. According to National Wetland Inventory Maps and previous documents on the 133 AW installation, there are no wetlands in the area of the proposed alert hangar.

MSP International Airport
Remote Monitoring Tower (RMT) Site Locations



Remote Monitoring Tower



0 2,000 4,000

SCALE IN FEET

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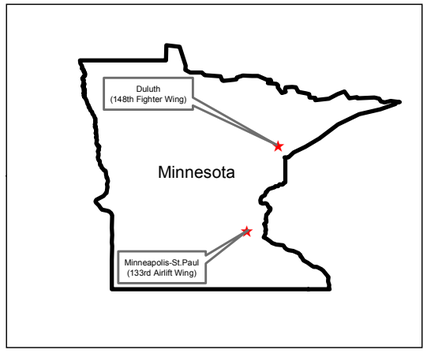


Legend

- Church
- Hospital
- School
- Day-Night Average Noise Contour (dB)
- Residential

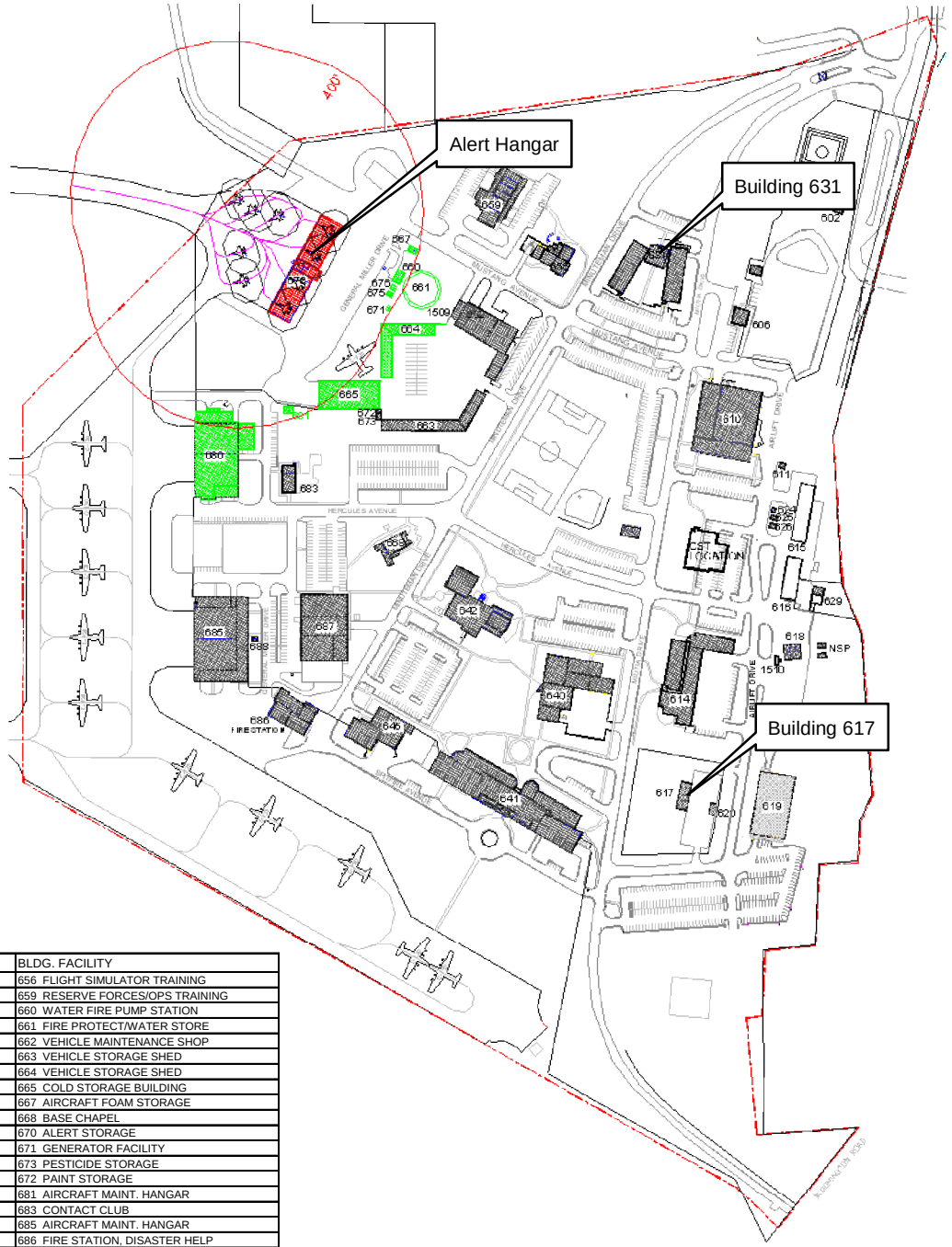
Reference

SOURCE OF AERIAL IMAGERY: ESRI ArcGIS Online Imagery Service
SOURCE OF LAND USE DATA: The Metropolitan Council, Minneapolis, MN. 2005
Data is projected in NAD83 UTM Zone 15.
Revised Draft 2007 Mitigated Day-Night Average Noise Level Contours (not yet approved by FAA)

Figure 3-2
Existing Noise Contour Map

Minneapolis-St. Paul International Airport
Air Reserve Station
Minnesota

URS



BUILDING LEGEND	BLDG. FACILITY
BLDG. FACILITY	656 FLIGHT SIMULATOR TRAINING
600 JET FUEL STORAGE	659 RESERVE FORCES/OPS TRAINING
601 JET FUEL STORAGE	660 WATER FIRE PUMP STATION
602 PUMP STATION	661 FIRE PROTECT/WATER STORE
606 PCL OPERATIONS	662 VEHICLE MAINTENANCE SHOP
608 MAIN GATE HOUSE	663 VEHICLE STORAGE SHED
610 BASE SUPPLY WAREHOUSE	664 VEHICLE STORAGE SHED
611 HAZMAT STORAGE, BASE SUPPLY	665 COLD STORAGE BUILDING
614 BASE CIVIL ENGINEER	667 AIRCRAFT FOAM STORAGE
615 MOBILITY SORAGE	668 BASE CHAPEL
616 HAZARDOUS MATERIAL	670 ALERT STORAGE
617 HAZMAT STORAGE, AMMUNITION	671 GENERATOR FACILITY
618 CORROSION CONTROL	673 PESTICIDE STORAGE
619 COLD STORAGE FACILITY	672 PAINT STORAGE
624 RMS STORAGE	681 AIRCRAFT MAINT. HANGAR
625 HAZMAT STORAGE, BASE SUPPLY	683 CONTACT CLUB
629 LIQUID OXYGEN STORAGE	685 AIRCRAFT MAINT. HANGAR
631 TRAINING, WING HQ, POLICE	686 FIRE STATION, DISASTER HELP
640 COMM-ELECTRONICS TRAINING	687 ENGINE MAINTENANCE SHOP
641 COMPOSITE OPS/AEROMED	1507 VEHICLE FUEL STATION
642 DINING HALL, MED TRAINING	1509 LOADING RAMP
645 MOBILITY PROCESSING CENTER	1510 WEIGHING SCALE

0 250 500

SCALE IN FEET

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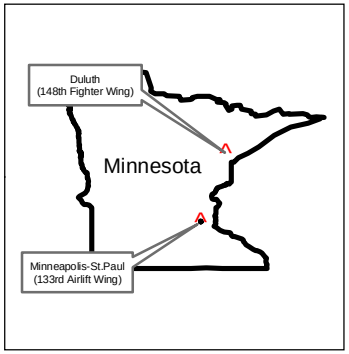

Figure 3-3

133rd Airlift Wing Installation

Minneapolis-St. Paul International Airport
Air Reserve Station
Minnesota

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CHAPTER 4
ENVIRONMENTAL CONSEQUENCES

This chapter describes the potential environmental impacts that are likely to occur as a result of the No Action Alternative and the Proposed Action. A discussion of mitigation measures is included, as necessary. Finally, a discussion of potential cumulative impacts from other actions that may contribute to the impacts of the Proposed Action is also included.

4.1 Noise

This section describes the evaluation of the potential noise impacts associated with the proposed project on potential noise receptors using the methodologies developed by the FAA and published in FAA Order 1050.1E, Environmental Impacts, Policies and Procedures, Change 1. In accordance with FAA Order 1050.1E, Change 1, Appendix A, Section 14.3 and 14.4c, a proposed action would be considered to have a significant impact with regard to aviation noise, when compared to the No-Action Alternative for the same time frame, if it would:

- Cause noise sensitive areas located at or above DNL 65 dB to experience a noise increase of at least DNL 1.5 dB.

- Cause an increase of DNL 1.5 dB that introduces new noise sensitive areas to exposure levels of DNL 65 dB or more.

To comply with FAA's guidance provided in 1050.1E and the recommendations of the 1992 FICON, noise-sensitive areas between 60 and 65 DNL should be evaluated for increases of 3.0 DNL or greater if an increase of 1.5 DNL occurs at any noise-sensitive area within the 65 DNL.

Using measured sound levels as a basis, including existing F-16 operations at MSPIA, noise levels, in terms of DNL were calculated. The foundations of this analysis are the actual noise levels and operational data obtained from the MSPIA noise monitoring system. The noise data consist of the calendar year 2006 DNL data and SEL measurement data from F-16 operations. The operational data consist of calendar year 2006 F-16 runway utilization data and operations attributable to the Proposed Action.

The sound levels calculated for aircraft operations in an airfield environment are all Day-Night Average Sound Levels (DNL). DNL metrics are the preferred noise metrics of the Department of Housing and Urban Development, the Department of Transportation, the Federal Aviation Administration (FAA), USEPA, and the Veteran's Administration (VA).

No Action Alternative

Under the No Action Alternative, there would be no or negligible change in the baseline conditions described in Chapter 3. No adverse impacts would be expected.

Proposed Action

The Minneapolis-St. Paul International Airport (MSPIA) would continue to function as an international airport with civilian and military components, and the 133rd Airlift Wing (133 AW) would continue to function as a military installation.

During the calendar year of 2006, MSPIA supported 467,488 aviation operations, which equates to 1,281 daily operations or 38,957 monthly operations. Under the Proposed Action, the potential number of flight operations using F-16C aircraft would be 32 per month (worst-case scenario), which would increase the number of monthly operations at the MSPIA by 0.08% during deployments. Noise from these operations will be added to the existing noise exposure.

SEL data serve as the acoustical building block for computing DNL. DNL and SEL are related by the following formula:

DNL = SEL + 10*Log (Day Operations + 10 * Night Operations) – 49.37

SEL data for F-16 operations at MSPIA were obtained from the airport's noise monitoring system. A total of seventy (70) F-16 operations were recorded during calendar year 2006. These data are shown in Tables 4-1 and 4-2. Table 4-1 contains F-16 arrival SEL data and Table 4-2 contains F-16 departure SEL data.

Table 4-1 Calendar Year 2006 F-16 Arrival SEL Data

RMT	Arrival SEL					
	Rwy 4	Rwy 22	Rwy 12L	Rwy 12R	Rwy 30L	Rwy 30R
1			84.4	90.1		
2			97.5	79.8		
3			80	94.4		
4			90.7	78.6		
5			80.2	93.3	87.8	
6			98.3	79.9		
7						
8						
9		95.6				

Table 4-1 (continued) Calendar Year 2006 F-16 Arrival SEL Data

RMT	Arrival SEL					
	Rwy 4	Rwy 22	Rwy 12L	Rwy 12R	Rwy 30L	Rwy 30R
10		101.8				
11		87.9				
12		81.9				
13					77.6	95.6
14					89.6	87.4
15						84.2
16					94.1	78.4
17	91.5	78.8				
18	91.7	94.6				
19		80.6				
20	85.8					
21						
22					85.9	83.6
23					77.5	85.2
24					87.9	90.5
25					85.3	
26					78.9	87
27						
28		84.2	79			
29						
30						
31						
32	86.2					
33						
34						
35						
36						
37						
38						
39						

Table 4-2 Calendar Year 2006 F-16 Departure SEL Data

RMT	Departure SEL					
	Rwy 4	Rwy 22	Rwy 12L	Rwy 12R	Rwy 30L	Rwy 30R
1					97.3	
2		87.1			94.6	
3		93.1			105	
4		96.3			98	104.6
5		98.7			108.6	

Table 4-2 (Continued) Calendar Year 2006 F-16 Departure SEL Data

RMT	Departure SEL					
	Rwy 4	Rwy 22	Rwy 12L	Rwy 12R	Rwy 30L	Rwy 30R
6		92.6		73.7	97.5	116.7
7		103.3			97	
8						97.6
9	108.6					
10	112.2	74.6				
11		92.7				
12		91.7	91.7			
13				78.6		
14				99.9		
15						
16			87.1	100.8		
17		106.6				
18		111.4				
19	84.7	102.3				
20		98.4				
21				97.9		
22						
23			104.9	94.6		
24				96.1		
25				87.9		
26				98.6		
27		89.1			94.4	
28	99.8	100		91.8	94.6	
29						
30		93.8				
31						
32		97.6				
33						
34						
35						
36						
37						
38						
39						

It is important to note that aircraft operations do not trigger noise events at each noise monitoring location and the noise levels are specific to individual monitoring sites. For example, an aircraft arriving to Runway 4 does not fly over RMT 1 and noise levels for these operations are not recorded at that location as the noise exposure is below ambient noise levels or are otherwise too low to be accurately recorded.

DNL is a function of SEL, i.e. the loudness of the noise, and the number noise events that occur. For this reason, it is important to analyze F-16 runway utilization patterns in order to determine the number of events occurring at specific locations. Table 4-3 depict F-16 runway use for calendar year 2006 for arrival and departure operations.

Table 4-3 Calendar Year 2006 F-16 Runway Utilization

Rwy	Arrival Percentage	Departure Percentage
4	7.8%	3.7%
22	43.3%	59.3%
12L	12.2%	7.4%
12R	11.1%	14.8%
30L	7.8%	7.4%
30R	17.8%	7.4%
Total	100.0%	100.0%

Table 4-3 indicates that Runway 22 is, by far, the most heavily utilized runway by F-16 aircraft.

The number of annual F-16 arrival and departure operations from each individual runway was calculated based on the data presented in Table 4-3 and the total number of F-16 operations attributable to the Proposed Action. These data are shown in Table 4-4.

Table 4-4 F-16 Projected Annual Operations By Runway

Runway	Annual Arrival Operations	Annual Departure Operations
4	14.93	7.11
22	83.20	113.78
12L	23.47	14.22
12R	21.33	28.44
30L	14.93	14.22
30R	34.13	14.22
Total	192.00	192.00

The arrival and departure SEL data contained in Table 4-1 and 4-2 and the operational data shown in Table 4-4 were used to calculate the DNL from the proposed F-16 operations. These noise levels resulting from the Proposed Action were added to the existing DNL data to

yield Proposed Action noise levels. The existing noise levels were then compared to the Proposed Action noise levels. The results of this analysis are shown in Table 4-5.

Table 4-5 Noise Level Comparison

RMT	2006 Existing DNL	F-16 Only DNL	Proposed Action DNL	Change
1	57.7	35.2	57.7	0.02
2	59.2	38.7	59.2	0.04
3	64.5	43.7	64.5	0.04
4	62.2	45.1	62.3	0.08
5	71.6	47.9	71.6	0.02
6	72.2	53.5	72.3	0.06
7	62.8	49.0	63.0	0.18
8	59.4	34.1	59.4	0.01
9	42.3	44.1	46.3	4.02
10	47.1	48.9	51.1	3.99
11	44.2	39.2	45.4	1.20
12	36	38.1	40.2	4.16
13	56	36.0	56.0	0.04
14	63.9	39.9	63.9	0.02
15	57.6	24.5	57.6	0.00
16	67.1	40.9	67.1	0.01
17	48.4	52.2	53.7	5.31
18	55.7	57.0	59.4	3.73
19	52.3	47.9	53.6	1.34
20	47.8	44.0	49.3	1.51
21	52.2	37.4	52.3	0.14
22	57.7	26.4	57.7	0.00
23	64.7	42.3	64.7	0.02
24	61.5	37.1	61.5	0.02
25	53.4	28.5	53.4	0.01
26	57.6	38.5	57.7	0.05
27	58.9	36.2	58.9	0.02
28	60.4	46.2	60.6	0.16
29	55.7		55.7	0.00
30	60.8	39.4	60.8	0.03
31	46.5		46.5	0.00
32	44.6	43.2	47.0	2.37
33	49.2		49.2	0.00
34	45.2		45.2	0.00
35	51.8		51.8	0.00
36	52.3		52.3	0.00

Table 4-5 (continued) Noise Level Comparison

RMT	2006 Existing DNL	F-16 Only DNL	Proposed Action DNL	Change
37	46.8		46.8	0.00
38	48.4		48.4	0.00
39	47.1		47.1	0.00

The first column of Table 4-5 lists the RMT identification numbers. These locations are shown in Figure 3-1. The second column contains the existing calendar year 2006 DNL from aircraft operations. Transient MSPIA F-16 operations that are not a part of the Proposed Action are included in these values. The third column lists the DNL from the F-16 operations attributable to the Proposed Action without consideration of existing noise exposure. Blank values indicate that no F-16 noise events were recorded at the respective RMT during calendar year 2006. The fourth column contains the resultant DNL based on existing conditions and the Proposed Action. These values were obtained from the logarithmic addition of columns two and three. The fifth column is the arithmetic difference of columns two and four and indicates the cumulative change (increase) in noise exposure at the RMT locations from the Proposed Action.

As shown in Table 4-5, the greatest DNL increases are seen in the noise monitoring locations associated with operations to Runway 22. These are RMTs 9-12, RMTs 17-20, and RMT 32. As shown in Figure 3-1, RMTs 9-12 are located northeast of the airport in the arrival corridor to Runway 22. RMTs 17-20 and RMT 32 are located southwest of the airport in the departure corridor for Runway 22. The Proposed Action noise level at each of these locations is below 60 DNL and these increases are not significant based on the criteria contained in FAA Order 1050.1E.

Mitigative Actions

The MSPIA currently uses noise mitigation techniques to address noise impacts to the community. The MSPIA operates the Home Mitigation Program, which installs new or reconditioned windows and doors, central air-conditioning, wall insulation and vent baffling for residences within the 65 DNL noise contour.

Significant adverse noise impacts would not be expected from the Proposed Action and noise mitigation measures are not required; however, in the interest of a "good neighbor" policy and to reduce the potential for increases in noise exposure the 148 FW has agreed to the following noise reduction measures to reduce the potential for annoyance:

(1) F-16 training sorties will only be scheduled during the daytime (8:00 AM to 8:00 PM) Additionally, there will be no planned touch-and-goes or low approaches. Engine system checks will only occur Mondays through Fridays.

(2) Departure operations will utilize a maximum climb profile consistent with safety in order to obtain maximum altitude prior to reaching residential areas.

(3) Use of afterburners will be restricted to operational necessity and afterburner use will be discontinued as soon as practicable during the departure.

These mitigation measures are intended to reduce the potential for noise related annoyance effects to nearby receptors.

4.2 Land Use

The following factors were considered in evaluating potential land use: 1) the degree to which the Proposed Action would adversely affect existing sensitive land uses; 2) the degree to which the Proposed Action would interfere with the activities or functions of adjacent existing or proposed land uses; and 3) the degree to which any physical changes in land use would affect surrounding land uses and compatibility with land use plans.

No Action Alternative

Under the No Action Alternative, there would be no change in the baseline conditions described in Chapter 3. No adverse impacts would be expected.

Proposed Action

The project, as proposed, is consistent with existing and proposed land uses at the 133 AW, the MSPIA, and the land surrounding the MSPIA. The MSPIA would continue to function as an international airport with civilian and military components, and the 133 AW would continue to function as a military installation. The existing Air National Guard (ANG) Museum, at its current location, would no longer inform the community of the history of the Minnesota Air National Guard (MNAG) units. The museum would be converted to the proposed alert hangar. Collections and displays would be stored within another area of the 133 AW installation until a suitable site for the Museum is determined. No significant adverse impacts to land use would be expected as a result of the Proposed Action.

Mitigative Actions

Significant adverse impacts to land use would not be expected from the proposed activities. No mitigative actions concerning land use are proposed.

4.3 Air Quality

The potential impacts to local and regional air quality conditions near a proposed federal action are determined based upon the increases in regulated pollutant emissions relative to existing ambient air quality conditions. If the Proposed Action contributes to an increase of direct or indirect pollutants that would contribute to a violation of any national or state ambient air quality standard, or represent an increase of 10% or more in an affected Air Quality Control Region (AQCR) emissions inventory, the impact would be considered significant and adverse.

Federal Prevention of Significant Deterioration (PSD) regulations also define air pollutant emissions to be "significant" if: 1) a proposed project is within 10 kilometers of any Class I area; and 2) regulated pollutant emissions would cause an increase in the 24-hour average concentration of 1 $\mu g/m^3$ or more of any regulated pollutant in the Class I area (40 Code of Federal Regulations (CFR) §52.21(b)(23)(iii)). The 133 AW is not within 10 kilometers of any Class I area. The nearest PSD Class I areas are the Boundary Waters Canoe Area and Voyageurs National Park, which are each located approximately 402 kilometers (250 miles) north of Minneapolis, along Minnesota's northern border.

According to the USEPA's General Conformity Rule in 40 CFR Part 51, Subpart W, any proposed federal action that has the potential to cause violations of a National Ambient Air Quality Standard (NAAQS) for a nonattainment or maintenance area must undergo a conformity analysis. Since Hennepin County is a maintenance area for CO and SO_2, the General Conformity Rule applies to the Proposed Action. Regulated pollutant emissions from the Proposed Action would not contribute to or affect local or regional attainment status with the NAAQS.

The purpose of the air quality analysis was to estimate the increase in emission levels due to the Proposed Action. The following factors were considered in evaluating air quality: 1) the air emissions generated from the Proposed Action (temporary deployment of four F-16C aircraft and associated operations); 2) the type of emissions generated; and 3) the potential for emissions to exceed NAAQSs or State Implementation Plan (SIP) limits.

No Action Alternative

Under the no action alternative, the F-16C aircraft would remain at the 148th Fighter Wing (148 FW) and Duluth International Airport. This alternative would involve launching missions from the 148 FW. The No Action Alternative would not result in any increases of short-term or long-term emissions. As such, no adverse impacts would be expected.

Proposed Action

The 148 FW could be tasked in the future and on an as needed basis to deploy up to four F-16C fighter aircraft to the 133 AW for the purpose of fulfilling Air Sovereignty Alert duties. When directed by higher headquarters, the aircraft would operate from the alert hangar (ANG Museum; building 670) of the 133 AW, and would use existing runways at the MSPIA. The Proposed Action would include sixteen training sorties with the F-16C aircraft per month and temporary relocation of airspace ground equipment (AGE), 45 support personnel, and 34 vehicles (privately-owned vehicles [POV] and government-owned vehicles [GOV]). The proposed alert hangar has space to contain four aircraft and would only require minor interior renovations inside the structure (i.e., would result in negligible emissions). Additionally, two aircraft display shells would have to be moved from their current location outside the museum; emissions from this activity would have negligible increases over the baseline emissions.

The Proposed Action would result in short-term emissions due to the operation of the F-16C aircraft, associated AGE, additional POV, GOV, and increased fuel transfer activities. As a conservative estimate, it was assumed that the temporary deployment would last an entire year (e.g., vehicle emissions were based on 365 days per year); however, the Proposed Action, if implemented, would likely last much less than a year (it would be expected that each deployment would last about three months). Table 4-6 summarizes the projected total air emissions from stationary and mobile sources from the Proposed Action. The projected emissions have been estimated using equipment specifications identified by base personnel and with emissions data from the USEPA MOBILE 6 vehicle emissions model (version 6.2.03, September 24, 2003), USAF air emissions inventory guidance documents for mobile and stationary sources, and the USEPA AP-42 guidance document. Detailed emission calculations for these sources are presented in Appendix C.

Table 4-6 Projected Air Emissions from the Proposed Action

Criteria Air Pollutant	CO	VOC	NO_X	SO_X	PM_{10}	$PM_{2.5}$
Proposed Action (tpy)	23.61	3.33	7.47	0.92	0.97	0.97
Percent of Regional Emissions (%)	0.0027	0.0023	0.0032	0.0012	0.0009	0.0031
2002 AQCR 131 Emissions (tpy)[a]	879,344	147,284	231,738	75,304	112,511	31,432

[a] Source: MPCA 2006. The emissions from AQCR 131 were calculated as the sum of emissions from the seven counties that make up AQCR 131. See Appendix C for the emissions by county.

Review of emissions from the Proposed Action in Table 4-6 indicates that the greatest percentage impact to the regional emissions (AQCR 131) in a given year during the project

would be from NO_x (7.47 tons per year increase) at 0.0032%. All emissions would fall well below the 10% threshold that is considered regionally significant by USEPA as stated in 40 CFR 51, Subpart W, Section 852. In addition, the emissions increases of CO and SO_2 are each well below the 100 tpy threshold for maintenance areas as required by the General Conformity Rule.

The emissions from the Proposed Action would not cause an exceedance of NAAQS or limits that would be established in a specific SIP. The emission of minor amounts of air pollution as a result of the Proposed Action is unavoidable; however, the individual and cumulative impacts during the temporary deployment and associated activities would be small when compared to the 2002 AQCR 131 emissions. Furthermore, the actual emissions would be lower than those calculated because the duration of each deployment would likely be much shorter than one year.

Mitigative Actions

No significant adverse impacts to regional air quality would be expected from the Proposed Action. No mitigative actions concerning air quality are proposed.

4.4 Socioeconomic Resources

In order to assess the potential socioeconomic and environmental justice impacts of the Proposed Action, employment, race, ethnicity, poverty status and age characteristics of populations in the region of influence were analyzed, as presented in Section 3.4. Potential socioeconomic impacts are assessed in terms of the direct effects of the proposal on the local economy and related effects on population and socioeconomic attributes. With regard to environmental justice issues, where impacts could result from implementing the proposal, the demographics and income levels of affected populations are examined to determine whether impacts would be disproportionately borne by minorities, children, or low-income persons.

No Action Alternative

Under the No Action Alternative, the 45 personnel would not be temporarily relocated from the 148 FW to the 133 AW, and there would be no change from the existing conditions. Therefore, no adverse impacts would be expected on socioeconomic resources from the No Action Alternative.

Proposed Action

No significant adverse impacts to socioeconomics would be expected as a result of implementation of the Proposed Action. The 45 personnel temporarily relocated to the MSPIA area would have a negligible impact on the local economy. The personnel would stay at the

North County Lodge located within the MSPIA Air Reserve Station. Input to the local economy would be negligible and likely limited to their personal spending. There would be no substantial long-term changes in population and/or employment as a result of implementation of the Proposed Action.

No children or families would relocate to the Minneapolis-St. Paul area as a result of the Proposed Action; therefore, there would be no higher demands for local schools.

Hennepin County is not considered a minority or low-income population. The Proposed Action would not be expected to create adverse environmental or health effects; therefore, no disproportionately high or adverse impacts to minority, low-income, or youth populations would be expected.

There are no known environmental health or safety risks associated with the Proposed Action that could disproportionately affect children. Access to the proposed alert hangar and F-16C aircraft would be controlled; thus, limiting unauthorized access by any person, including children.

Mitigative Actions

Since the Proposed Action would not be expected to have an adverse impact on socioeconomic resources or minority or low-income populations, no mitigative actions would be needed.

4.5 Safety

Safety impacts were assessed according to the potential to increase or decrease safety risks to personnel, the public, and property. Proposed activities were assessed to determine if additional or unique safety risks would be associated with the undertaking. If any proposed activity required a major variance from existing conditions, it would be considered a safety impact.

No Action Alternative

If the option to deploy F-16C aircraft to the 133 AW installation were not available, this would weaken the ability of the 148 FW to complete its Air Sovereignty Alert duties by not allowing for rapid response to the Minneapolis-St. Paul area. This would result in an increase in risk for that community from terrorism-related threats and the purpose and need would not be met.

Proposed Action

The Proposed Action would result in ground activities that could expose military personnel to risk associated with the explosives within the weaponry of the F-16C aircraft and the aircraft's use of hydrazine as a back-up fuel source.

The Explosive Site Plan generated for the Proposed Action would minimize risks from explosions to the area surrounding the proposed alert hangar to an acceptable level. The only building currently inhabited within the Inhabited Building Distance (IBD) would be the maintenance hangar (building 680), which would be part of the 133 AW installation. The 133 AW has determined that, in the case of an explosives mishap at the proposed alert hangar, minimal structural damage at the maintenance hangar would occur, serious injuries at the maintenance hangar would not be expected, and personnel within the maintenance hangar would have a high degree of protection. The IBD clear zone surrounding the proposed alert hangar would encompass property owned by the U.S. Army Reserve and the Metropolitan Airports Commission. Agreements to control land use have been established with both the Reserve and Commission that would mitigate risk. Proposed mitigation related to explosives is described below.

The personnel temporarily deployed from the 148 FW would be exposed to the majority of risk associated with explosives. These personnel would be exposed to the same level of risk under the No Action Alternative since the F-16C aircraft would be operated out of the 148 FW installation. Therefore, no change in risk to 148 FW personnel is expected from the Proposed Action. The only 133 AW personnel that would be in close proximity to the aircraft at the proposed alert hangar are the Petroleum, Oils, and Lubricants (POL) truck drivers. The POL drivers would be exposed to a minor amount of risk since they would only pass through the area of the proposed hangar approximately five times a day, each time lasting approximately one minute.

Pilots and maintenance personnel expected to be in close proximity to the proposed F-16C aircraft after landing would be those personnel temporarily deployed from the 148 FW and would be familiar with health and safety procedures associated with the use of hydrazine. No 133 AW personnel unfamiliar with hydrazine would be in close proximity to the proposed F-16C aircraft. The risk from hydrazine use is expected to be similar to the No Action Alternative. This is because 148 FW personnel would work in close proximity to the F-16C aircraft under both the Proposed Action and No Action Alternative.

Increasing the number of flights at the MSPIA would also increase the risk of aircraft mishaps at the MSPIA. Based on aircraft mishap data, F-16 aircraft are four times more likely

than C-130 aircraft, the aircraft currently operated at the 133 AW installation, to experience an aircraft mishap (Flying Safety 2003). Since the worst-case scenario of the Proposed Action would increase the number of flights at the MSPIA by 16 per month, the overall increase in risk of a mishap would be considered negligible.

Broad-scale beneficial effects would be expected from implementation of the Proposed Action. Safety of the Minneapolis-St. Paul area related to national defense would be expected to increase. The decrease in risk from terrorism-related activities for the larger Minneapolis-St. Paul area would be greater than the increased risk associated with deploying the F-16C aircraft to the 133 AW installation. In general, implementation of the Proposed Action would result in positive impacts to safety.

Mitigative Actions

The increased risk associated with the Proposed Action would be minimized from the implementation of the Explosive Site Plan, which highlights the following.

- To prevent injury to personnel within the maintenance hangar (building 680) in the event of glass breakage, glass-blast curtains or shatter protective films would be installed on all glass in exterior windows and doors of the maintenance hangar. Other buildings within the IBD would have protective film or blast curtains applied/installed to reduce hazards of flying glass.
- The IBD clear zone surrounding the proposed alert hangar encompasses property owned by the U.S. Army Reserve. A Memorandum of Understanding (MOU) has been generated with the U.S. Army Reserve, who own land north of the proposed alert hangar. The MOU maintains that the Army Reserve would 1) keep the number of personnel occupying lands located north of proposed alert hangar to the minimum number necessary to accomplish mission essential tasks, 2) restrict the time that such personnel are present within the IBD of the proposed alert hangar, and 3) not issue any real property out-grants, such as leases, licenses, that would affect the zone encompassed by the IBD without giving prior notice to the 934 AW, along with additional agreements.
- The IBD clear zone surrounding the proposed alert hangar encompasses property owned by the Metropolitan Airports Commission. A MOU has been generated with the Metropolitan Airport Commission that requires them to not lease, license, grant easements, or in any other manner convey the right to any entity to build any buildings, taxiways, or infrastructure within this IBD zone without prior written approval by the 934 AW.
- Parking lots within the Public Traffic Route (PTR) of the proposed aircraft would be used by government personnel only.

- Mustang Avenue is located near the proposed alert hangar and is considered an inter-base road. While the proposed aircraft are on alert, Mustang Avenue would be used for essential personnel movement only.

4.6 Cultural Resources

Potential impacts were assessed by identifying types and possible locations of construction activities that could directly or indirectly affect cultural resources and identifying whether cultural resources could be affected. Impacts to cultural and/or historic resources could occur if project activities resulted in the following:

- Destruction or alteration of all or a contributing part of any National Register of Historic Places (NRHP) eligible cultural or historic site without prior consultation with the State Historic Preservation Office (SHPO);
- Isolation of an eligible cultural resource from its surrounding environment;
- Introduction of visual, audible, or atmospheric elements that are out of character with a NRHP eligible site or would alter its setting;
- Neglect and subsequent deterioration of a NRHP eligible site; and
- Disturbance of important sites of religious or cultural significance to Native Americans.

Historic properties, under 36 CFR 800, are defined as cultural resources included in or eligible for inclusion in the NRHP. The term "eligible for inclusion" includes both listed and eligible properties, which meet NRHP evaluation criteria as outlined by 36 CFR 60.4. Therefore, cultural resources not yet evaluated are considered potentially eligible for the NRHP and are afforded the same regulatory consideration as nominated historic properties.

No Action Alternative

Under the No Action Alternative, there would be no change in the baseline conditions described in Chapter 3. Therefore, there would be no adverse impact on any known historic or archeological resources.

Proposed Action

Activities associated with the Proposed Action would not be expected to impact archaeological or historical resources. No demolitions or excavations would occur as a result of the Proposed Action. The Cultural Resources Survey Report of the MSPIA Air Reserve Station indicated the ANG Museum (proposed alert hangar) was not eligible for the NRHP.

Therefore, there would be no adverse impact on any known historic or archaeological resources.

Mitigative Actions

Impacts to historic and archaeological resources would not be expected from the proposed activities. Therefore, no mitigative actions would be required.

4.7 Hazardous Materials and Wastes

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

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

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

No Action Alternative

Under the No Action Alternative, there would be no changes to the current conditions of hazardous materials and wastes, and therefore, no significant adverse impacts on hazardous materials and waste would be expected.

Proposed Action

The Proposed Action would not be anticipated to significantly impact solid and hazardous materials or wastes. Under the Proposed Action, hazardous materials and wastes

associated with 133 AW operations would continue to be managed in accordance with all federal, state, and local regulations, as well as existing 133 AW procedures. The waste paint and paint-related filters, strainers, and paper that are currently stored at the hazardous waste satellite accumulation point at the proposed alert hangar would be stored at a different location.

Under the Proposed Action, minor renovations to the alert hangar and other close structures could include applying protective film onto windows and installing blast windows and doors to reduce the hazards from an explosive accident. The interior of the proposed alert hangar contains transite wallboard that is considered an asbestos-containing material (ACM).

The refueling that would occur within the alert hangar is expected to follow all military procedures and be identical to those for the C-130 aircraft. The proposed F-16C aircraft would use the same type of jet fuel as the C-130 aircraft, and fuel storage capacity at the 133 AW would not increase as a result of the temporary deployment. Existing refueling procedures at the 133 AW would not require modification as a result of the Proposed Action.

The 133 AW installation does not currently use or store hydarazine, which would be used by the proposed F-16C aircraft and stored within 15-pound sealed containers. Liquid hydrazine, a highly flammable and toxic substance, is a fuel mixture used as part of the emergency power unit on F-16 aircraft. When these in-flight storage vessels require maintenance or servicing, they are transported in electrically grounded, Department of Transportation-approved canisters to Springfield, Ohio. There is the potential that a spill of hydrazine could occur at the 133 AW installation. Accidental spills of hydrazine can be neutralized with bleach or calcium hypochlorite. Hazardous materials and waste management plans would be updated as necessary, and a strategy to protect stormwater drains in case of a spill would be implemented.

Since no excavation activities are proposed, the discovery or disturbance of contaminated soils or groundwater would not be expected. Additionally, the Proposed Action would not have any impact on the way that herbicides and pesticides are used currently on the installation.

Mitigative Actions

Should the renovations require the disturbance of ACM, remediation/management of appropriate materials would be conducted in accordance with all applicable state and federal regulations.

To address potential spills from the use of hydrazine, stormwater drains near the proposed alert hangar would be protected through the use of best management practices (BMPs) and Spill Prevention, Control, and Countermeasure (SPCC) procedures.

4.8 Geological Resources

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

No Action Alternative

Under the No Action Alternative, there would be no adverse impacts to geological resources. Conditions would remain as described in Section 3.8.

Proposed Action

The Proposed Action would not include excavation or construction. Therefore, no potential impacts to geological resources as a result of the Proposed Action would be expected.

Mitigative Actions

There would be no adverse impacts to geological resources; therefore, no mitigative actions would be required.

4.9 Water Resources

Impacts to surface water and groundwater resulting from the Proposed Action could occur if project activities resulted in the following:

- An increase in water usage from the underlying aquifer;
- A decline in surface water quality;
- Violation of water quality standards or other applicable regulations; and/or
- Water availability issues.

No Action Alternative

Under the No Action Alternative, there would be no impacts to water resources. Conditions would remain as described in Section 3.9.

Proposed Action

The Proposed Action would require a total of 34 vehicles to be temporarily relocated from the 148 FW to the 133 AW. This would have the potential to increase stormwater pollutants due to leakage associated with engine, coolant, transmission, and brake systems of those vehicles. However, because the deployments would be temporary and the 133 AW would adhere to a SWPPP with strategies to control stormwater discharges and minimize pollution of nearby surface waters, the impacts to stormwater from the 34 vehicles would be expected to be negligible.

The proposed F-16C aircraft would remain within a heated alert hangar, so deicing of the F-16C would not occur. The Proposed Action would not include earth-moving activities, so impacts to water resources from erosion and sedimentation would not be expected. Considering that F-16 aircraft require washing once every three months and that the proposed F-16C aircraft would be temporarily deployed to the 133 AW installation, no washing of aircraft and associated water discharge would be expected from the Proposed Action. Based on this, no additional water use or wastewater discharge would be expected from the implementation of the Proposed Action. The proposed fueling operations of the F-16C aircraft would occur within the alert hangar, and BMPs and SPCCs would be used to prevent accidental spills from reaching a stormwater drain.

The 133 AW would not be located within a mapped 100-year floodplain, so no adverse impacts to floodplains would result. Additionally, no negative impacts to groundwater would be expected as a result of the Proposed Action.

Mitigative Actions

To address the increased risk of potential spills, stormwater drains near the proposed alert hangar would be protected through the use of BMPs and SPCC procedures.

4.10 Biological Resources

Potential impacts to biological resources were determined by analyzing the Proposed Action within the context of the importance of the existing resources, the sensitivity of those resources, and the duration of the Proposed Action. In addition, impacts were evaluated based on whether the Proposed Action would do the following:

- Affect any threatened or endangered species;
- Substantially diminish natural habitats for a plant or animal species;
- Substantially interfere with wildlife movement or reproductive behavior; or
- Introduce an exotic plant or animal species.

No Action Alternative

Under the No Action Alternative, there would be no potential impacts to biological resources including threatened and endangered species, vegetation, wildlife, and wetlands.

Proposed Action

Threatened and Endangered Species. The only species listed by the federal government as threatened or endangered that is expected to occur within Hennepin County is the Higgins eye pearlymussel, which occurs within aquatic habitats such as the Mississippi River. Habitat for the Higgins eye pearlymussel does not occur within the 133 AW installation; therefore, no negative impacts to this species would be expected as a result of the Proposed Action. Under the Proposed Action, minor adverse effects could occur to animal species listed by the State of Minnesota as threatened or endangered from an increase in noise associated with the additional flights at the MSPIA. These effects would be expected to be negligible since the worst-case scenario of the Proposed Action would only include 16 additional flights per month at the MSPIA. Since there would be no excavation or construction under the Proposed Action, no adverse effects to plant species would be expected.

Wildlife and Migratory Birds. No significant impact would be expected, directly or indirectly, to wildlife habitat as a result of the Proposed Action. Under the Proposed Action, minor adverse effects would be expected on wildlife species from an increase in noise associated with the additional flights at the MSPIA. These effects would be expected to be negligible since the worst-case scenario of the Proposed Action would only include 16 additional flights per month at the MSPIA (the worst-case scenario of the proposed action includes sixteen (16) training sorties per month, which is 32 flight operations). A wildlife strike hazard does exist at the 133 AW installation. A large number of birds have been observed on and around the airfield. The C-130 aircraft currently operated at the 133 AW has a larger wing and fuselage than the F-16C aircraft; thus, the proposed aircraft would be less likely to experience wildlife strikes. Because of this and because the worst-case scenario of the Proposed Action would only increase the number of flights at the MSPIA by 16 per month, no significant adverse impacts to migratory birds would be expected from the Proposed Action.

Wetlands. Since no wetlands occur in the area of the proposed alert hangar and the Proposed Action would not include construction or earth-moving activities, no negative impacts to wetlands would be expected as a result of the Proposed Action.

Mitigative Actions

Best management practices for flight operations would minimize impacts on bird species, which would also increase aircraft safety. Birds at the airport would continue to be dispersed by the use of pyrotechnics, and pilots would continue to adjust altitudes and flying patterns, as needed, to avoid bird strikes.

4.11 Cumulative Effects

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."

As described in Chapter 2, other proposed actions have either taken place, are underway, or planned within the region of influence of 133 AW and surrounding areas. This EA addresses the environmental impacts of these other actions only in the context of potential cumulative impacts, if any. Actions considered for cumulative effects are listed below:

- Continued expansion and improvement of the MSPSIA;
- Projects within MAC's Capital Improvement Program; and
- Increased aircraft operations at the MSPIA.

The major environmental impacts from implementation of the above actions could be on air quality, noise, and water quality (MAC 2006). Projects that affect aircraft operations can affect air quality and noise. Projects that create additional impervious surface or increase generation of wastewater can affect water quality (MAC 2006). Impacts from the above actions are discussed qualitatively as follows within the context of cumulative effects.

Noise. The MSPIA is a large, active airport located within an urbanized area. Noise impacts associated with flight operations have been addressed within the MSPIA Part 150 Study Update. Land use recommendations within the Part 150 Update include mitigation of noise impacts to residential dwellings within the 65 dB DNL contour, as an extension of the airport's ongoing noise mitigation program. The methods of mitigation for said properties will be established by the airport and implemented under the guides of 14 CFR Part 150. Temporary noise effects from future construction projects/programs at the MSPIA would include the temporary rerouting of aircraft due to rehabilitation of runways 12R/30L and 12L/30R. Temporary changes in flight noise patterns could occur, as flight operations are temporarily redistributed to the other runways. Noise control/reduction measures during future construction projects/programs would include 1) scheduling construction for mid-August to

mid-October, 2) balancing effects from night construction noise with aircraft operating noise, 3) enforcing penalties on work delays, and 4) implementing departure procedures that minimize the noise effect of aircraft operations (MAC 2006). The Proposed Action includes training sorties that would increase aircraft operations by 32 per month, a 0.08% increase in activity. The resulting minimal increase in aircraft activity and resulting noise exposure would not be considered a significant adverse cumulative impact. Noise impacts from all aircraft activity onto the community surrounding the MSPIA are addressed with the proposed mitigation according to the Part 150 Update. The Proposed Action would not contribute to significant cumulative effects on noise levels in the area.

Land Use. The Proposed Action would not impact the land use patterns and would, therefore, not contribute to cumulative effects to land use.

Air Quality. As a result of future construction projects/programs, CO and SO_2 emissions will increase compared to existing CO levels. However, many of the planned projects are projected to have a positive impact on CO emissions over time since fewer delays will occur at terminal gates (MAC 2006). Since AQCR 131 is designated as a maintenance area for CO and SO_2, the *de minimis* threshold for General Conformity applicability is 100 tpy for both of pollutants. None of the proposed projects at MSPIA are expected to exceed, alone or in combination, the 100 tpy threshold for CO or SO_2. Furthermore, as previously discussed, not all of the projects would coincide in time and place with the Proposed Action. As such, in the event the Proposed Action and the projected construction projects and programs occur simultaneously, it is anticipated that the increases in CO and SO2 would not exceed the 100 tpy thresholds and thus, would not cause an exceedance of the NAAQS or established SIP limits.

The emission of minor amounts of air pollution due to the Proposed Action is unavoidable. However, the individual and cumulative impacts during the temporary deployment and associated activities would be minor when compared to the 2002 AQCR 131 emissions. Therefore, the Proposed Action would not contribute to significant cumulative effects on air quality in the AQCR 131.

Socioeconomic Resources. The Proposed Action would not adversely impact socioeconomic resources, minority or low-income populations, or children; therefore, the Proposed Action would not contribute to cumulative effects.

Safety. The Proposed Action would be expected to have a positive impact on safety to the Minneapolis-St. Paul area.

Cultural Resources. The Proposed Action would not affect cultural resources in or around the 133 AW installation and, therefore, would not contribute to cumulative effects to cultural resources.

Hazardous Materials and Wastes. The Proposed Action would require the management of ACM during renovation of the proposed alert hangar (building 670) and surrounding buildings. Additionally, hazardous materials and waste management plans would be updated, as needed, to address the use of hydrazine and the relocation of the hazardous waste satellite accumulation point currently located at the proposed alert hangar. No other actions would coincide in time and place to contribute to cumulative impacts pertaining to hazardous materials and wastes. Therefore, the Proposed Action would not contribute to cumulative effects to hazardous materials and wastes in or around 133 AW installation.

Geological Resources. The Proposed Action would not affect geological resources in or around the 133 AW installation and, therefore, would not contribute to cumulative effects to geological resources.

Water Resources. Potential effects to water resources from the Proposed Action would be mitigated through the implementation of BMP and SPCC procedures and, therefore, would not contribute to cumulative effects to water resources.

Biological Resource. Because there would be no adverse effects to vegetation, wildlife, threatened and endangered species, or wetlands, implementation of the Proposed Action would not contribute to cumulative impacts to these resources. Minor unavoidable impacts to migratory birds from the Proposed Action, when added to the other foreseeable actions in the area, would be appropriately mitigated. The cumulative impacts would be insignificant.

4.12 Unavoidable Adverse Environmental Impacts

Unavoidable impacts would result from implementation of the Proposed Action; however, none of the impacts would be significant. The Proposed Action would have minor adverse impacts on noise from operation of the F-16C aircraft. These impacts would not be considered significant since they would be of short duration and frequency, and the Proposed Action would only result in a 0.08% increase in aircraft activity at the MSPIA. The Proposed Action would displace the existing ANG Museum, which would be relocated once a suitable site for the Museum is determined. The Proposed Action would have unavoidable minor adverse impacts on air quality from operation and maintenance of the F-16C aircraft. However, based on the conformity analysis conducted, the Proposed Action would not cause

an exceedance of NAAQS or limits that would be established in a specific SIP. The Proposed Action would result in minor increases to safety risks to military personnel in the vicinity of the alert aircraft activities related to the presence of explosives within aircraft weapon systems; however, the risks would be minimized through the use of land use controls and building improvements, such as the installation of glass and door reinforcements. The Proposed Action would have minor adverse impacts to the management of hazardous waste by requiring the waste paint and paint-related filters, strainers, and paper that are currently stored at the hazardous waste satellite accumulation point at the proposed alert hangar to be stored at a different location. Minor adverse impacts to water resources associated with the potential increase in stormwater pollutants from an increase in vehicle use and refueling activities would be mitigated through the use of BMPs and SPCC procedures. Minor adverse impacts to biological resources from an increase in wildlife strike hazard would be expected; however, the use of pyrotechnics and altitude and flying pattern adjustments would minimize these impacts.

4.13 Irreversible and Irretrievable Commitment of Resources

NEPA also requires that environmental analysis include identification of "… any irreversible and irretrievable commitments of resources which would be involved in the Proposed Action should it be implemented." Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effects the use of these resources would have on consumption or destruction of a resource that could not be replaced in a reasonable period of time. The irreversible environmental changes that could result from implementation of the Proposed Action include the consumption of material resources, energy resources, and human resources.

Material resources used for the Proposed Action include the temporary use of the proposed alert hangar and the temporary use of runway space at the MSPIA during takeoffs and landings. Use of these materials would insignificantly limit other activities at the MSPIA and 133 AW installation.

Energy resources, including fuel, would be irretrievably lost. During operation of the F-16C aircraft and associated maintenance, fuel consumption would be expected. Consumption of these energy resources would not place an unreasonable demand on their availability in the region and would occur under both the Proposed Action and No Action Alternative. Therefore, no significant adverse impacts would be expected.

The use of human resources for operation and maintenance activities is considered an irretrievable loss, only in that it would preclude such personnel from engaging in other work activities. However, the personnel required to implement the Proposed Action would likely be

operating and maintaining F-16C aircraft at the 148 FW installation in Duluth under the No Action Alternative. Therefore, no loss in human resources is expected from the implementation of the Proposed Action.

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CHAPTER 5
LIST OF PREPARERS

This EA has been prepared under the direction of Minneapolis-St. Paul International Airport (MSPIA) Air Reserve Station and Air Force Center for Environmental Excellence (AFCEE). Individuals who contributed to the preparation of this document are listed below.

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CHAPTER 6
PUBLIC REVIEW PROCESS

6.1 Description of Public Review Process

The Draft Finding of No Significant Impact (FONSI) and Draft Environmental Assessment (EA) were completed in September of 2007 and then circulated to agencies, individuals, and the public for review and comment. A list of the agencies and individuals that received a copy of the Draft FONSI and Draft EA is provided below in Section 6.2. Those agencies and individuals received a copy on September 24, 2007. Copies of the Draft FONSI and Draft EA were available for public review at the Minneapolis Public Library from September 24, 2007 to October 24, 2007. A notice of availability was posted in the Star Tribune newspaper on September 24, 2007. The public notice indicated the nature of the proposed action, the availability of copies of the Draft FONSI and Draft EA at the Minneapolis Public Library, and instructions for submitting comments and inquiries. A copy of the notice of availability is provided in Appendix A. Comments were accepted during a 30 day period from September 24 2007 to October 24, 2007. All comments, responses, and modifications to the FONSI and EA are described below in Section 6.3.

6.2 Agencies and Individuals

This section lists the agencies and individuals that received a copy of the Draft FONSI and Draft EA.

FEDERAL AGENCIES

U.S. Environmental Protection Agency
Environmental Planning and Evaluation Unit
77 W. Jackson Blvd., Mailstop B-19J
Chicago, IL 60604-3590

U.S. Fish and Wildlife Service
Twin Cities Field Office E.S.
4101 E. 80th St.
Bloomington, MN 55425-1665

U.S. Army Corp of Engineers
Regulatory Functions Branch
Army Corps of Engineers Center
190 Fifth St. E.
St. Paul, MN 55101-1638

Minnesota Valley National Wildlife Refuge
3815 American Blvd. East
Bloomington, MN 55425

National Park Service
Stewardship Team Manager
111 East Kellogg Blvd., Suite 105
St. Paul, MN 55101-1288

STATE AGENCIES

Environmental Quality Board
Environmental Review Program
300 Centennial Office Building
658 Cedar Street
St. Paul, MN 55155

Department of Transportation
Mn/DOT Environmental Services
395 John Ireland Blvd, MS620,
St. Paul, MN 55155

Minnesota Department of Natural Resources
Environmental Review Unit
500 Lafayette Road
St. Paul, MN 55155-4010

Minnesota Historical Society
State Historic Preservation Office
345 Kellogg Blvd. West, Level A
St. Paul, MN 55102

Minnesota Pollution Control Agency
Env. Review Unit/Majors/Rem Division
520 Lafayette Road
St. Paul, MN 55155-4194

Fort Snelling State Park
101 Snelling Lake Road
St. Paul, Minnesota 55111

LOCAL AGENCIES

Metropolitan Council
Referrals Coordinator
Planning & Technical Assistance Unit
230 E. Fifth Street
St. Paul, MN 55101

Hennepin County
Planning Department, Suite A-2308
300 South 6th Street
Minneapolis, MN 55487

City of Minneapolis
Planning Department
350 South 5th Street
Minneapolis, MN 55415

Lower Minnesota River Watershed District
200 4th Avenue West
Shakopee, MN 55379

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Prairie Island Mdewakanton Community
Attn: President Doreen Hagen
5636 Sturgeon Lake Rd.
Welch, MN 55089

Shakopee Mdewakanton Sioux Community
Attn: Tribal Chair
2330 Sioux Trail NW
Prior Lake, MN 55372

Lower Sioux Community
Attn: Tribal Chair
39458 Res. Highway 1
Morton, MN 56270

Upper Sioux Community
Attn: Tribal Chair
5744 Highway 67 East
Granite Falls, MN 56241-3662

Mendota Mdewakanton Dakota Community
Attn: Tribal Chair
1324 Sibley Memorial Hwy
Mendota, MN 55150

OTHER AGENCIES

Metropolitan Airports Commission
Attn: Bridget Rief, Airside Project Manager
Lindbergh Terminal, Room 325
4300 Glumack Drive
Minneapolis-St. Paul International Airport
St. Paul, MN

Metropolitan Airports Commission
Noise Program
6040 28th Avenue South
Minneapolis, MN 55450

6.3 Comments Received

Five written comments and two oral comments were received during the comment period, as listed below. A copy of the written comments is provided in Appendix D. Comments that offered new information, addressed errors, or addressed facts relevant to the content of the Draft EA resulted in revisions to the text of the Draft EA. This Final EA document contains the revisions made to the original Draft EA.

Written Comments

Mr. Chad Leqve of the Aviation Noise and Satellite Programs for the MAC submitted written comments on October 22, 2007. Sections 3.1 and 4.1 of the EA were modified to incorporate additional information and analysis based on the comments. The comments and modifications to the EA are described below.

Written Comment 1

Mr. Leqve stated the following:

On page 4-2, the EA states that "The civilian Boeing 747 (i.e., loudest civilian aircraft reported at MSPIA) produces a sound exposure level (SEL) of105.2 A-weighted sound level (dBA), and the military C-130 produces noise at 105 dBA (measured at 30 feet in front of aircraft). The F16C aircraft produce an SEL of 109 dBA (measured at 1,000 feet)." For comparative purposes and consistency in the EA, the SEL for each aircraft type represented in the analysis should be the same distance measured from each aircraft type. A Day-Night Average Sound Level (DNL) noise contour analysis between the no-action and proposed action alternatives would provide a more appropriate noise analysis of the overall noise effects of the proposed action.

Response: The reference above was eliminated from the text. Furthermore, since the DNL is a function of SEL, i.e. the loudness of the noise, and the number of noise events that occur, the F-16 runway utilization patterns were analyzed to determine the number of events occurring at specific locations. These noise levels resulting from the Proposed Action were added to the existing DNL data to yield Proposed Action noise levels. The existing noise levels were then compared to the Proposed Action noise levels. As shown in Table 4-5 in Chapter 4 of this Final EA, the greatest DNL increases are seen in the noise monitoring locations associated with operations to Runway 22. These are RMTs 9-12, RMTs 17-20, and RMT 32. As shown in Figure 3-1, RMTs 9-12 are located northeast of the airport in the arrival corridor to Runway 22. RMTs 17-20 and RMT 32 are located southwest of the airport in the departure corridor for Runway 22. The Proposed Action noise level at each of these locations is below 60 DNL and these increases are not significant based on the criteria contained in FAA Order 1050.1E. (See Section 4.1 of this document for the results of this analysis).

Written Comment 2

Mr. Leqve stated the following:

On page 4-3, the EA states that "However, the sound level increases have the potential to cause greater annoyance to nearby receptors, but because of the low frequency and short duration of F-16C flights, sensitive receptors already accustomed to aircraft related noise would not likely be aware oft his slight increase in noise levels." MAC analysis shows that, at noise monitoring site (RMT) #18 (approximately 15,240 feet from the departure end of Runway 22), the average SEL for the F-16 aircraft was 111.4 dB while the average SEL for the Boeing 747-400 was 103.9 dB. MAC analysis shows the highest SEL recorded at RMT #18 for the F-16 aircraft registered 115.8 dB. The magnitude of the measured F-16 noise events at MSP represent noise levels significantly higher than those to which residents in the communities surrounding the airport are accustomed. Furthermore, the average duration of the noise events at RMT #18 was 65 seconds for the F-16 aircraft, while the average duration of the B747 aircraft was 42 seconds. Both the noise level and the duration of the F-16 aircraft noise events, as measured by MAC ANOMS, are contrary to the statement made on page 4-3 and are likely to be noticed by residents living close to the airport whether or not they are already accustomed to aircraft-related noise.

Response: This entire statement was eliminated. See response to comment 1 above and Section 4.1 of this document for the results of the additional noise analysis performed.

Written Comment 3

Mr. Leqve stated the following:

As part of the mitigation proposed on page 4-3, the EA states, "To minimize noise impacts from training sorties, flight operations would only occur during the daytime (7:00 AM to 10:00 PM) and during periods when aircraft activity is typically lower than normal. Additionally, there would be no planned touch-and-goes, and engine system checks would only occur Mondays through Fridays." Due to the significance and duration of noise events created by the proposed action, and the addition of aircraft noise that residents living close to the airport are not accustomed to, the 133rd Airlift Wing should consider a voluntary curfew on flight operations between 8:00 PM to 8:00 AM. This voluntary curfew would help minimize noise impacts beyond the standard daytime hours (7:00 AM to 10:00 PM). Residents would be less likely to complain during these hours and children who may go to sleep before 10:00 PM or awake after 7:00 AM would be afforded additional protection from F-16 noise impacts and sleep-related disturbances to which they are not normally subjected.

Response: Significant adverse noise impacts would not be expected from the Proposed Action and noise mitigation measures are not required; however, in the interest of a "good neighbor" policy and to reduce the potential for increases in noise exposure the 148 FW has agreed to the following noise reduction measures to reduce the potential for annoyance:

(1) F-16 training sorties will only be scheduled during the daytime (8:00 AM to 8:00 PM). Additionally, there will be no planned touch-and-goes or low approaches. Engine system checks will only occur Mondays through Fridays.

(2) Departure operations will utilize a maximum climb profile consistent with safety in order to obtain maximum altitude prior to reaching residential areas.

(3) Use of afterburners will be restricted to operational necessity and afterburner use will be discontinued as soon as practicable during the departure.

These mitigation measures are intended to reduce the potential for noise related annoyance effects to nearby receptors.

Written Comment 4

Mr. Leqve stated the following:

On page 4-3, the EA states, "The MSPIA currently uses noise mitigation techniques to address noise impacts to the community. The MSPIA operates the Home Mitigation Program, which installs new or reconditioned windows and doors, central air-conditioning, wall insulation and vent baffling for residences within the 65 DNL noise contour. Additionally, an Airport Noise and Operations Monitoring System has been established to fully monitor noise issues within the community. These mitigation measures would be sufficient to decrease noise related annoyance effects to nearby receptors." As detailed in the EA, the residential sound mitigation program and ANOMS system at MSP are critical parts of the noise reduction effort at MSP. However, reducing the sortie flying times to within 8:00 AM to 8:00 PM and the use of a steep departure profile would help to address the additional noise impacts that would result from the F-16 operations at MSP.

Response: See Response to Comment 3 above.

Written Comment 5

Mr. Leqve stated the following:

On page 4-15 and 4-16, the EA states, "Under the Proposed Action, minor adverse effects would be expected on wildlife species from an increase in noise associated with the additional flights at the MSPIA. These effects would be expected to be negligible since the worst-case scenario of the Proposed Action would only include 16 additional flights per month at the MSPIA." This page states that the proposed action would include only 16 additional flights per month at MSP. Page 4-2 states that under the proposed action the potential number of flight operations would be 32 per month. The total number of flight operations under the proposed action should be consistent throughout the document.

Response: A single F-16 sortie includes two operations, one for takeoff and one landing. The worst-case scenario for the proposed action includes sixteen (16) training sorties (32 flight operations) per month. The referenced statement is correct; however, to avoid confusion the referenced statement now includes clarification.

Oral Comment 1

Ms. Sherry Kamke from EPA Region 5 submitted an oral comment in October 2007 stating that noise sensitivity might be a critical concern in the area around the Minneapolis-St. Paul International Airport (MSPIA), based on her agency's experiences from review of previous NEPA documents for proposed actions with the airport. Based on that, she suggested that it might be beneficial to present information in the EA discussing any history of complaints related to F-16 operations that have occurred at MSPIA in the past.

Response: In response to this comment, the 934th Airlift Wing (934 AW) MSPIA Reserve Station contacted the local Air Force Reserve and Air National Guard units, as well as Metropolitan Airports Commission (MAC) (the agency operating the airport) to request a list of noise complaints received related to F-16s. Below are the results of that inquiry.

- The 934 AW (Air Force Reserve) Public Affairs Office has records dating back to 2001. A single noise complaint record associated with F-16 operations was provided. The complaint occurred in 2005. A copy of this complaint is attached.
- The 133 AW (MN Air National Guard) Public Affairs Office did not provide a response to the 934 AW request.
- MAC noise staff indicated their data cannot associate noise complaints with F-16 operations.

Oral Comment 2

Mr. Nick Rowse from U.S. Fish & Wildlife Service – Twin Cities Field Office provided an oral comment in October 2007 stating that he would like the EA to look at potential impacts on the visitor use of the Minnesota Valley National Wildlife Refuge.

Response: The Refuge comprises 14,000 acres, stretching for 45 miles from Fort Snelling State Park to Bell Plain, Minnesota. The focal point of the refuge is an 8,000 square foot visitor center, auditorium, classrooms, and an observation deck. The Refuge provides education and interpretive programs and allows recreational activities such as hiking, cross-country skiing, hunting, and fishing. The visitor center is located at 3815 American Blvd. in Bloomington, southeast of the MSPIA. The visitor center is located approximately 6,000 feet from the nearest runway of the MSPIA. Based on the location of the visitor center, no runway of the MSPIA would direct aircraft operations directly at the visitor center; so F-16 aircraft are not expected to fly over the visitor center. Even so, short-term minor adverse impacts from noise to visitors at the visitor center and refuge would occur from operation of the F-16C aircraft. These impacts, however, are not considered significant due to the location of the visitor center in relation to the MSPIA runways, the small increase in aircraft activity at the

MSPIA that would result from the Proposed Action, and the mitigation measures described in Section 4.1.

NOISE COMPLAINT REPORT

DATE:	TIME OF CALL:	YOUR NAME:
26 Aug 05	1515	Stephanie Sobtzak

COMPLAINANT'S NAME:	LOCATION/ADDRESS:
Barbara Giarlorenzi	5308 29th Ave S Minneapolis, MN 55417

PHONE:	REPLY REQUESTED:
612-728-2109	Call back

REMARKS:

Flying N/NW, small jet aircraft, flying low grey - Two, close together. Same noise last night in Uptown (between 2030-2200)

(Ask for details such as type aircraft, exact time, repeat problem, or 1st time/route description, i.e., east to west)

OPR CONTACT TIME:	CONTACT:

CONFIRMATION & DETAILS:

Called Ops in Duluth. Confirmed it was their planes responsible

IF NOT OUR AIRCRAFT, CONTACT ANG:

FOLLOW-UP CALL DATE/TIME:

26 Aug 05 1530

ANY OTHER FOLLOW-UP REQUIRED:

COMMENTS:

I called Ms. Giarlorenzi + apologized, as well as relayed the message that "the fighters were on an authorized mission."

Annual usage less than 30; form number not required.

CHAPTER 7

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Appendix A

Notice of Availability

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PUBLIC NOTICE

NOTICE OF AVAILABILITY

Draft Finding of No Significant Impact and Draft Environmental Assessment for the Deployment of Up to Four F-16C Aircraft to the 133rd Airlift Wing for Air Sovereignty Alert Operations Minneapolis - St. Paul International Airport Air Reserve Station, MN Minneapolis, Minnesota. - A Draft Environmental Assessment (EA) titled "Deployment of Up to Four F-16C Aircraft to the 133rd Airlift Wing for Air Sovereignty Alert Operations" has been prepared for the 934th Airlift Wing, Air Force Reserve Command, and 148th Fighter Wing, Minnesota Air National Guard. The U.S. Air Force (USAF) is proposing to issue a Finding of No Significant Impact (FONSI) based on this Draft EA. The analysis considered potential effects of the Proposed Action on noise, land use, air quality, safety, socioeconomic resources, cultural resources, hazardous materials and waste, geological resources, water resources, and biological resources. The results, as found in the Draft EA, show that the proposed Action would not have an adverse impact on the environment, indicating that a FONSI would be appropriate. An Environmental Impact Statement should not be necessary prior to implementing the proposed Action.

Copies of the Draft FONSI and EA showing the analysis are available for review at the Minneapolis Public Library, Science & Technology/Environmental Conservation, 300 Nicollet Mall, Minneapolis, MN 55401, 612-630-6000. Public comments on the EA and FONSI will be accepted for 30 days from the date of this publication.

Written comments and inquiries on the Draft FONSI and EA should be directed to Mr. Douglas Yocum, 934 MSG/CEV, 760 Military Highway, Minneapolis, MN 55450-2100.

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Appendix B

Minnesota's List of Endangered, Threatened, and Special Concern Species

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MINNESOTA'S LIST OF ENDANGERED, THREATENED, AND SPECIAL CONCERN SPECIES

PURPOSE, SCOPE, AND RELATIONSHIP TO FEDERAL LAWS

Minnesota's Endangered Species Statute (Minnesota Statutes, Section 84.0895) requires the Minnesota Department of Natural Resources (DNR) to adopt rules designating species meeting the statutory definitions of endangered, threatened, or species of special concern. The resulting List of Endangered, Threatened, and Special Concern Species is codified as Minnesota Rules, Chapter 6134. The Endangered Species Statute also authorizes the DNR to adopt rules that regulate treatment of species designated as endangered and threatened. These regulations are codified as Minnesota Rules, Parts 6212.1800 to 6212.2300.

Minnesota's Endangered Species Statute and the associated Rules impose a variety of restrictions, a permit program, and several exemptions pertaining to species designated as endangered or threatened. A person may not take, import, transport, or sell any portion of an endangered or threatened species. However, these acts may be allowed by permit issued by the DNR; plants on certain agricultural lands and plants destroyed in consequence of certain agricultural practices are exempt; and the accidental, unknowing destruction of designated plants is exempt. Species of special concern are not protected by Minnesota's Endangered Species Statute or the associated Rules. Persons are advised to read the full text of the Statute and Rules in order to understand all regulations pertaining to species that are designated as endangered, threatened, or species of special concern.

Note that the Federal Endangered Species Act of 1973, as amended (16 USC 1531 - 1544) requires the U.S. Department of the Interior to identify species as endangered or threatened according to a separate set of definitions, and imposes a separate set of restrictions pertaining to those species. In the following list, the federal status of the eleven federally-listed species that occur in Minnesota is noted to the right of those species' names (E = Endangered; T = Threatened).

DEFINITIONS

A species is considered **endangered**, if the species is threatened with extinction throughout all or a significant portion of its range within Minnesota.

A species is considered **threatened**, if the species is likely to become endangered within the foreseeable future throughout all or a significant portion of its range within Minnesota.

A species is considered a **species of special concern**, if although the species is not endangered or threatened, is extremely uncommon in Minnesota, or has unique or highly specific habitat requirements and deserves careful monitoring of its status. Species on the periphery of their range that are not listed as threatened may be included in this category along with those species that were once threatened or endangered but now have increasing or protected, stable populations.

CONTENTS

FOR MORE INFORMATION, CONTACT:

Natural Heritage and Nongame Research Program
Section of Ecological Services, Minnesota Department of Natural Resources
500 Lafayette Rd., Box 25
St. Paul, MN 55155
Phone: 1-800-766-6000 (or 651-296-6157 in the metro area)
Fax: 651-296-1811

MAMMALS

Threatened

Spilogale putorius . . . . . eastern spotted skunk

Special Concern

Canis lupus . . . . . gray wolf (Fed. Status: T)
Cervus elaphus . . . . . elk
Cryptotis parva . . . . . least shrew
Felis concolor . . . . . mountain lion
Microtus ochrogaster . . . . . prairie vole
Microtus pinetorum . . . . . woodland vole
Mustela nivalis . . . . . least weasel
Myotis septentrionalis . . . . . northern myotis
Perognathus flavescens . . . . . plains pocket mouse
Phenacomys intermedius . . . . . heather vole
Pipistrellus subflavus . . . . . eastern pipistrelle
Sorex fumeus . . . . . smokey shrew
Synaptomys borealis . . . . . northern bog lemming
Thomomys talpoides . . . . . northern pocket gopher

BIRDS

Endangered

Ammodramus bairdii . . . . . Baird's sparrow
Ammodramus henslowii . . . . . Henslow's Sparrow
Anthus spragueii . . . . . Sprague's Pipit
Calcarius ornatus . . . . . chestnut-collared longspur
Charadrius melodus . . . . . piping plover (Fed. Status: T)
Rallus elegans . . . . . king rail
Speotyto cunicularia . . . . . burrowing owl

Threatened

Cygnus buccinator . . . . . trumpeter swan
Falco peregrinus . . . . . peregrine falcon (Fed. Status: E)
Lanius ludovicianus . . . . . loggerhead shrike
Phalaropus tricolor . . . . . Wilson's phalarope
Podiceps auritus . . . . . horned grebe
Sterna hirundo . . . . . common tern

Special Concern

Ammodramus nelsoni . . . . . Nelson's sharp-tailed sparrow
Asio flammeus . . . . . short-eared owl
Buteo lineatus . . . . . red-shouldered hawk
Coturnicops noveboracensis . . . . . yellow rail
Dendroica cerulea . . . . . cerulean warbler
Empidonax virescens . . . . . acadian flycatcher
Gallinula chloropus . . . . . common moorhen
Haliaeetus leucocephalus . . . . . bald eagle (Fed. Status: T)
Larus pipixcan . . . . . Franklin's gull
Limosa fedoa . . . . . marbled godwit
Pelecanus erythrorhynchos . . . . . American white pelican
Seiurus motacilla . . . . . Louisiana waterthrush
Sterna forsteri . . . . . Forster's tern
Tympanuchus cupido . . . . . greater prairie-chicken
Wilsonia citrina . . . . . hooded warbler

AMPHIBIANS AND REPTILES

Endangered

Acris crepitans . . . . . northern cricket frog
Sistrurus catenatus . . . . . massasauga

Threatened

Clemmys insculpta . . . . . wood turtle
Crotalus horridus . . . . . timber rattlesnake
Emydoidea blandingii . . . . . Blanding's turtle

Special Concern

Apalone mutica . . . . . smooth softshell
Chelydra serpentina . . . . . snapping turtle
Coluber constrictor . . . . . racer
Elaphe obsoleta . . . . . rat snake
Eumeces fasciatus . . . . . five-lined skink
Hemidactylium scutatum . . . . . four-toed salamander
Heterodon nasicus . . . . . western hognose snake
Pituophis catenifer . . . . . gopher snake
Tropidoclonion lineatum . . . . . lined snake

FISH

Threatened

Polyodon spathula . . . . . paddlefish

Special Concern

Acipenser fulvescens . . . . . lake sturgeon
Alosa chrysochloris . . . . . skipjack herring
Ammocrypta asprella . . . . . crystal darter
Aphredoderus sayanus . . . . . pirate perch
Coregonus kiyi . . . . . kiyi
Coregonus zenithicus . . . . . shortjaw cisco
Cycleptus elongatus . . . . . blue sucker
Erimystax x-punctata . . . . . gravel chub
Etheostoma microperca . . . . . least darter
Fundulus sciadicus . . . . . plains topminnow
Ichthyomyzon fossor . . . . . northern brook lamprey
Ichthyomyzon gagei . . . . . southern brook lamprey
Ictiobus niger . . . . . black buffalo
Morone mississippiensis . . . . . yellow bass
Notropis amnis . . . . . pallid shiner
Notropis anogenus . . . . . pugnose shiner
Notropis nubilus . . . . . Ozark minnow
Notropis topeka . . . . . Topeka shiner
Noturus exilis . . . . . slender madtom
Percina evides . . . . . gilt darter

MOLLUSKS

Endangered

Arcidens confragosus . . . . . rock pocketbook
Elliptio crassidens . . . . . elephant-ear
Fusconaia ebena . . . . . ebonyshell
Lampsilis higginsi . . . . . Higgins eye (Fed. Status: E)
Lampsilis teres . . . . . yellow sandshell
Novasuccinea n. sp. Minnesota B . . . . . Iowa pleistocene ambersnail
Plethobasus cyphyus . . . . . sheepnose
Quadrula fragosa . . . . . winged mapleleaf (Fed. Status: E)
Quadrula nodulata . . . . . wartyback
Vertigo hubrichti hubrichti . . . . . Midwest pleistocene vertigo

Threatened

Actinonaias ligamentina . . . . . mucket
Alasmidonta marginata . . . . . elktoe
Cumberlandia monodonta . . . . . spectaclecase
Cyclonaias tuberculata . . . . . purple wartyback
Ellipsaria lineolata . . . . . butterfly
Epioblasma triquetra . . . . . snuffbox
Megalonaias nervosa . . . . . washboard
Novasuccinea n. sp. Minnesota A . . . . . Minnesota pleistocene ambersnail
Pleurobema coccineum . . . . . round pigtoe
Quadrula metanevra . . . . . monkeyface
Simpsonaias ambigua . . . . . salamander mussel
Tritogonia verrucosa . . . . . pistolgrip
Venustaconcha ellipsiformis . . . . . ellipse
Vertigo hubrichti variabilis n. subsp. . . . . variable pleistocene vertigo
Vertigo meramecensis . . . . . bluff vertigo

Special Concern

Elliptio dilatata . . . . . spike
Lasmigona compressa . . . . . creek heelsplitter
Lasmigona costata . . . . . fluted-shell
Ligumia recta . . . . . black sandshell
Obovaria olivaria . . . . . hickorynut

JUMPING SPIDERS

Special Concern

Habronattus texanus . . . . . a species of jumping spider
Marpissa grata . . . . . a species of jumping spider
Metaphidippus arizonensis . . . . . a species of jumping spider
Paradamoetas fontana . . . . . a species of jumping spider
Phidippus apacheanus . . . . . a species of jumping spider
Phidippus pius . . . . . a species of jumping spider
Sassacus papenhoei . . . . . a species of jumping spider
Tutelina formicaria . . . . . a species of jumping spider

LEAFHOPPERS

Special Concern

Aflexia rubranura . . . . . red-tailed prairie leafhopper

DRAGONFLIES

Special Concern

Ophiogomphus anomalis . . . . . extra-striped snaketail
Ophiogomphus susbehcha . . . . . St. Croix snaketail

BUTTERFLIES AND MOTHS

Endangered

Erynnis persius . . . . . persius dusky wing
Hesperia comma assiniboia . . . . . assiniboia skipper
Hesperia uncas . . . . . uncas skipper
Lycaeides melissa samuelis . . . . . Karner blue (Fed. Status: E)
Oeneis uhleri varuna . . . . . Uhler's arctic

Threatened

Hesperia dacotae . . . . . dakota skipper
Hesperia ottoe . . . . . ottoe skipper
Oarisma garita . . . . . garita skipper

Special Concern

Atrytone arogos . . . . . arogos skipper
Erebia disa mancinus . . . . . disa alpine
Hesperia leonardus . . . . . leonardus skipper
Lycaeides idas nabokovi . . . . . Nabokov's blue
Oarisma powesheik . . . . . powesheik skipper
Pyrgus centaureae freija . . . . . grizzled skipper
Schinia indiana . . . . . phlox moth
Speyeria idalia . . . . . regal fritillary

CADDISFLIES

Endangered

Chilostigma itascae . . . . . headwaters chilostigman

Special Concern

Agapetus tomus . . . . . a species of caddisfly
Asynarchus rossi . . . . . a species of caddisfly
Ceraclea brevis . . . . . a species of caddisfly
Ceraclea vertreesi . . . . . a species of caddisfly
Hydroptila metoeca . . . . . a species of caddisfly
Hydroptila novicola . . . . . a species of caddisfly
Hydroptila tortosa . . . . . a species of caddisfly
Oxyethira ecornuta . . . . . a species of caddisfly
Oxyethira itascae . . . . . a species of caddisfly
Polycentropus milaca . . . . . a species of caddisfly
Protoptila talola . . . . . a species of caddisfly
Setodes guttatus . . . . . a species of caddisfly

TIGER BEETLES

Endangered

Cicindela fulgida fulgida . . . . . a species of tiger beetle
Cicindela limbata nympha . . . . . a species of tiger beetle

Threatened

Cicindela denikei . . . . . a species of tiger beetle
Cicindela fulgida westbournei . . . . . a species of tiger beetle
Cicindela lepida . . . . . a species of tiger beetle

Special concern

Cicindela hirticollis rhodensis . . . . . a species of tiger beetle
Cicindela macra macra . . . . . a species of tiger beetle
Cicindela patruela patruela . . . . . a species of tiger beetle
Cicindela splendida cyanocephalata . . . . . a species of tiger beetle

VASCULAR PLANTS

Endangered

Agalinis auriculata . . . . . eared false foxglove
Agalinis gattingeri . . . . . round-stemmed false foxglove
Asclepias stenophylla . . . . . narrow-leaved milkweed
Astragalus alpinus . . . . . alpine milk-vetch
Bartonia virginica . . . . . Virginia bartonia
Botrychium gallicomontanum . . . . . frenchman's bluff moonwort
Botrychium oneidense . . . . . blunt-lobed grapefern
Botrychium pallidum . . . . . pale moonwort
Cacalia suaveolens . . . . . sweet-smelling Indian-plantain
Caltha natans . . . . . floating marsh-marigold
Carex formosa . . . . . handsome sedge
Carex pallescens . . . . . pale sedge
Carex plantaginea . . . . . plantain-leaved sedge
Castilleja septentrionalis . . . . . northern paintbrush
Cheilanthes lanosa . . . . . hairy lip-fern
Chrysosplenium iowense . . . . . Iowa golden saxifrage
Cristatella jamesii . . . . . James' polanisia
Dodecatheon meadia . . . . . prairie shooting star
Draba norvegica . . . . . Norwegian whitlow-grass
Eleocharis wolfii . . . . . Wolf's spike-rush
Empetrum eamesii . . . . . purple crowberry
Empetrum nigrum . . . . . black crowberry
Erythronium propullans . . . . . dwarf trout lily (Fed. Status: E)
Escobaria vivipara . . . . . ball cactus
Fimbristylis puberula var. *interior* . . . . . hairy fimbristylis
Glaux maritima . . . . . sea milkwort
Hydrastis canadensis . . . . . golden-seal
Iodanthus pinnatifidus . . . . . purple rocket
Isoetes melanopoda . . . . . blackfoot quillwort
Lechea tenuifolia . . . . . narrow-leaved pinweed
Lesquerella ludoviciana . . . . . bladder pod
Listera auriculata . . . . . auricled twayblade
Malaxis paludosa . . . . . bog adder's-mouth
Marsilea vestita . . . . . hairy water clover
Montia chamissoi . . . . . montia
Oryzopsis hymenoides . . . . . Indian ricegrass
Osmorhiza berteroi . . . . . Chilean sweet cicely
Oxytropis viscida . . . . . sticky locoweed
Paronychia fastigiata . . . . . forked chickweed
Parthenium integrifolium . . . . . wild quinine
Platanthera flava var. *herbiola* . . . . . tubercled rein-orchid
Platanthera praeclara . . . . . western prairie fringed orchid (Fed. Status: T)
Polemonium occidentale ssp. *lacustre* . . . . western Jacob's-ladder
Polygala cruciata . . . . . cross-leaved milkwort
Polystichum braunii . . . . . Braun's holly fern
Potamogeton bicupulatus . . . . . snailseed pondweed
Potamogeton diversifolius . . . . . diverse-leaved pondweed
Psoralidium tenuiflora . . . . . slender-leaved scurf pea
Sagina nodosa ssp. *borealis* . . . . . knotty pearlwort
Saxifraga cernua . . . . . nodding saxifrage
Scleria triglomerata . . . . . tall nut-rush
Sedum integrifolium ssp. *leedyi* . . . . . Leedy's roseroot (Fed. Status: T)
Selaginella selaginoides . . . . . northern spikemoss
Senecio canus . . . . . gray ragwort
Talinum rugospermum . . . . . rough-seeded fameflower
Tofieldia pusilla . . . . . small false asphodel
Xyris torta . . . . . twisted yellow-eyed grass

VASCULAR PLANTS

Threatened

Achillea sibirica . . . . . Siberian yarrow
Allium cernuum . . . . . nodding wild onion
Allium schoenoprasum var. *sibiricum* . . . . wild chives
Ammophila breviligulata . . . . . beachgrass
Arabis holboellii var. *retrofracta* . . . . . Holboell's rockcress
Arnica lonchophylla . . . . . long-leaved arnica
Arnoglossum plantagineum . . . . . tuberous Indian-plantain
Asclepias hirtella . . . . . prairie milkweed
Asclepias sullivantii . . . . . Sullivant's milkweed
Asplenium trichomanes . . . . . maidenhair spleenwort
Aster shortii . . . . . Short's aster
Aureolaria pedicularia . . . . . fernleaf false foxglove
Besseya bullii . . . . . kitten-tails
Botrychium lanceolatum . . . . . triangle moonwort
Botrychium lunaria . . . . . common moonwort
Botrychium rugulosum . . . . . St. Lawrence grapefern
Carex careyana . . . . . Carey's sedge
Carex conjuncta . . . . . jointed sedge
Carex davisii . . . . . Davis' sedge
Carex festucacea . . . . . fescue sedge
Carex garberi . . . . . Garber's sedge
Carex jamesii . . . . . James' sedge
Carex katahdinensis . . . . . Katahdin sedge
Carex laevivaginata . . . . . smooth-sheathed sedge
Carex laxiculmis . . . . . spreading sedge
Carex sterilis . . . . . sterile sedge
Crassula aquatica . . . . . pigmyweed
Crataegus douglasii . . . . . black hawthorn
Cyperus acuminatus . . . . . short-pointed umbrella-sedge
Cypripedium arietinum . . . . . ram's-head lady's-slipper
Diplazium pycnocarpon . . . . . narrow-leaved spleenwort
Dryopteris marginalis . . . . . marginal shield-fern
Eleocharis nitida . . . . . neat spike-rush
Eleocharis olivacea . . . . . olivaceous spike-rush
Eleocharis rostellata . . . . . beaked spike-rush
Eupatorium sessilifolium . . . . . upland boneset
Floerkea proserpinacoides . . . . . false mermaid
Heteranthera limosa . . . . . mud plantain
Huperzia porophila . . . . . rock clubmoss
Lespedeza leptostachya . . . . . prairie bush clover (Fed. Status: T)
Melica nitens . . . . . three-flowered melic
Moehringia macrophylla . . . . . large-leaved sandwort
Napaea dioica . . . . . glade mallow
Nymphaea leibergii . . . . . small white waterlily
Paronychia canadensis . . . . . Canadian forked chickweed
Phegopteris hexagonoptera . . . . . broad beech-fern
Plantago elongata . . . . . slender plantain
Poa paludigena . . . . . bog bluegrass
Polystichum acrostichoides . . . . . Christmas fern
Rhynchospora capillacea . . . . . hair-like beak-rush
Rotala ramosior . . . . . tooth-cup
Rubus chamaemorus . . . . . cloudberry
Salicornia rubra . . . . . red saltwort
Saxifraga paniculata . . . . . encrusted saxifrage
Scleria verticillata . . . . . whorled nut-rush
Scutellaria ovata . . . . . ovate-leaved skullcap
Shinnersoseris rostrata . . . . . annual skeletonweed
Silene nivea . . . . . snowy campion
Subularia aquatica . . . . . awlwort
Sullivantia sullivantii . . . . . reniform sullivantia
Vaccinium uliginosum . . . . . alpine bilberry
Valeriana edulis var. *ciliata* . . . . . valerian
Viola lanceolata . . . . . lance-leaved violet
Viola nuttallii . . . . . yellow prairie violet
Woodsia glabella . . . . . smooth woodsia
Woodsia scopulina . . . . . Rocky Mountain woodsia

VASCULAR PLANTS

Special Concern

Adoxa moschatellina . . . . . moschatel
Agrostis geminata . . . . . twin bentgrass
Androsace septentrionalis ssp. *puberulenta* northern androsace
Antennaria parvifolia . . . . . small-leaved pussytoes
Aristida purpurea var. *longiseta* . . . . . red three-awn
Aristida tuberculosa . . . . . sea-beach needlegrass
Asclepias amplexicaulis . . . . . clasping milkweed
Asplenium platyneuron . . . . . ebony spleenwort
Astragalus flexuosus . . . . . slender milk-vetch
Astragalus missouriensis . . . . . Missouri milk-vetch
Bacopa rotundifolia . . . . . water-hyssop
Baptisia alba . . . . . white wild indigo
Baptisia bracteata var. *leucophaea* . . . . . plains wild indigo
Botrychium campestre . . . . . prairie moonwort
Botrychium mormo . . . . . goblin fern
Botrychium minganense . . . . . Mingan moonwort
Botrychium simplex . . . . . least moonwort
Buchloe dactyloides . . . . . buffalo grass
Calamagrostis lacustris . . . . . marsh reedgrass
Calamagrostis montanensis . . . . . plains reedgrass
Calamagrostis purpurascens . . . . . purple reedgrass
Callitriche heterophylla . . . . . larger water-starwort
Carex annectens . . . . . yellow-fruited sedge
Carex crus-corvi . . . . . raven's foot sedge
Carex exilis . . . . . coastal sedge
Carex flava . . . . . yellow sedge
Carex hallii . . . . . Hall's sedge
Carex michauxiana . . . . . Michaux's sedge
Carex obtusata . . . . . blunt sedge
Carex praticola . . . . . prairie sedge
Carex scirpoidea . . . . . northern singlespike sedge
Carex supina var. *spaniocarpa* . . . . . weak arctic sedge
Carex typhina . . . . . cattail sedge
Carex woodii . . . . . Wood's sedge
Carex xerantica . . . . . dry sedge
Chamaesyce missurica . . . . . Missouri spurge
Cirsium hillii . . . . . Hill's thistle
Cladium mariscoides . . . . . twig-rush
Claytonia caroliniana . . . . . Carolina spring-beauty
Cymopterus acaulis . . . . . wild parsley
Cypripedium candidum . . . . . small white lady's-slipper
Dalea candida var. *oligophylla* . . . . . white prairie-clover
Decodon verticillatus . . . . . waterwillow
Deschampsia flexuosa . . . . . slender hairgrass
Desmanthus illinoensis . . . . . prairie mimosa
Desmodium cuspidatum var. *longifolium* . . big tick-trefoil
Desmodium nudiflorum . . . . . stemless tick-trefoil
Diarrhena obovata . . . . . American beakgrain
Dicentra canadensis . . . . . squirrel-corn
Draba arabisans . . . . . rock whitlow-grass
Drosera anglica . . . . . English sundew
Drosera linearis . . . . . linear-leaved sundew
Dryopteris goldiana . . . . . Goldie's fern
Eleocharis parvula . . . . . dwarf spike-rush
Eleocharis quinqueflora . . . . . few-flowered spike-rush
Eryngium yuccifolium . . . . . rattlesnake-master
Euphrasia hudsoniana . . . . . Hudson Bay eyebright
Fimbristylis autumnalis . . . . . autumn fimbristylis
Gaillardia aristata . . . . . blanket-flower
Gentiana affinis . . . . . northern gentian
Gentianella amarella ssp. *acuta* . . . . . felwort
Hamamelis virginiana . . . . . witch-hazel
Helianthus nuttallii ssp. *rydbergii* . . . . . Nuttall's sunflower
Helictotrichon hookeri . . . . . oat-grass
Hudsonia tomentosa . . . . . beach-heather
Hydrocotyle americana . . . . . American water-pennywort

VASCULAR PLANTS

Special Concern (continued)

Jeffersonia diphylla . . . . . twinleaf
Juglans cinerea . . . . . butternut
Juncus marginatus . . . . . marginated rush
Juncus stygius var. *americanus* . . . . . bog rush
Juniperus horizontalis . . . . . creeping juniper
Leersia lenticularis . . . . . catchfly grass
Limosella aquatica . . . . . mudwort
Listera convallarioides . . . . . broad-lipped twayblade
Littorella uniflora . . . . . American shore-plantain
Luzula parviflora ssp. *melanocarpa* . . . . . small-flowered woodrush
Lysimachia quadrifolia . . . . . whorled loosestrife
Machaeranthera pinnatifida . . . . . cutleaf ironplant
Malaxis monophyllos var. *brachypoda* . . . white adder's-mouth
Minuartia dawsonensis . . . . . rock sandwort
Muhlenbergia uniflora . . . . . one flowered muhly
Najas gracillima . . . . . slender naiad
Najas marina . . . . . sea naiad
Oenothera rhombipetala . . . . . rhombic-petaled evening primrose
Opuntia macrorhiza . . . . . plains prickly pear
Orobanche fasciculata . . . . . clustered broomrape
Orobanche ludoviciana . . . . . Louisiana broomrape
Orobanche uniflora . . . . . one-flowered broomrape
Osmorhiza depauperata . . . . . blunt-fruited sweet cicely
Panax quinquefolius . . . . . American ginseng
Pellaea atropurpurea . . . . . purple cliff-brake
Phacelia franklinii . . . . . Franklin's phacelia
Pinguicula vulgaris . . . . . butterwort
Platanthera clavellata . . . . . club-spur orchid
Poa wolfii . . . . . Wolf's bluegrass
Polygonum careyi . . . . . Carey's smartweed
Polygonum viviparum . . . . . alpine bistort
Polytaenia nuttallii . . . . . prairie-parsley
Potamogeton vaginatus . . . . . sheathed pondweed
Potamogeton vaseyi . . . . . Vasey's pondweed
Prenanthes crepidinea . . . . . nodding rattlesnake-root
Pyrola minor . . . . . small shinleaf
Ranunculus lapponicus . . . . . Lapland buttercup
Rhynchospora fusca . . . . . sooty-colored beak-rush
Rorippa sessiliflora . . . . . sessile-flowered cress
Rudbeckia triloba . . . . . three-leaved coneflower
Ruppia maritima . . . . . ditch-grass
Salix maccalliana . . . . . Maccall's willow
Salix pellita . . . . . satiny willow
Sanicula trifoliata . . . . . beaked snakeroot
Schedonnardus paniculatus . . . . . tumblegrass
Scirpus clintonii . . . . . Clinton's bulrush
Senecio indecorus . . . . . elegant grounsel
Silene drummondii . . . . . Drummond's campion
Solidago mollis . . . . . soft goldenrod
Solidago sciaphila . . . . . cliff goldenrod
Sparganium glomeratum . . . . . clustered bur-reed
Stellaria longipes . . . . . long-stalked chickweed
Symphoricarpos orbiculatus . . . . . coralberry
Tephrosia virginiana . . . . . goat's-rue
Torreyochloa pallida . . . . . Torrey's manna-grass
Trillium nivale . . . . . snow trillium
Trimorpha acris var. *asteroides* . . . . . bitter fleabane
Trimorpha lonchophylla . . . . . shortray fleabane
Triplasis purpurea . . . . . purple sand-grass
Tsuga canadensis . . . . . eastern hemlock
Utricularia purpurea . . . . . purple-flowered bladderwort
Utricularia resupinata . . . . . lavender bladderwort
Verbena simplex . . . . . narrow-leaved vervain
Vitis aestivalis . . . . . silverleaf grape
Waldsteinia fragarioides . . . . . barren strawberry
Woodsia alpina . . . . . alpine woodsia
Xyris montana . . . . . montane yellow-eyed grass

LICHENS

Endangered

Buellia nigra . . . . . a species of lichen
Caloplaca parvula . . . . . a species of lichen
Dermatocarpon moulinsii . . . . . a species of lichen
Leptogium apalachense . . . . . a species of lichen
Lobaria scrobiculata . . . . . a species of lichen
Parmelia stictica . . . . . a species of lichen
Pseudocyphellaria crocata . . . . . a species of lichen
Umbilicaria torrefacta . . . . . a species of lichen

Threatened

Cetraria oakesiana . . . . . a species of lichen
Coccocarpia palmicola . . . . . a species of lichen
Parmelia stuppea . . . . . a species of lichen

Special concern

Anaptychia setifera . . . . . a species of lichen
Cetraria aurescens . . . . . a species of lichen
Cladonia pseudorangiformis . . . . . a species of lichen
Lobaria quercizans . . . . . a species of lichen
Peltigera venosa . . . . . a species of lichen
Sticta fuliginosa . . . . . a species of lichen

MOSSES

Endangered

Schistostegia pennata . . . . . luminous moss

Special Concern

Bryoxiphium norvegicum . . . . . sword moss
Tomenthypnum falcifolium . . . . . a species of moss

FUNGI

Endangered

Fuscoboletinus weaverae . . . . . a species of fungus
Psathyrella cystidiosa . . . . . a species of fungus
Psathyrella rhodospora . . . . . a species of fungus

Special concern

Laccaria trullisata . . . . . a species of fungus
Lactarius fuliginellus . . . . . a species of fungus
Lysurus cruciatus . . . . . a species of fungus

Alphabetical Index by Scientific Name

STATUS CODES: E = Endangered; T = Threatened; SC = Special Concern

SCIENTIFIC NAME	COMMON NAME	STATUS	TAXONOMIC GROUP
Achillea sibirica	Siberian yarrow	T	vascular plant
Acipenser fulvescens	lake sturgeon	SC	fish
Acris crepitans	northern cricket frog	E	amphibian/reptile
Actinonaias ligamentina	mucket	T	mollusk
Adoxa moschatellina	moschatel	SC	vascular plant
Aflexia rubranura	red-tailed prairie leafhopper	SC	leafhopper
Agalinis auriculata	eared false foxglove	E	vascular plant
Agalinis gattingeri	round-stemmed false foxglove	E	vascular plant
Agapetus tomus	a species of caddisfly	SC	caddisfly
Agrostis geminata	twin bentgrass	SC	vascular plant
Alasmidonta marginata	elktoe	T	mollusk
Allium cernuum	nodding wild onion	T	vascular plant
Allium schoenoprasum var. *sibiricum*	wild chives	T	vascular plant
Alosa chrysochloris	skipjack herring	SC	fish
Ammocrypta asprella	crystal darter	SC	fish
Ammodramus bairdii	Baird's sparrow	E	bird
Ammodramus henslowii	Henslow's Sparrow	E	bird
Ammodramus nelsoni	Nelson's sharp-tailed sparrow	SC	bird
Ammophila breviligulata	beachgrass	T	vascular plant
Anaptychia setifera	a species of lichen	SC	lichen
Androsace septentrionalis ssp. *puberulenta*	northern androsace	SC	vascular plant
Antennaria parvifolia	small-leaved pussytoes	SC	vascular plant
Anthus spragueii	Sprague's Pipit	E	bird
Apalone mutica	smooth softshell	SC	amphibian/reptile
Aphredoderus sayanus	pirate perch	SC	fish
Arabis holboellii var. *retrofracta*	Holboell's rockcress	T	vascular plant
Arcidens confragosus	rock pocketbook	E	mollusk
Aristida purpurea var. *longiseta*	red three-awn	SC	vascular plant
Aristida tuberculosa	sea-beach needlegrass	SC	vascular plant
Arnica lonchophylla	long-leaved arnica	T	vascular plant
Arnoglossum plantagineum	tuberous Indian-plantain	T	vascular plant
Asclepias amplexicaulis	clasping milkweed	SC	vascular plant
Asclepias hirtella	prairie milkweed	T	vascular plant
Asclepias stenophylla	narrow-leaved milkweed	E	vascular plant
Asclepias sullivantii	Sullivant's milkweed	T	vascular plant
Asio flammeus	short-eared owl	SC	bird
Asplenium platyneuron	ebony spleenwort	SC	vascular plant
Asplenium trichomanes	maidenhair spleenwort	T	vascular plant
Aster shortii	Short's aster	T	vascular plant
Astragalus alpinus	alpine milk-vetch	E	vascular plant
Astragalus flexuosus	slender milk-vetch	SC	vascular plant
Astragalus missouriensis	Missouri milk-vetch	SC	vascular plant
Asynarchus rossi	a species of caddisfly	SC	caddisfly
Atrytone arogos	arogos skipper	SC	butterfly/moth
Aureolaria pedicularia	fernleaf false foxglove	T	vascular plant
Bacopa rotundifolia	water-hyssop	SC	vascular plant
Baptisia alba	white wild indigo	SC	vascular plant
Baptisia bracteata var. *leucophaea*	plains wild indigo	SC	vascular plant
Bartonia virginica	Virginia bartonia	E	vascular plant
Besseya bullii	kitten-tails	T	vascular plant
Botrychium campestre	prairie moonwort	SC	vascular plant
Botrychium gallicomontanum	frenchman's bluff moonwort	E	vascular plant
Botrychium lanceolatum	triangle moonwort	T	vascular plant
Botrychium lunaria	common moonwort	T	vascular plant
Botrychium minganense	Mingan moonwort	SC	vascular plant
Botrychium mormo	goblin fern	SC	vascular plant
Botrychium oneidense	blunt-lobed grapefern	E	vascular plant
Botrychium pallidum	pale moonwort	E	vascular plant
Botrychium rugulosum	St. Lawrence grapefern	T	vascular plant
Botrychium simplex	least moonwort	SC	vascular plant
Bryoxiphium norvegicum	sword moss	SC	moss
Buchloe dactyloides	buffalo grass	SC	vascular plant
Buellia nigra	a species of lichen	E	lichen
Buteo lineatus	red-shouldered hawk	SC	bird
Cacalia suaveolens	sweet-smelling Indian-plantain	E	vascular plant
Calamagrostis lacustris	marsh reedgrass	SC	vascular plant
Calamagrostis montanensis	plains reedgrass	SC	vascular plant
Calamagrostis purpurascens	purple reedgrass	SC	vascular plant
Calcarius ornatus	chestnut-collared longspur	E	bird
Callitriche heterophylla	larger water-starwort	SC	vascular plant
Caloplaca parvula	a species of lichen	E	lichen
Caltha natans	floating marsh-marigold	E	vascular plant
Canis lupus	gray wolf (Fed. Status: T)	SC	mammal
Carex annectens	yellow-fruited sedge	SC	vascular plant

Alphabetical Index by Scientific Name

STATUS CODES: E = Endangered; T = Threatened; SC = Special Concern

SCIENTIFIC NAME	COMMON NAME	STATUS	TAXONOMIC GROUP
Carex careyana	Carey's sedge	T	vascular plant
Carex conjuncta	jointed sedge	T	vascular plant
Carex crus-corvi	raven's foot sedge	SC	vascular plant
Carex davisii	Davis' sedge	T	vascular plant
Carex exilis	coastal sedge	SC	vascular plant
Carex festucacea	fescue sedge	T	vascular plant
Carex flava	yellow sedge	SC	vascular plant
Carex formosa	handsome sedge	E	vascular plant
Carex garberi	Garber's sedge	T	vascular plant
Carex hallii	Hall's sedge	SC	vascular plant
Carex jamesii	James' sedge	T	vascular plant
Carex katahdinensis	Katahdin sedge	T	vascular plant
Carex laevivaginata	smooth-sheathed sedge	T	vascular plant
Carex laxiculmis	spreading sedge	T	vascular plant
Carex michauxiana	Michaux's sedge	SC	vascular plant
Carex obtusata	blunt sedge	SC	vascular plant
Carex pallescens	pale sedge	E	vascular plant
Carex plantaginea	plantain-leaved sedge	E	vascular plant
Carex praticola	prairie sedge	SC	vascular plant
Carex scirpoidea	northern singlespike sedge	SC	vascular plant
Carex sterilis	sterile sedge	T	vascular plant
Carex supina var. *spaniocarpa*	weak arctic sedge	SC	vascular plant
Carex typhina	cattail sedge	SC	vascular plant
Carex woodii	Wood's sedge	SC	vascular plant
Carex xerantica	dry sedge	SC	vascular plant
Castilleja septentrionalis	northern paintbrush	E	vascular plant
Ceraclea brevis	a species of caddisfly	SC	caddisfly
Ceraclea vertreesi	a species of caddisfly	SC	caddisfly
Cervus elaphus	elk	SC	mammal
Cetraria aurescens	a species of lichen	SC	lichen
Cetraria oakesiana	a species of lichen	T	lichen
Chamaesyce missurica	Missouri spurge	SC	vascular plant
Charadrius melodus	piping plover (Fed. Status: T)	E	bird
Cheilanthes lanosa	hairy lip-fern	E	vascular plant
Chelydra serpentina	snapping turtle	SC	amphibian/reptile
Chilostigma itascae	headwaters chilostigman	E	caddisfly
Chrysosplenium iowense	Iowa golden saxifrage	E	vascular plant
Cicindela denikei	a species of tiger beetle	T	tiger beetle
Cicindela fulgida westbournei	a species of tiger beetle	T	tiger beetle
Cicindela fulgida fulgida	a species of tiger beetle	E	tiger beetle
Cicindela hirticollis rhodensis	a species of tiger beetle	SC	tiger beetle
Cicindela lepida	a species of tiger beetle	T	tiger beetle
Cicindela limbata nympha	a species of tiger beetle	E	tiger beetle
Cicindela macra macra	a species of tiger beetle	SC	tiger beetle
Cicindela patruela patruela	a species of tiger beetle	SC	tiger beetle
Cicindela splendida cyanocephalata	a species of tiger beetle	SC	tiger beetle
Cirsium hillii	Hill's thistle	SC	vascular plant
Cladium mariscoides	twig-rush	SC	vascular plant
Cladonia pseudorangiformis	a species of lichen	SC	lichen
Claytonia caroliniana	Carolina spring-beauty	SC	vascular plant
Clemmys insculpta	wood turtle	T	amphibian/reptile
Coccocarpia palmicola	a species of lichen	T	lichen
Coluber constrictor	racer	SC	amphibian/reptile
Coregonus kiyi	kiyi	SC	fish
Coregonus zenithicus	shortjaw cisco	SC	fish
Coturnicops noveboracensis	yellow rail	SC	bird
Crassula aquatica	pigmyweed	T	vascular plant
Crataegus douglasii	black hawthorn	T	vascular plant
Cristatella jamesii	James' polanisia	E	vascular plant
Crotalus horridus	timber rattlesnake	T	amphibian/reptile
Cryptotis parva	least shrew	SC	mammal
Cumberlandia monodonta	spectaclecase	T	mollusk
Cycleptus elongatus	blue sucker	SC	fish
Cyclonaias tuberculata	purple wartyback	T	mollusk
Cygnus buccinator	trumpeter swan	T	bird
Cymopterus acaulis	wild parsley	SC	vascular plant
Cyperus acuminatus	short-pointed umbrella-sedge	T	vascular plant
Cypripedium arietinum	ram's-head lady's-slipper	T	vascular plant
Cypripedium candidum	small white lady's-slipper	SC	vascular plant
Dalea candida var. *oligophylla*	white prairie-clover	SC	vascular plant
Decodon verticillatus	waterwillow	SC	vascular plant
Dendroica cerulea	cerulean warbler	SC	bird
Dermatocarpon moulinsii	a species of lichen	E	lichen
Deschampsia flexuosa	slender hairgrass	SC	vascular plant

Alphabetical Index by Scientific Name

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SCIENTIFIC NAME	COMMON NAME	STATUS	TAXONOMIC GROUP
Desmanthus illinoensis	prairie mimosa	SC	vascular plant
Desmodium cuspidatum var. *longifolium*	big tick-trefoil	SC	vascular plant
Desmodium nudiflorum	stemless tick-trefoil	SC	vascular plant
Diarrhena obovata	American beakgrain	SC	vascular plant
Dicentra canadensis	squirrel-corn	SC	vascular plant
Diplazium pycnocarpon	narrow-leaved spleenwort	T	vascular plant
Dodecatheon meadia	prairie shooting star	E	vascular plant
Draba arabisans	rock whitlow-grass	SC	vascular plant
Draba norvegica	Norwegian whitlow-grass	E	vascular plant
Drosera anglica	English sundew	SC	vascular plant
Drosera linearis	linear-leaved sundew	SC	vascular plant
Dryopteris goldiana	Goldie's fern	SC	vascular plant
Dryopteris marginalis	marginal shield-fern	T	vascular plant
Elaphe obsoleta	rat snake	SC	amphibian/reptile
Eleocharis nitida	neat spike-rush	T	vascular plant
Eleocharis olivacea	olivaceous spike-rush	T	vascular plant
Eleocharis parvula	dwarf spike-rush	SC	vascular plant
Eleocharis quinqueflora	few-flowered spike-rush	SC	vascular plant
Eleocharis rostellata	beaked spike-rush	T	vascular plant
Eleocharis wolfii	Wolf's spike-rush	E	vascular plant
Ellipsaria lineolata	butterfly	T	mollusk
Elliptio crassidens	elephant-ear	E	mollusk
Elliptio dilatata	spike	SC	mollusk
Empetrum eamesii	purple crowberry	E	vascular plant
Empetrum nigrum	black crowberry	E	vascular plant
Empidonax virescens	acadian flycatcher	SC	bird
Emydoidea blandingii	Blanding's turtle	T	amphibian/reptile
Epioblasma triquetra	snuffbox	T	mollusk
Erebia disa mancinus	disa alpine	SC	butterfly/moth
Erimystax x-punctata	gravel chub	SC	fish
Eryngium yuccifolium	rattlesnake-master	SC	vascular plant
Erynnis persius	persius dusky wing	E	butterfly/moth
Erythronium propullans	dwarf trout lily (Fed. Status: E)	E	vascular plant
Escobaria vivipara	ball cactus	E	vascular plant
Etheostoma microperca	least darter	SC	fish
Eumeces fasciatus	five-lined skink	SC	amphibian/reptile
Eupatorium sessilifolium	upland boneset	T	vascular plant
Euphrasia hudsoniana	Hudson Bay eyebright	SC	vascular plant
Falco peregrinus	peregrine falcon (Fed. Status: E)	T	bird
Felis concolor	mountain lion	SC	mammal
Fimbristylis autumnalis	autumn fimbristylis	SC	vascular plant
Fimbristylis puberula var. *interior*	hairy fimbristylis	E	vascular plant
Floerkea proserpinacoides	false mermaid	T	vascular plant
Fundulus sciadicus	plains topminnow	SC	fish
Fuscoboletinus weaverae	a species of fungus	E	fungus
Fusconaia ebena	ebonyshell	E	mollusk
Gaillardia aristata	blanket-flower	SC	vascular plant
Gallinula chloropus	common moorhen	SC	bird
Gentiana affinis	northern gentian	SC	vascular plant
Gentianella amarella ssp. *acuta*	felwort	SC	vascular plant
Glaux maritima	sea milkwort	E	vascular plant
Habronattus texanus	a species of jumping spider	SC	jumping spider
Haliaeetus leucocephalus	bald eagle (Fed. Status: T)	SC	bird
Hamamelis virginiana	witch-hazel	SC	vascular plant
Helianthus nuttallii ssp. *rydbergii*	Nuttall's sunflower	SC	vascular plant
Helictotrichon hookeri	oat-grass	SC	vascular plant
Hemidactylium scutatum	four-toed salamander	SC	amphibian/reptile
Hesperia comma assiniboia	assiniboia skipper	E	butterfly/moth
Hesperia dacotae	dakota skipper	T	butterfly/moth
Hesperia leonardus	leonardus skipper	SC	butterfly/moth
Hesperia ottoe	ottoe skipper	T	butterfly/moth
Hesperia uncas	uncas skipper	E	butterfly/moth
Heteranthera limosa	mud plantain	T	vascular plant
Heterodon nasicus	western hognose snake	SC	amphibian/reptile
Hudsonia tomentosa	beach-heather	SC	vascular plant
Huperzia porophila	rock clubmoss	T	vascular plant
Hydrastis canadensis	golden-seal	E	vascular plant
Hydrocotyle americana	American water-pennywort	SC	vascular plant
Hydroptila metoeca	a species of caddisfly	SC	caddisfly
Hydroptila novicola	a species of caddisfly	SC	caddisfly
Hydroptila tortosa	a species of caddisfly	SC	caddisfly
Ichthyomyzon fossor	northern brook lamprey	SC	fish
Ichthyomyzon gagei	southern brook lamprey	SC	fish
Ictiobus niger	black buffalo	SC	fish

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SCIENTIFIC NAME	COMMON NAME	STATUS	TAXONOMIC GROUP
Iodanthus pinnatifidus	purple rocket	E	vascular plant
Isoetes melanopoda	blackfoot quillwort	E	vascular plant
Jeffersonia diphylla	twinleaf	SC	vascular plant
Juglans cinerea	butternut	SC	vascular plant
Juncus marginatus	marginated rush	SC	vascular plant
Juncus stygius var. *americanus*	bog rush	SC	vascular plant
Juniperus horizontalis	creeping juniper	SC	vascular plant
Laccaria trullisata	a species of fungus	SC	fungus
Lactarius fuliginellus	a species of fungus	SC	fungus
Lampsilis higginsi	Higgins eye (Fed. Status: E)	E	mollusk
Lampsilis teres	yellow sandshell	E	mollusk
Lanius ludovicianus	loggerhead shrike	T	bird
Larus pipixcan	Franklin's gull	SC	bird
Lasmigona compressa	creek heelsplitter	SC	mollusk
Lasmigona costata	fluted-shell	SC	mollusk
Lechea tenuifolia	narrow-leaved pinweed	E	vascular plant
Leersia lenticularis	catchfly grass	SC	vascular plant
Leptogium apalachense	a species of lichen	E	lichen
Lespedeza leptostachya	prairie bush clover (Fed. Status: T)	T	vascular plant
Lesquerella ludoviciana	bladder pod	E	vascular plant
Ligumia recta	black sandshell	SC	mollusk
Limosa fedoa	marbled godwit	SC	bird
Limosella aquatica	mudwort	SC	vascular plant
Listera auriculata	auricled twayblade	E	vascular plant
Listera convallarioides	broad-lipped twayblade	SC	vascular plant
Littorella uniflora	American shore-plantain	SC	vascular plant
Lobaria quercizans	a species of lichen	SC	lichen
Lobaria scrobiculata	a species of lichen	E	lichen
Luzula parviflora ssp. *melanocarpa*	small-flowered woodrush	SC	vascular plant
Lycaeides idas nabokovi	Nabokov's blue	SC	butterfly/moth
Lycaeides melissa samuelis	Karner blue (Fed. Status: E)	E	butterfly/moth
Lysimachia quadrifolia	whorled loosestrife	SC	vascular plant
Lysurus cruciatus	a species of fungus	SC	fungus
Machaeranthera pinnatifida	cutleaf ironplant	SC	vascular plant
Malaxis monophyllos var. *brachypoda*	white adder's-mouth	SC	vascular plant
Malaxis paludosa	bog adder's-mouth	E	vascular plant
Marpissa grata	a species of jumping spider	SC	jumping spider
Marsilea vestita	hairy water clover	E	vascular plant
Megalonaias nervosa	washboard	T	mollusk
Melica nitens	three-flowered melic	T	vascular plant
Metaphidippus arizonensis	a species of jumping spider	SC	jumping spider
Microtus ochrogaster	prairie vole	SC	mammal
Microtus pinetorum	woodland vole	SC	mammal
Minuartia dawsonensis	rock sandwort	SC	vascular plant
Moehringia macrophylla	large-leaved sandwort	T	vascular plant
Montia chamissoi	montia	E	vascular plant
Morone mississippiensis	yellow bass	SC	fish
Muhlenbergia uniflora	one flowered muhly	SC	vascular plant
Mustela nivalis	least weasel	SC	mammal
Myotis septentrionalis	northern myotis	SC	mammal
Najas gracillima	slender naiad	SC	vascular plant
Najas marina	sea naiad	SC	vascular plant
Napaea dioica	glade mallow	T	vascular plant
Notropis amnis	pallid shiner	SC	fish
Notropis anogenus	pugnose shiner	SC	fish
Notropis nubilus	Ozark minnow	SC	fish
Notropis topeka	Topeka shiner	SC	fish
Noturus exilis	slender madtom	SC	fish
Novasuccinea n. sp. Minnesota B	Iowa pleistocene ambersnail	E	mollusk
Novasuccinea n. sp. Minnesota A	Minnesota pleistocene ambersnail	T	mollusk
Nymphaea leibergii	small white waterlily	T	vascular plant
Oarisma garita	garita skipper	T	butterfly/moth
Oarisma powesheik	powesheik skipper	SC	butterfly/moth
Obovaria olivaria	hickorynut	SC	mollusk
Oeneis uhleri varuna	Uhler's arctic	E	butterfly/moth
Oenothera rhombipetala	rhombic-petaled evening primrose	SC	vascular plant
Ophiogomphus anomalis	extra-striped snaketail	SC	dragonfly
Ophiogomphus susbehcha	St. Croix snaketail	SC	dragonfly
Opuntia macrorhiza	plains prickly pear	SC	vascular plant
Orobanche fasciculata	clustered broomrape	SC	vascular plant
Orobanche ludoviciana	Louisiana broomrape	SC	vascular plant
Orobanche uniflora	one-flowered broomrape	SC	vascular plant
Oryzopsis hymenoides	Indian ricegrass	E	vascular plant
Osmorhiza berteroi	Chilean sweet cicely	E	vascular plant

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SCIENTIFIC NAME	COMMON NAME	STATUS	TAXONOMIC GROUP
Osmorhiza depauperata	blunt-fruited sweet cicely	SC	vascular plant
Oxyethira ecornuta	a species of caddisfly	SC	caddisfly
Oxyethira itascae	a species of caddisfly	SC	caddisfly
Oxytropis viscida	sticky locoweed	E	vascular plant
Panax quinquefolius	American ginseng	SC	vascular plant
Paradamoetas fontana	a species of jumping spider	SC	jumping spider
Parmelia stictica	a species of lichen	E	lichen
Parmelia stuppea	a species of lichen	T	lichen
Paronychia canadensis	Canadian forked chickweed	T	vascular plant
Paronychia fastigiata	forked chickweed	E	vascular plant
Parthenium integrifolium	wild quinine	E	vascular plant
Pelecanus erythrorhynchos	American white pelican	SC	bird
Pellaea atropurpurea	purple cliff-brake	SC	vascular plant
Peltigera venosa	a species of lichen	SC	lichen
Percina evides	gilt darter	SC	fish
Perognathus flavescens	plains pocket mouse	SC	mammal
Phacelia franklinii	Franklin's phacelia	SC	vascular plant
Phalaropus tricolor	Wilson's phalarope	T	bird
Phegopteris hexagonoptera	broad beech-fern	T	vascular plant
Phenacomys intermedius	heather vole	SC	mammal
Phidippus apacheanus	a species of jumping spider	SC	jumping spider
Phidippus pius	a species of jumping spider	SC	jumping spider
Pinguicula vulgaris	butterwort	SC	vascular plant
Pipistrellus subflavus	eastern pipistrelle	SC	mammal
Pituophis catenifer	gopher snake	SC	amphibian/reptile
Plantago elongata	slender plantain	T	vascular plant
Platanthera clavellata	club-spur orchid	SC	vascular plant
Platanthera flava var. *herbiola*	tubercled rein-orchid	E	vascular plant
Platanthera praeclara	western prairie fringed orchid (Fed. Status: T)	E	vascular plant
Plethobasus cyphyus	sheepnose	E	mollusk
Pleurobema coccineum	round pigtoe	T	mollusk
Poa paludigena	bog bluegrass	T	vascular plant
Poa wolfii	Wolf's bluegrass	SC	vascular plant
Podiceps auritus	horned grebe	T	bird
Polemonium occidentale ssp. *lacustre*	western Jacob's-ladder	E	vascular plant
Polycentropus milaca	a species of caddisfly	SC	caddisfly
Polygala cruciata	cross-leaved milkwort	E	vascular plant
Polygonum careyi	Carey's smartweed	SC	vascular plant
Polygonum viviparum	alpine bistort	SC	vascular plant
Polyodon spathula	paddlefish	T	fish
Polystichum acrostichoides	Christmas fern	T	vascular plant
Polystichum braunii	Braun's holly fern	E	vascular plant
Polytaenia nuttallii	prairie-parsley	SC	vascular plant
Potamogeton bicupulatus	snailseed pondweed	E	vascular plant
Potamogeton diversifolius	diverse-leaved pondweed	E	vascular plant
Potamogeton vaginatus	sheathed pondweed	SC	vascular plant
Potamogeton vaseyi	Vasey's pondweed	SC	vascular plant
Prenanthes crepidinea	nodding rattlesnake-root	SC	vascular plant
Protoptila talola	a species of caddisfly	SC	caddisfly
Psathyrella cystidiosa	a species of fungus	E	fungus
Psathyrella rhodospora	a species of fungus	E	fungus
Pseudocyphellaria crocata	a species of lichen	E	lichen
Psoralidium tenuiflora	slender-leaved scurf pea	E	vascular plant
Pyrgus centaureae freija	grizzled skipper	SC	butterfly/moth
Pyrola minor	small shinleaf	SC	vascular plant
Quadrula fragosa	winged mapleleaf (Fed. Status: E)	E	mollusk
Quadrula metanevra	monkeyface	T	mollusk
Quadrula nodulata	wartyback	E	mollusk
Rallus elegans	king rail	E	bird
Ranunculus lapponicus	Lapland buttercup	SC	vascular plant
Rhynchospora capillacea	hair-like beak-rush	T	vascular plant
Rhynchospora fusca	sooty-colored beak-rush	SC	vascular plant
Rorippa sessiliflora	sessile-flowered cress	SC	vascular plant
Rotala ramosior	tooth-cup	T	vascular plant
Rubus chamaemorus	cloudberry	T	vascular plant
Rudbeckia triloba	three-leaved coneflower	SC	vascular plant
Ruppia maritima	ditch-grass	SC	vascular plant
Sagina nodosa ssp. *borealis*	knotty pearlwort	E	vascular plant
Salicornia rubra	red saltwort	T	vascular plant
Salix maccalliana	Maccall's willow	SC	vascular plant
Salix pellita	satiny willow	SC	vascular plant
Sanicula trifoliata	beaked snakeroot	SC	vascular plant
Sassacus papenhoei	a species of jumping spider	SC	jumping spider
Saxifraga cernua	nodding saxifrage	E	vascular plant

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SCIENTIFIC NAME	COMMON NAME	STATUS	TAXONOMIC GROUP
Saxifraga paniculata	encrusted saxifrage	T	vascular plant
Schedonnardus paniculatus	tumblegrass	SC	vascular plant
Schinia indiana	phlox moth	SC	butterfly/moth
Schistostegia pennata	luminous moss	E	moss
Scirpus clintonii	Clinton's bulrush	SC	vascular plant
Scleria triglomerata	tall nut-rush	E	vascular plant
Scleria verticillata	whorled nut-rush	T	vascular plant
Scutellaria ovata	ovate-leaved skullcap	T	vascular plant
Sedum integrifolium ssp. *leedyi*	Leedy's roseroot (Fed. Status: T)	E	vascular plant
Seiurus motacilla	Louisiana waterthrush	SC	bird
Selaginella selaginoides	northern spikemoss	E	vascular plant
Senecio canus	gray ragwort	E	vascular plant
Senecio indecorus	elegant grounsel	SC	vascular plant
Setodes guttatus	a species of caddisfly	SC	caddisfly
Shinnersoseris rostrata	annual skeletonweed	T	vascular plant
Silene drummondii	Drummond's campion	SC	vascular plant
Silene nivea	snowy campion	T	vascular plant
Simpsonaias ambigua	salamander mussel	T	mollusk
Sistrurus catenatus	massasauga	E	amphibian/reptile
Solidago mollis	soft goldenrod	SC	vascular plant
Solidago sciaphila	cliff goldenrod	SC	vascular plant
Sorex fumeus	smokey shrew	SC	mammal
Sparganium glomeratum	clustered bur-reed	SC	vascular plant
Speotyto cunicularia	burrowing owl	E	bird
Speyeria idalia	regal fritillary	SC	butterfly/moth
Spilogale putorius	eastern spotted skunk	T	mammal
Stellaria longipes	long-stalked chickweed	SC	vascular plant
Sterna forsteri	Forster's tern	SC	bird
Sterna hirundo	common tern	T	bird
Sticta fuliginosa	a species of lichen	SC	lichen
Subularia aquatica	awlwort	T	vascular plant
Sullivantia sullivantii	reniform sullivantia	T	vascular plant
Symphoricarpos orbiculatus	coralberry	SC	vascular plant
Synaptomys borealis	northern bog lemming	SC	mammal
Talinum rugospermum	rough-seeded fameflower	E	vascular plant
Tephrosia virginiana	goat's-rue	SC	vascular plant
Thomomys talpoides	northern pocket gopher	SC	mammal
Tofieldia pusilla	small false asphodel	E	vascular plant
Tomenthypnum falcifolium	a species of moss	SC	moss
Torreyochloa pallida	Torrey's manna-grass	SC	vascular plant
Trillium nivale	snow trillium	SC	vascular plant
Trimorpha acris var. *asteroides*	bitter fleabane	SC	vascular plant
Trimorpha lonchophylla	shortray fleabane	SC	vascular plant
Triplasis purpurea	purple sand-grass	SC	vascular plant
Tritogonia verrucosa	pistolgrip	T	mollusk
Tropidoclonion lineatum	lined snake	SC	amphibian/reptile
Tsuga canadensis	eastern hemlock	SC	vascular plant
Tutelina formicaria	a species of jumping spider	SC	jumping spider
Tympanuchus cupido	greater prairie-chicken	SC	bird
Umbilicaria torrefacta	a species of lichen	E	lichen
Utricularia purpurea	purple-flowered bladderwort	SC	vascular plant
Utricularia resupinata	lavender bladderwort	SC	vascular plant
Vaccinium uliginosum	alpine bilberry	T	vascular plant
Valeriana edulis var. *ciliata*	valerian	T	vascular plant
Venustaconcha ellipsiformis	ellipse	T	mollusk
Verbena simplex	narrow-leaved vervain	SC	vascular plant
Vertigo hubrichti variabilis n. subsp.	variable pleistocene vertigo	T	mollusk
Vertigo hubrichti hubrichti	Midwest pleistocene vertigo	E	mollusk
Vertigo meramecensis	bluff vertigo	T	mollusk
Viola lanceolata	lance-leaved violet	T	vascular plant
Viola nuttallii	yellow prairie violet	T	vascular plant
Vitis aestivalis	silverleaf grape	SC	vascular plant
Waldsteinia fragarioides	barren strawberry	SC	vascular plant
Wilsonia citrina	hooded warbler	SC	bird
Woodsia alpina	alpine woodsia	SC	vascular plant
Woodsia glabella	smooth woodsia	T	vascular plant
Woodsia scopulina	Rocky Mountain woodsia	T	vascular plant
Xyris montana	montane yellow-eyed grass	SC	vascular plant
Xyris torta	twisted yellow-eyed grass	E	vascular plant

Appendix C

Air Quality Conformity Calculations

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Environmental Assessment - Air Quality Analysis:
Temporary Deployment of F-16C Aircraft from Duluth Air Guard Station to MSP Air Reserve Station

Proposed Action Emission Totals

Pollutant	Emission Totals by Category (tpy)				Total Emissions (tpy)
	Aircraft	AGE Equipment	POVs and GOVs	Fuel Transfer Losses	
CO	8.30	2.07	13.24	--	23.61
NO_x	2.42	3.94	1.11	--	7.47
PM_{10}	0.65	0.28	0.03	--	0.97
$PM_{2.5}$	0.65	0.28	0.03	--	0.97
SO_2	0.58	0.34	0.01	--	0.92
VOC	2.01	0.46	0.71	0.16	3.33

Environmental Assessment - Air Quality Analysis:
Temporary Deployment of F-16C Aircraft from Duluth Air Guard Station to MSP Air Reserve Station

Calculated Emissions from Aircraft

Activity	Aircraft Type	Engine Type	Number of Engines	Number of Activity or LTO/yr	Procedure	Power Setting	Duration (hrs)	Fuel Flow Rate (lb fuel/hr)	Emission Factors (lb/1000 lb fuel)						Estimated Actual Emissions (tpy)					
									CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC
Training Sorties	F16-C	F100-PW-220E	2	192	Taxi Out	Idle	0.31	1,084	35.3	4.61	2.06	2.06	1.7	7.94	2.28	0.30	0.13	0.13	0.11	0.51
					Take Off	Afterburner	0.01	41,682	11.99	8.37	1.15	1.15	1.7	1.53	0.96	0.67	0.09	0.09	0.14	0.12
					Climb Out	Intermediate	0.01	5,770	0.86	22.18	2.06	2.06	1.7	2.89	0.01	0.25	0.02	0.02	0.02	0.03
					Approach	Approach	0.06	3,837	1.92	12.53	2.63	2.63	1.7	5.12	0.08	0.55	0.12	0.12	0.08	0.23
					Taxi In	Idle	0.19	1,084	35.3	4.61	2.06	2.06	1.7	7.94	1.40	0.18	0.08	0.08	0.07	0.31
Aircraft System Checks	F16-C	F100-PW-220E	2	416	--	Idle	0.17	1,084	35.3	4.61	2.06	2.06	1.7	7.94	2.65	0.35	0.15	0.15	0.13	0.60
					--	Afterburner	0.00	41,682	11.99	8.37	1.15	1.15	1.7	1.53	0.00	0.00	0.00	0.00	0.00	0.00
					--	Intermediate	0.00	5,770	0.86	22.18	2.06	2.06	1.7	2.89	0.00	0.00	0.00	0.00	0.00	0.00
					--	Approach	0.00	3,837	1.92	12.53	2.63	2.63	1.7	5.12	0.00	0.00	0.00	0.00	0.00	0.00
Aircraft Maintenance	F16-C	F100-PW-220E	2	12	--	Idle	2.00	1,084	35.3	4.61	2.06	2.06	1.7	7.94	0.92	0.12	0.05	0.05	0.04	0.21
					--	Afterburner	0.00	41,682	11.99	8.37	1.15	1.15	1.7	1.53	0.00	0.00	0.00	0.00	0.00	0.00
					--	Intermediate	0.00	5,770	0.86	22.18	2.06	2.06	1.7	2.89	0.00	0.00	0.00	0.00	0.00	0.00
					--	Approach	0.00	3,837	1.92	12.53	2.63	2.63	1.7	5.12	0.00	0.00	0.00	0.00	0.00	0.00
Total Emissions from Aircraft															**8.30**	**2.42**	**0.65**	**0.65**	**0.58**	**2.01**

Notes:

1. For the training sorties, the number of LTOs per year based on sixteen training sorties per month. The duration of each power setting based on information included in the 148 FW 2004 Air Emissions Inventory.
2. For the aircraft system checks, the number of activities per year was calculated based on checks occurring twice a week for each aircraft for 52 weeks per year. Each system check is estimated to last 10 minutes per aircraft.
3. For the aircraft maintenance emissions, the number of activities per year assumed as 12 with the monthly duration totaling to 2 hours per maintenance activity. These maintenance activities will only occur on an as-needed basis. The 2 hour duration is a conservative estimate based on what could potentially be required and is inclusive of all four aircraft deployed to the 133 AW.
4. SO_2 emissions based on the sulfur content of JP-8 fuel refined in the East Central United States (0.085 wt%) as provided in Table 3-6 of the USAF IERA Air Emissions Inventory Guidance Document for Mobile Sources at Air Force Installations (revised December 2003).
5. $PM_{2.5}$ emissions assumed equal to PM_{10}.

References:

1. Emission factors and emission calculation methodology based on information in the USAF IERA Air Emissions Inventory Guidance Document for Mobile Sources at Air Force Installations (revised December 2003).

Environmental Assessment - Air Quality Analysis:
Temporary Deployment of F-16C Aircraft from Duluth Air Guard Station to MSP Air Reserve Station

Calculated Emissions from Aerospace Ground Equipment (AGE)

Typical Heating Value of Diesel: 137,000 Btu/gal
Average Btu/hp-hr for AGE: 7,500 Btu/hp-hr

Equipment	No. of Equipment	Total Run Time (hr/yr)	Fuel	Total Fuel Used (gal/yr)	Engine Rating (hp)	Emission Factor Ref.	Emission Factor units	Emission Factors						Estimated Actual Emissions (tpy)					
								CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC
AM32A-60	3	413.8	Jet Fuel	14,483	--	A	lb/1,000 gal	140	30	5	5	11.9	0.3	1.01	0.22	0.04	0.04	0.09	0.00
MJ-1B Bomblift	3	540	Diesel	--	27	D	lb/1,000 hp-hr	6.68	31	2.2	2.2	2.05	2.5	0.05	0.23	1.60E-02	1.60E-02	1.49E-02	1.82E-02
FL1D Light Cart	4	125.9	Diesel	94.4	--	B	lb/1,000 gal	130	604	42	42	40	49	0.01	0.03	2.00E-03	2.00E-03	1.88E-03	2.33E-03
Self Gen Nitrogen Cart	1	104	Diesel	--	49	D	lb/1,000 hp-hr	6.68	31	2.2	2.2	2.05	2.5	0.02	0.08	5.61E-03	5.61E-03	5.22E-03	6.37E-03
MC-2A Low Pac	2	--	Diesel	123.3	12	C	g/hp-hr	6.57	10.33	1.74	1.74	0.93	6.57	0.02	0.03	4.32E-03	4.32E-03	2.31E-03	0.02
H-1 Heater	3	--	Diesel	1,112	6.50	C	g/hp-hr	12.6	11	ND	ND	0.93	6.97	0.28	0.25	--	--	0.02	0.16
MHU Bomblift	2	360	Diesel	--	27	D	lb/1,000 hp-hr	6.68	31	2.2	2.2	2.05	2.5	0.03	0.15	1.07E-02	1.07E-02	9.96E-03	1.22E-02
MJ2A Hydraulic Test Stand	1	48	Diesel	168	--	B	lb/1,000 gal	130	604	42	42	40	49	0.01	0.05	3.57E-03	3.57E-03	3.34E-03	4.14E-03
MC-11 High Pac	1	40	Diesel	--	18.4	C	g/hp-hr	6.57	10.33	1.74	1.74	0.93	6.57	0.01	0.01	1.41E-03	1.41E-03	7.55E-04	5.33E-03
MC-7 Compressor	1	--	Diesel	185	58	C	g/hp-hr	5.6	11.21	ND	ND	0.93	0.5	0.02	0.04	--	--	3.46E-03	1.86E-03
MEPS Generator	1	125	Diesel	--	180	D	lb/1,000 hp-hr	6.68	31	2.2	2.2	2.05	2.5	0.08	0.35	2.48E-02	2.48E-02	2.31E-02	2.81E-02
AGE Tow Tug	1	500	Diesel	--	325	D	lb/1,000 hp-hr	6.68	31	2.2	2.2	2.05	2.5	0.54	2.52	1.79E-01	1.79E-01	1.67E-01	2.03E-01
Total AGE Emissions														**2.07**	**3.94**	**0.28**	**0.28**	**0.34**	**0.46**

Notes:
1. Typical heating value of diesel based on information contained in Table 2-1 of the USAF IERA Air Emissions Inventory Guidance Document for Mobile Sources at Air Force Installations (revised December 2003).
2. Average Btu/hp-hr for AGE based on information contained on page 9 of Section 2 of the USAF IERA Air Emissions Inventory Guidance Document for Mobile Sources at Air Force Installations (revised December 2003).
3. The following AGE equipment is also expected to be added as part of the Proposed Action but will not result in any increases in emissions (i.e., non-powered units).

Equipment	No. of Equipment
AM32C-10 Air Cond	2
Nitrogen Cart (4-bottle)	1
B-1 Stand	1
Tow Bar	2
B-4 Stand	1
Stores Loader	2
Crane	1
Cabin Leak Tester	1
AGE Mob Bin	1

4. Emissions of $PM_{2.5}$ assumed equal to PM_{10}.
5. Duty of AGE equipment estimated by 133 AW personnel and based on usage and duty data for similar pieces of equipment at other installations.

References:
A. Emission factors for the AM32A-60 based on information in Table 2-6 of the USAF IERA Air Emissions Inventory Guidance Document for Mobile Sources at Air Force Installations (revised December 2003). SO_2 emissions based on the sulfur content of the fuel (assumed as 0.085 wt%; see aircraft LTO SO2 emissions).
B. Emission factors from AP-42, Table 3.3-1 (Fifth Edition, October 1996) for diesel industrial engines. The emission factors were converted from a lb/MMBtu basis to a lb/1,000 gal basis using a heating value of 137,000 Btu/gal.
C. Emission factors based on source-specific emissions data in Table 2-3 of the USAF IERA Air Emissions Inventory Guidance Document for Mobile Sources at Air Force Installations (revised December 2003). SO_2 emissions based on site-specific data included in Table C-4 of the 2005 133rd AW AEI. Note - Emission factors for the MC-2A Low Pac assumed equal to the MC-1A Air Compressor in the Table 2.3.
D. Emission factors from Table 2-4 of the USAF IERA Air Emissions Inventory Guidance Document for Mobile Sources at Air Force Installations (revised December 2003).

Environmental Assessment - Air Quality Analysis:
Temporary Deployment of F-16C Aircraft from Duluth Air Guard Station to MSP Air Reserve Station

Calculated Emissions from Additional POVs and GOVs

Additional POVs:	25	
Additional GOVs:	9	
Estimated Vehicle Miles Traveled:	40	mi/day/vehicle

Pollutant	Emission Factors (g/VMT)	Annual Emissions (tpy)
CO	24.202	13.24
NO_x	2.037	1.11
PM_{10}	0.0525	0.03
$PM_{2.5}$	0.0525	0.03
SO_2	0.0097	0.005
VOC	1.299	0.71

Notes:

1. Emission factors for all pollutants, except $PM_{2.5}$, obtained from EPA's MOBILE6 model (version 6.2.03, 2003) using arterial roads. The model was run for the year 2007 representing vehicle model years 1983-2007, and the emission factors are representative of a speed of 20 miles per hour. Composite emission factors were developed by the model based on the vehicle type category and VMT distribution below.

Vehicle Type Category	VMT Distribution (%)
LDGV: Light Duty Gasoline-Fueled Vehicles (Passenger Cars)	39.47
LDGT12: Light-Duty Gasoline Trucks (0-6,000 lbs.)	35.56
LDGT34: Light-Duty Gasoline Trucks (6,001-8,500 lbs.)	12.13
HDGV: Heavy-Duty Gasoline Vehicles	3.56
LDDV: Light-Duty Diesel Vehicles (Passenger Cars)	0.04
LDDT: Light-Duty Diesel Trucks	0.19
HDDV: Heavy-Duty Diesel Vehicles	8.49
MC: Motorcycles (Gasoline)	0.55

2. The same distribution of vehicle type was assumed for GOVs and POVs.

3. The vehicle miles traveled per day were estimated based on 40 mi/day for 365 days/year. This is a very conservative estimate, since it assumed that all relocated personnel would be staying on-base. Additionally, it is unlikely that any temporary deployment would last a complete year.

Environmental Assessment - Air Quality Analysis:
Temporary Deployment of F-16C Aircraft from Duluth Air Guard Station to MSP Air Reserve Station

Calculated Emissions from Fuel Transfer Losses

Transfer Activity	Loading Type:	Saturation Factor	Liquid Vapor Pressure (psia)	Liquid Molecular Weight (lb/lb-mol)	Liquid Temperature (R)	Quantity of Fuel Transferred (1,000 gal)	Emission Factor (lb/1000 gal)	Emission Factor Reference	VOC Emissions (tpy)
Gasoline: Vehicle Refueling	--	--	--	--	--	23.7	11.7	A	0.14
Diesel: Vehicle/AGE Refueling	Splash	1.45	0.004	130	507	19.46	0.019	B	1.85E-04
JP-8: AGE Refueling	Splash	1.45	0.0053	160	507	14.5	0.030	B	2.19E-04
JP-8: Storage Tanks to Fuel Tank Truck	Splash	1.45	0.0053	160	507	379	0.030	B	5.73E-03
JP-8: Fuel Tank Truck to Aircraft	Splash	1.45	0.0053	160	507	379	0.030	B	5.73E-03
JP-8: Aircraft Defuels to Tank Truck	Splash	1.45	0.0053	160	507	379	0.030	B	5.73E-03
Total Fuel Transfer Loss Emissions									**0.16**

Notes:
1. For the POV and GOVs, the estimated fuel use (or transfer) was calculated based on the average fuel economy of each classification of vehicle type as provided by MOBILE6 (version 6.02, 24-Sep-2003) and the estimated average miles traveled per day per vehicle. The values shown are weighted averages over a 25-year range (1983-2007). See table below for breakdown by classification.

Vehicle Type Category	VMT Distribution (%)	Average Fuel Economy (mpg)	Estimated Fuel Use (gal/yr)
LDGV: Light Duty Gasoline-Fueled Vehicles (Passenger Cars)	39.47	24.1	8,130
LDGT12: Light-Duty Gasoline Trucks (0-6,000 lbs.)	35.56	18.6	9,490
LDGT34: Light-Duty Gasoline Trucks (6,001-8,500 lbs.)	12.13	14.3	4,211
HDGV: Heavy-Duty Gasoline Vehicles	3.56	9.6	1,841
LDDV: Light-Duty Diesel Vehicles (Passenger Cars)	0.04	31.4	6
LDDT: Light-Duty Diesel Trucks	0.19	17.3	55
HDDV: Heavy-Duty Diesel Vehicles	8.49	7.1	5,936
MC: Motorcycles (Gasoline)	0.55	50	55
Total Gasoline Usage for POVs and GOVs			**23,726**
Total Diesel Usage for POVs and GOVs			**5,997**

2. For the AGE equipment, the estimated fuel use was either provided by 133 AW or calculated based on the engine rating of each piece of equipment (hp), 7,500 Btu/hp-hr (provided on page 9 of Section 2 of the USAF IERA Air Emissions Inventory Guidance Document for Mobile Sources at Air Force Installations [revised December 2003]), diesel heating value of 137,000 Btu/gal (provided in the same guidance document), and the estimated annual operational hours per year (provided by 133 AW). See table below for breakdown by type of AGE equipment.

Equipment	No. of Equipment	Total Run Time (hr/yr)	Fuel	Engine Rating (hp)	Total Fuel Used (gal/yr)
AM32A-60	3	413.8	Jet Fuel	--	14,483
MJ-1B Bomblift	3	540	Diesel	27	798
FL1D Light Cart	4	126	Diesel	--	94
Self Gen Nitrogen Cart	1	104	Diesel	49	279
MC-2A Low Pac	2	--	Diesel	12	123
H-1 Heater	3	--	Diesel	6.50	1,112
MHU Bomblift	2	360	Diesel	27	532
MJ2A Hydraulic Test Stand	1	48	Diesel	--	168
MC-11 High Pac	1	40	Diesel	18.4	40
MC-7 Compressor	1	--	Diesel	58	185
MEPS Generator	1	125	Diesel	180	1,232
AGE Tow Tug	1	500	Diesel	325	8,896
Total Jet Fuel Usage for AGE					**14,483**
Total Diesel Usage for AGE					**13,460**

3.For the calculation of JP-8 transferred from storage tanks to fuel tank trucks, fuel tank truck to aircraft, and aircraft defueling to tank truck, it was assumed that for each activity type 12,700 lb of fuel was transferred with a JP-8 heating value of 6.7 lb/gal for aircraft LTOs. For the same three activities, fuel transfer during system checks and maintenance activities that the fuel transferred was equivalent to the fuel flow rate (based on power setting) multiplied by the duration of each event and multiplied by the number of activities per year. This value was also converted to gal/yr using a heating value of 6.7 lb/gal. Please note that this estimate is extremely conservative, since it assumes that all of the fuel is both loaded and unloaded from the aircraft. This is impossible unless the aircraft engines are never turned on.

References:
A. Emission factor for gasoline vehicle refueling based on sum of displacement losses (uncontrolled) and spillage emission factors in Table 15-1 of the USAF Air Emissions Inventory Guidance Document for Stationary Sources at Air Force Installations (December 2003).
B. Emission factors for diesel and JP-8 fuel transfer based on loading loss equation contained in Section 14.2 of the USAF Air Emissions Inventory Guidance Document for Stationary Sources at Air Force Installations (December 2003). Saturation factor based on splash loading as provided in Table 14-1. The liquid vapor pressure, molecular weight, and liquid temperature are based on information in the 133 AW 2005 emissions inventory.

Environmental Assessment - Air Quality Analysis:
Temporary Deployment of F-16C Aircraft from Duluth Air Guard Station to MSP Air Reserve Station

2002 Criteria Air Pollutant Emissions (tons) by County

County	Pollutant Name	Point Sources	Area Sources	Onrorad Mobile Sources	Nonroad Mobile sources	Grand Total	Total Stationary	Total Mobile
ANOKA	Ammonia	2	527	270	3	802	529	273
	CO	220	2,634	60,306	19,726	82,886	2,854	80,032
	Lead	0.02	0.07	0.00	0.74	0.83	0.08	0.75
	NO_x	211	2,282	8,153	2,741	13,387	2,494	10,894
	PM_{10}	147	10,383	190	269	10,990	10,531	459
	$PM_{2.5}$	84	2,062	137	245	2,528	2,146	383
	SO_2	15	555	151	220	941	570	371
	VOC	644	6,799	4,017	3,900	15,360	7,443	7,917
CARVER	Ammonia	1	1,244	63	1	1,309	1,245	65
	CO	44	1,321	13,091	8,152	22,608	1,365	21,243
	Lead	0.02	0.02	0.00	0.00	0.04	0.04	0.00
	NO_x	111	585	1,809	766	3,270	696	2,574
	PM_{10}	150	9,248	44	92	9,534	9,398	136
	$PM_{2.5}$	106	1,702	32	84	1,924	1,807	117
	SO_2	107	148	35	60	351	255	95
	VOC	229	1,975	884	1,243	4,332	2,204	2,128
DAKOTA	Ammonia	171	2,486	339	4	2,999	2,657	342
	CO	2,260	3,119	71,895	26,454	103,729	5,380	98,350
	Lead	1.76	0.08	0.00	0.63	2.48	1.84	0.63
	NO_x	10,508	3,496	10,135	3,201	27,341	14,004	13,336
	PM_{10}	1,081	12,547	237	298	14,163	13,628	535
	$PM_{2.5}$	548	2,664	171	273	3,656	3,212	444
	SO_2	7,701	827	189	259	8,976	8,528	448
	VOC	1,807	8,205	4,563	3,578	18,153	10,013	8,141
HENNEPIN	Ammonia	12	1,693	1,065	11	2,780	1,705	1,076
	CO	1,395	13,016	237,684	102,981	355,076	14,411	340,665
	Lead	2.81	0.60	0.01	2.32	5.74	3.41	2.33
	NO_x	15,331	19,719	32,987	11,210	79,247	35,050	44,197
	PM_{10}	1,043	18,540	746	855	21,183	19,582	1,600
	$PM_{2.5}$	523	5,488	540	780	7,330	6,011	1,319
	SO_2	13,574	4,976	594	901	20,045	18,550	1,495
	VOC	3,911	25,923	15,102	10,638	55,573	29,834	25,740
RAMSEY	Ammonia	21	820	474	4	1,319	841	478
	CO	4,503	5,234	110,780	32,474	152,991	9,737	143,254
	Lead	1.43	0.12	0.00	0.85	2.40	1.55	0.85
	NO_x	6,926	7,237	14,989	4,587	33,740	14,164	19,576
	PM_{10}	1,162	3,592	333	330	5,418	4,754	664
	$PM_{2.5}$	491	1,567	241	301	2,600	2,058	542
	SO_2	5,712	1,822	265	339	8,138	7,535	603
	VOC	3,698	10,865	7,122	3,447	25,131	14,563	10,568
SCOTT	Ammonia	3	1,279	210	4	1,497	1,282	214
	CO	2,029	15,807	56,468	19,002	93,305	17,835	75,469
	Lead	6.13	0.06	0.00	0.69	6.88	6.19	0.70
	NO_x	36,175	2,245	6,867	6,833	52,120	38,420	13,700
	PM_{10}	12,080	23,806	150	409	36,445	35,886	559
	$PM_{2.5}$	4,100	5,590	109	372	10,171	9,690	480
	SO_2	9,788	1,008	118	735	11,649	10,796	854
	VOC	593	6,214	3,897	4,876	15,580	6,807	8,773
WASHINGTON	Ammonia	256	395	205	2	858	651	207
	CO	7,907	1,973	42,843	16,025	68,748	9,880	58,868
	Lead	0.72	0.05	0.00	0.38	1.15	0.77	0.38
	NO_x	12,911	1,490	6,032	2,199	22,633	14,401	8,232
	PM_{10}	912	13,508	143	216	14,779	14,420	359
	$PM_{2.5}$	508	2,415	103	197	3,223	2,923	301
	SO_2	24,522	389	114	181	25,206	24,911	295
	VOC	3,425	4,049	2,733	2,946	13,154	7,474	5,680
TOTAL	**Ammonia**	**465**	**8,445**	**2,626**	**29**	**11,565**	**8,910**	**2,655**
	CO	**18,357**	**43,104**	**593,068**	**224,814**	**879,344**	**61,462**	**817,882**
	Lead	**12.89**	**1.00**	**0.02**	**5.62**	**19.53**	**13.89**	**5.64**
	NO_x	**82,174**	**37,055**	**80,973**	**31,536**	**231,738**	**119,229**	**112,509**
	PM_{10}	**16,574**	**91,625**	**1,843**	**2,469**	**112,511**	**108,199**	**4,312**
	$PM_{2.5}$	**6,359**	**21,487**	**1,333**	**2,252**	**31,432**	**27,847**	**3,585**
	SO_2	**61,419**	**9,724**	**1,466**	**2,695**	**75,304**	**71,143**	**4,161**
	VOC	**14,307**	**64,031**	**38,318**	**30,628**	**147,284**	**78,337**	**68,947**

Reference: MPCA website (http://www.pca.state.mn.us/air/criteria-emissiondata.html).

Appendix D

Written Public Comments

METROPOLITAN AIRPORTS COMMISSION

Minneapolis-Saint Paul International Airport
6040 - 28th Avenue South • Minneapolis, MN 55450-2799
Phone (612) 726-8100

October 22, 2007

934th Airlift Wing, MSG/CEV
Attn: Douglas Yocum
760 Military Highway
Minneapolis, MN 55450-2100

RE: Draft Finding of No Significant Impact and Draft Environmental Assessment for the Deployment of Up to Four F-16C Aircraft to the 133rd Airlift Wing for Sovereignty Alert Operations, Minneapolis-St. Paul International Airport Air Reserve Station, MN

Dear Mr. Yocum:

Thank you for providing the opportunity to comment on the Draft Finding of No Significant Impact and Draft Environmental Assessment for the Deployment of Up to Four F-16C Aircraft to the 133rd Airlift Wing.

The Metropolitan Airports Commission (MAC), which owns and operates Minneapolis-St. Paul International Airport (MSP), is responsible for identifying noise impacts around the airport and mitigating those impacts via innovative aircraft operational procedures and land use planning policies. These mitigation efforts have primarily been implemented via 14 CFR Part 150 and have resulted in improved compatibility of surrounding land uses with aircraft operations at MSP.

In an effort to ensure the proposed action as outlined in the *"Draft Finding of No Significant Impact and Draft Environmental Assessment for the Deployment of Up to Four F-16C Aircraft to the 133rd Airlift Wing"* has as little adverse impact on the communities surrounding MSP as possible, the MAC offers the following comments for consideration.

- On page 4-2, the EA states that *"The civilian Boeing 747 (i.e., loudest civilian aircraft reported at MSPIA) produces a sound exposure level (SEL) of 105.2 A-weighted sound level (dBA), and the military C-130 produces noise at 105 dBA (measured at 30 feet in front of aircraft). The F-16C aircraft produce an SEL of 109 dBA (measured at 1,000 feet)."*

  For comparative purposes and consistency in the EA, the SEL for each aircraft type represented in the analysis should be the same distance measured from each aircraft type. A Day-Night Average Sound Level (DNL) noise contour analysis between the no-action and proposed action alternatives would provide a more appropriate noise analysis of the overall noise effects of the proposed action.

- On page 4-3, the EA states that *"However, the sound level increases have the potential to cause greater annoyance to nearby receptors, but because of the low frequency and short duration of*

F-16C flights, sensitive receptors already accustomed to aircraft related noise would not likely be aware of this slight increase in noise levels."

MAC analysis shows that, at noise monitoring site (RMT) #18 (approximately 15,240 feet from the departure end of Runway 22), the average SEL for the F-16 aircraft was 111.4 dB while the average SEL for the Boeing 747-400 was 103.9 dB. MAC analysis shows the highest SEL recorded at RMT #18 for the F-16 aircraft registered 115.8 dB. The magnitude of the measured F-16 noise events at MSP represent noise levels significantly higher than those to which residents in the communities surrounding the airport are accustomed.

Furthermore, the average duration of the noise events at RMT #18 was 65 seconds for the F-16 aircraft, while the average duration of the B747 aircraft was 42 seconds. Both the noise level and the duration of the F-16 aircraft noise events, as measured by MAC ANOMS, are contrary to the statement made on page 4-3 and **are likely** to be noticed by residents living close to the airport whether or not they are already accustomed to aircraft-related noise.

- As part of the mitigation proposed on page 4-3, the EA states, *"To minimize noise impacts from training sorties, flight operations would only occur during the daytime (7:00 AM to 10:00 PM) and during periods when aircraft activity is typically lower than normal. Additionally, there would be no planned touch-and-goes, and engine system checks would only occur Mondays through Fridays."*

  Due to the significance and duration of noise events created by the proposed action, and the addition of aircraft noise that residents living close to the airport are not accustomed to, the 133rd Airlift Wing should consider a voluntary curfew on flight operations between 8:00 PM to 8:00 AM. This voluntary curfew would help minimize noise impacts beyond the standard daytime hours (7:00 AM to 10:00 PM). Residents would be less likely to complain during these hours and children who may go to sleep before 10:00 PM or awake after 7:00 AM would be afforded additional protection from F-16 noise impacts and sleep-related disturbances to which they are not normally subjected.

- On page 4-3, the EA states, *"The MSPIA currently uses noise mitigation techniques to address noise impacts to the community. The MSPIA operates the Home Mitigation Program, which installs new or reconditioned windows and doors, central air-conditioning, wall insulation and vent baffling for residences within the 65 Ldn noise contour. Additionally, an Airport Noise and Operations Monitoring System has been established to fully monitor noise issues within the community. These mitigation measures would be sufficient to decrease noise related annoyance effects to nearby receptors."*

  As detailed in the EA, the residential sound mitigation program and ANOMS system at MSP are critical parts of the noise reduction effort at MSP. However, reducing the sortie flying times to within 8:00 AM to 8:00 PM and the use of a steep departure profile would help to address the additional noise impacts that would result from the F-16 operations at MSP.

- On page 4-15 and 4-16, the EA states, *"Under the Proposed Action, minor adverse effects would be expected on wildlife species from an increase in noise associated with the additional*

flights at the MSPIA. These effects would be expected to be negligible since the worst-case scenario of the Proposed Action would only include 16 additional flights per month at the MSPIA."

This page states that the proposed action would include only 16 additional flights per month at MSP. Page 4-2 states that under the proposed action the potential number of flight operations would be 32 per month. The total number of flight operations under the proposed action should be consistent throughout the document.

Again, the MAC would like to thank you for providing the opportunity to comment on the Draft Finding of No Significant Impact and Draft Environmental Assessment for the Deployment of Up to Four F-16C Aircraft to the 133rd Airlift Wing.

Regards,

Chad E. Leqve – Manager
Aviation Noise and Satellite Programs

Appendix E

Noise Calculations

RMT	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yearly Average
1	56.8	54.8	58.8	59.3	57.5	58.0	57.3	58.6	58.0	57.1	57.3	57.7	57.7
2	57.6	55.8	59.9	60.7	59.3	60.1	58.4	60.5	59.8	58.5	58.9	58.4	59.2
3	63.7	62.0	65.6	65.9	63.5	64.5	64.2	65.6	64.6	64.0	64.5	64.7	64.5
4	60.9	59.9	61.7	62.6	62.6	63.1	62.8	63.7	63.1	62.2	61.9	60.9	62.2
5	71.0	71.9	72.4	72.1	71.9	71.9	71.8	72.1	71.5	71.3	71.1	70.5	71.6
6	71.5	71.5	71.0	71.8	73.7	73.1	72.0	72.5	72.8	72.5	71.8	71.7	72.2
7	62.8	65.3	63.8	62.8	65.1	62.8	61.3	60.2	60.9	62.4	61.5	60.8	62.8
8	58.9	58.7	57.5	58.3	60.6	59.3	58.7	58.9	60.8	60.6	59.3	59.3	59.4
9	37.6	38.3	40.5	38.4	38.7	40.4	40.4	46.9	44.2	47.5	38.0	39.1	42.3
10	34.3	33.0	38.2	38.4	35.5	48.8	49.6	51.6	49.3	51.9	42.0	43.4	47.1
11	36.0	38.2	40.9	37.2	38.6	47.7	46.3	47.3	47.1	46.5	41.5	42.0	44.2
12	33.7	34.3	36.7	37.2	37.4	38.0	32.9	37.3	35.7	34.1	34.7	36.1	36
13	55.4	51.3	57.1	57.0	54.7	56.4	56.2	57.0	56.2	56.0	56.4	55.7	56
14	63.7	62.1	65.2	65.2	63.3	64.1	63.9	63.7	64.0	63.4	64.0	64.1	63.9
15	57.8	53.4	58.9	58.9	56.1	55.7	56.7	58.6	57.7	58.0	58.6	58.0	57.6
16	66.8	66.6	68.3	67.8	66.7	67.3	67.8	67.2	66.4	66.7	66.2	67.2	67.1
17	44.2	48.2	44.1	44.4	45.6	48.7	48.8	50.8	50.3	47.1	50.7	49.8	48.4
18	53.0	50.9	54.1	54.5	53.0	55.0	55.4	58.4	56.6	57.2	56.6	57.9	55.7
19	50.0	49.1	52.9	52.1	53.7	50.7	50.2	52.1	53.7	52.1	53.1	54.6	52.3
20	47.5	49.9	46.1	45.4	49.6	47.0	44.9	44.3	48.5	47.9	47.6	50.5	47.8
21	50.9	47.2	51.6	52.5	51.5	53.3	52.9	53.7	52.6	52.7	52.2	52.0	52.2
22	57.3	57.0	57.4	57.6	58.1	58.5	56.9	56.9	58.1	58.2	57.8	58.4	57.7
23	64.0	59.6	65.0	64.9	63.5	65.2	65.5	66.1	64.9	64.5	65.5	64.3	64.7
24	61.4	60.5	62.2	61.8	61.4	61.5	61.1	61.1	61.8	61.7	61.3	61.8	61.5
25	52.9	50.2	55.1	54.5	51.1	53.2	56.2	53.3	52.3	53.1	51.9	53.7	53.4
26	55.8	54.8	57.2	56.3	55.2	57.7	57.9	60.1	58.8	58.2	58.2	57.9	57.6
27	58.8	61.5	58.8	61.4	61.1	58.2	57.6	56.9	58.5	57.6	56.7	54.9	58.9
28	61.3	60.5	60.7	61.2	61.2	59.6	57.7	58.8	60.4	61.0	60.5	60.4	60.4
29	56.2	57.7	53.8	53.2	55.5	54.1	52.9	56.4	55.6	57.3	57.6	55.0	55.7
30	57.2	56.6	60.3	60.8	60.4	60.1	58.6	62.4	63.1	60.5	61.2	63.4	60.8
31	44.9	47.0	45.3	45.7	47.7	45.9	45.7	45.9	47.3	45.6	45.6	48.9	46.5
32	44.8	45.5	42.6	41.5	47.0	42.5	39.8	45.1	46.2	41.7	42.8	47.7	44.6
33	48.2	47.8	49.3	49.1	48.6	48.3	47.8	50.7	50.9	48.1	48.6	51.3	49.2
34	43.6	44.0	44.2	45.3	45.1	44.2	42.7	45.3	47.1	43.6	43.1	49.4	45.2
35	50.2	50.9	50.7	50.8	51.3	49.9	49.5	52.0	53.5	52.6	52.9	54.2	51.8
36	50.7	51.4	51.0	51.8	53.2	52.4	51.3	52.4	53.9	52.5	52.7	53.1	52.3
37	44.6	43.4	47.2	47.9	47.3	46.6	44.2	47.9	47.9	47.4	47.5	46.8	46.8
38	45.5	44.7	49.5	48.8	48.8	47.9	46.7	48.8	50.2	48.6	49.6	48.5	48.4
39	45.8	42.8	46.7	46.9	47.5	45.9	46.6	47.8	47.1	48.5	48.3	48.5	47.1

AIRCRAFT TYPE	A/D FLAG	RUNWAYNAME	AIRPORTID	RMTID	START DATE	START TIME	MAXLEVEL	LEQ	SEL	DURATION
F16	A	4	MSP	17	11/14/2001	20:44:42	80.2	75.1	87.696	18
F16	A	4	MSP	17	3/6/2002	11:44:06	89.3	81.5	94.7429	21
F16	A	4	MSP	17	6/5/2003	15:39:52	81.6	76.4	89.7492	22
F16	A	4	MSP	17	6/7/2003	15:50:40	80.9	76.1	89.1398	20
F16	A	4	MSP	17	6/8/2003	15:54:25	84.3	78.4	92.007	23
F16	A	4	MSP	17	8/31/2006	8:27:47	82.0	77	88.5292	14
F16	A	4	MSP	17	8/31/2006	8:46:33	92.2	81	96.6698	37
F16	A	4	MSP	18	11/14/2001	20:45:06	80.9	75	87.3214	17
F16	A	4	MSP	18	6/5/2003	15:40:23	78.3	71.6	90.3635	76
F16	A	4	MSP	18	6/7/2003	15:51:12	78.8	74.1	86.6839	18
F16	A	4	MSP	18	6/8/2003	15:54:51	75.1	72.5	84.1995	15
F16	A	4	MSP	18	8/31/2006	8:28:10	79.7	74.1	85.3723	13
F16	A	4	MSP	18	8/31/2006	8:28:28	75.5	71.8	82.4504	12
F16	A	4	MSP	18	8/31/2006	8:47:00	90.0	83.3	98.7004	34
F16	A	4	MSP	20	8/31/2006	8:47:13	81.7	76.6	85.7617	8
F16	A	4	MSP	32	8/31/2006	8:45:53	78.8	73.4	86.157	19
F16	A	22	MSP	6	11/16/2001	8:31:47	69.0	66.2	79.981	24
F16	A	22	MSP	9	9/28/2001	10:31:38	95.6	86.9	100.06	21
F16	A	22	MSP	9	9/29/2001	11:33:20	84.5	79.3	91.1936	16
F16	A	22	MSP	9	10/1/2001	15:21:16	85.0	78.4	90.6701	17
F16	A	22	MSP	9	10/10/2001	4:48:31	86.5	80.4	93.5529	21
F16	A	22	MSP	9	10/10/2001	4:48:55	68.4	66.3	76.9123	12
F16	A	22	MSP	9	10/10/2001	12:43:12	83.8	78	90.2873	17
F16	A	22	MSP	9	10/10/2001	12:54:13	88.3	82.2	95.4045	21
F16	A	22	MSP	9	10/30/2001	23:44:59	87.8	81.7	94.0639	17
F16	A	22	MSP	9	11/7/2001	10:02:28	79.6	75.6	87.306	15
F16	A	22	MSP	9	11/7/2001	22:02:20	77.6	73.4	85.4467	16
F16	A	22	MSP	9	11/14/2001	12:32:08	85.6	79.4	93.1107	23
F16	A	22	MSP	9	11/15/2001	10:59:06	83.3	79.1	92.056	20
F16	A	22	MSP	9	11/16/2001	8:30:48	77.0	73.3	84.5951	14
F16	A	22	MSP	9	11/16/2001	13:10:53	83.3	76.6	90.4779	25
F16	A	22	MSP	9	11/17/2001	16:31:01	85.7	79.2	91.4779	17
F16	A	22	MSP	9	11/18/2001	4:44:19	79.5	73.2	87.1185	24
F16	A	22	MSP	9	11/18/2001	11:37:20	81.3	76.4	89.6576	21
F16	A	22	MSP	9	11/18/2001	12:03:36	87.3	79.8	93.6576	24
F16	A	22	MSP	9	11/18/2001	13:29:55	101.2	92.8	107.571	30
F16	A	22	MSP	9	11/30/2001	13:21:52	77.0	73.3	86.3998	21
F16	A	22	MSP	9	12/4/2001	14:22:32	88.0	80.8	94.431	23
F16	A	22	MSP	9	12/6/2001	12:21:18	81.3	77.2	89.1029	16
F16	A	22	MSP	9	12/28/2001	13:02:03	82.8	77.4	90.4701	20
F16	A	22	MSP	9	1/11/2002	9:11:56	85.8	80.1	93.2357	21
F16	A	22	MSP	9	1/23/2002	14:19:13	81.1	76.2	88.7123	18
F16	A	22	MSP	9	1/25/2002	10:19:08	97.5	88.9	102.993	26
F16	A	22	MSP	9	1/25/2002	10:19:39	72.8	70.7	80.0326	9
F16	A	22	MSP	9	1/25/2002	10:19:52	81.9	74.9	90.267	35
F16	A	22	MSP	9	1/25/2002	10:22:12	90.2	80.8	95.2904	28
F16	A	22	MSP	9	2/8/2002	10:39:32	78.2	74.7	85.8529	13
F16	A	22	MSP	9	2/13/2002	9:29:34	84.1	78.4	91.7123	22
F16	A	22	MSP	9	2/15/2002	8:54:32	82.7	76.9	88.4076	14
F16	A	22	MSP	9	2/22/2002	10:17:50	77.6	73.7	85.9935	17
F16	A	22	MSP	9	2/22/2002	10:18:13	90.3	80.9	94.6889	24
F16	A	22	MSP	9	2/22/2002	12:14:27	88.0	80.5	94.4701	25
F16	A	22	MSP	9	2/27/2002	14:49:10	92.1	84.7	97.3295	18
F16	A	22	MSP	9	3/12/2002	12:54:57	69.4	67.2	76.2904	8
F16	A	22	MSP	9	3/22/2002	9:29:19	87.9	78.5	93.9232	35
F16	A	22	MSP	9	3/22/2002	16:08:06	83.9	78.8	91.806	20
F16	A	22	MSP	10	9/28/2001	10:32:06	85.0	79.3	90.2954	13
F16	A	22	MSP	10	9/29/2001	11:33:37	68.6	65.6	75.9048	11
F16	A	22	MSP	10	9/29/2001	11:33:50	83.6	75.5	90.6079	32
F16	A	22	MSP	10	10/1/2001	15:21:43	85.6	79	90.5298	14
F16	A	22	MSP	10	10/10/2001	4:49:07	88.9	82	94.4829	18
F16	A	22	MSP	10	10/10/2001	12:43:47	98.6	89.3	101.889	18
F16	A	22	MSP	10	10/10/2001	12:54:49	86.8	80.4	92.3032	16

AIRCRAFT TYPE	A/D FLAG	RUNWAYNAME	AIRPORTID	RMTID	START DATE	START TIME	MAXLEVEL	LEQ	SEL	DURATION
F16	A	22	MSP	10	10/13/2001	18:14:40	99.3	91.7	104.092	17
F16	A	22	MSP	10	10/30/2001	23:45:30	87.7	80.8	92.9189	16
F16	A	22	MSP	10	11/7/2001	10:02:58	85.0	77.8	90.5985	19
F16	A	22	MSP	10	11/7/2001	22:02:51	85.4	79.2	90.997	15
F16	A	22	MSP	10	11/14/2001	12:32:42	89.7	82.8	95.2548	18
F16	A	22	MSP	10	11/15/2001	10:59:38	86.7	79.8	92.1532	17
F16	A	22	MSP	10	11/16/2001	8:31:21	96.3	87.7	101.7	25
F16	A	22	MSP	10	11/16/2001	13:11:22	93.1	85.8	98.6689	19
F16	A	22	MSP	10	11/17/2001	16:31:33	88.9	82.5	95.0907	18
F16	A	22	MSP	10	11/18/2001	4:44:55	85.3	79.8	91.4579	15
F16	A	22	MSP	10	11/18/2001	11:37:54	96.3	84.5	101.762	53
F16	A	22	MSP	10	11/18/2001	12:04:06	85.8	78.1	91.8564	24
F16	A	22	MSP	10	11/18/2001	13:30:24	86.1	78.3	91.6064	21
F16	A	22	MSP	10	11/30/2001	13:22:27	83.4	77.8	91.372	23
F16	A	22	MSP	10	12/4/2001	14:23:01	85.4	78.9	91.5048	18
F16	A	22	MSP	10	12/6/2001	12:21:48	87.7	80.5	92.7704	17
F16	A	22	MSP	10	12/28/2001	13:02:37	83.6	79.1	90.6298	14
F16	A	22	MSP	10	1/11/2002	9:12:32	93.6	85.9	98.2548	17
F16	A	22	MSP	10	1/23/2002	14:19:45	86.0	79.6	91.3876	15
F16	A	22	MSP	10	1/25/2002	10:19:41	110.6	98.8	116.325	57
F16	A	22	MSP	10	1/25/2002	10:22:37	84.5	76.5	91.6064	33
F16	A	22	MSP	10	2/8/2002	10:40:02	84.7	78.7	90.0829	14
F16	A	22	MSP	10	2/13/2002	9:30:15	82.8	77.4	89.2782	15
F16	A	22	MSP	10	2/15/2002	8:55:02	88.8	82.6	94.4345	15
F16	A	22	MSP	10	2/22/2002	10:18:26	84.8	78.5	90.4814	16
F16	A	22	MSP	10	2/22/2002	12:15:01	88.7	82.1	93.8564	15
F16	A	22	MSP	10	2/27/2002	14:49:41	89.5	82.9	94.7235	15
F16	A	22	MSP	10	3/12/2002	12:55:14	86.1	80.3	91.6689	14
F16	A	22	MSP	10	3/22/2002	9:29:54	90.0	83.6	95.3173	15
F16	A	22	MSP	10	3/22/2002	16:08:48	88.6	81.6	94.6923	20
F16	A	22	MSP	11	10/10/2001	4:49:05	73.6	69.5	80.9851	14
F16	A	22	MSP	11	11/14/2001	12:32:35	69.7	65.9	77.2664	14
F16	A	22	MSP	11	11/16/2001	8:31:15	74.6	68.3	78.9539	12
F16	A	22	MSP	11	11/16/2001	8:31:36	71.6	68.9	79.0164	10
F16	A	22	MSP	11	11/18/2001	13:30:07	70.8	67.1	78.196	13
F16	A	22	MSP	11	12/28/2001	13:02:30	70.4	67.8	79.4617	15
F16	A	22	MSP	11	1/25/2002	10:19:39	76.8	72.9	82.5373	9
F16	A	22	MSP	11	1/25/2002	10:19:50	89.7	78.2	96.2561	64
F16	A	22	MSP	12	9/28/2001	10:32:07	73.7	70.3	79.7186	9
F16	A	22	MSP	12	10/10/2001	12:54:38	74.2	70.1	81.0311	12
F16	A	22	MSP	12	11/18/2001	12:04:11	69.0	66	78.3592	17
F16	A	22	MSP	12	2/22/2002	12:14:39	78.2	73.3	85.1917	15
F16	A	22	MSP	17	11/18/2001	11:39:11	70.5	67.9	78.7507	12
F16	A	22	MSP	18	11/18/2001	11:38:53	87.1	81.9	94.6	19
F16	A	22	MSP	19	11/18/2001	11:39:02	73.7	69.7	80.6164	12
F16	A	22	MSP	28	11/18/2001	11:38:49	75.3	71.5	84.1835	18
F16	A	12L	MSP	1	9/20/2001	14:32:08	72.1	68.5	79.7504	13
F16	A	12L	MSP	1	10/7/2001	19:12:30	71.6	68.2	83.6489	35
F16	A	12L	MSP	1	10/12/2001	10:09:40	82.0	74.2	90.5004	42
F16	A	12L	MSP	1	10/30/2001	20:46:39	71.8	68.4	80.5161	16
F16	A	12L	MSP	1	10/30/2001	20:47:25	73.6	69.2	81.4536	17
F16	A	12L	MSP	1	9/5/2003	14:34:55	73.2	69.7	81.5607	16
F16	A	12L	MSP	1	5/28/2004	13:58:40	75.7	70.9	83.3264	17
F16	A	12L	MSP	1	5/28/2004	13:59:14	77.3	72.5	85.8498	21
F16	A	12L	MSP	1	11/8/2004	14:25:57	72.9	69.8	81.7129	15
F16	A	12L	MSP	1	9/21/2006	15:42:34	71.2	67.2	80.9107	24
F16	A	12L	MSP	1	9/21/2006	15:43:12	75.2	70.9	85.2076	27
F16	A	12L	MSP	2	9/20/2001	14:32:23	75.8	70.7	83.5032	19
F16	A	12L	MSP	2	10/7/2001	19:12:52	73.7	70.8	82.222	14
F16	A	12L	MSP	2	10/12/2001	10:10:14	77.7	71.8	85.3626	23
F16	A	12L	MSP	2	10/30/2001	20:47:00	84.6	78.1	92.6439	29
F16	A	12L	MSP	2	9/5/2003	14:35:16	82.5	77.1	90.1867	20

AIRCRAFT TYPE	A/D FLAG	RUNWAYNAME	AIRPORTID	RMTID	START DATE	START TIME	MAXLEVEL	LEQ	SEL	DURATION
F16	A	12L	MSP	2	5/28/2004	13:58:58	91.1	83.8	96.9054	21
F16	A	12L	MSP	2	11/8/2004	14:26:11	75.9	71.2	82.5251	14
F16	A	12L	MSP	2	9/21/2006	15:42:57	99.7	87.3	105.566	68
F16	A	12L	MSP	3	9/20/2001	14:32:53	66.5	65.1	74.7011	9
F16	A	12L	MSP	3	10/30/2001	20:47:26	67.9	65.1	78.5136	22
F16	A	12L	MSP	3	10/30/2001	20:47:49	69.8	66.7	76.4823	10
F16	A	12L	MSP	3	10/30/2001	20:48:08	82.2	74.6	85.3339	12
F16	A	12L	MSP	3	5/28/2004	13:59:22	73.5	69.5	81.4207	16
F16	A	12L	MSP	3	5/28/2004	13:59:47	69.6	65.9	76.0692	10
F16	A	12L	MSP	3	11/8/2004	14:26:35	68.3	66.1	76.7351	12
F16	A	12L	MSP	3	9/21/2006	15:43:27	71.5	67.7	76.8026	8
F16	A	12L	MSP	3	9/21/2006	15:43:38	70.6	68	78.5917	12
F16	A	12L	MSP	3	9/21/2006	15:43:52	77.3	72.9	82.5136	9
F16	A	12L	MSP	4	9/20/2001	14:32:54	77.7	73	85.4557	17
F16	A	12L	MSP	4	10/7/2001	19:13:26	78.4	73.6	87.237	23
F16	A	12L	MSP	4	10/12/2001	10:10:44	78.7	74	87.2995	21
F16	A	12L	MSP	4	10/12/2001	19:59:57	83.1	75.7	89.8307	26
F16	A	12L	MSP	4	10/30/2001	20:47:36	87.1	78.3	92.5339	26
F16	A	12L	MSP	4	9/5/2003	14:35:44	83.4	77.3	89.9523	18
F16	A	12L	MSP	4	5/28/2004	13:59:24	88.5	80.6	93.7698	21
F16	A	12L	MSP	4	11/8/2004	14:26:39	77.7	73.4	85.6839	17
F16	A	12L	MSP	4	9/21/2006	15:43:37	88.6	80.8	94.3964	23
F16	A	12L	MSP	5	10/12/2001	20:00:22	72.7	67.2	79.9617	19
F16	A	12L	MSP	5	10/30/2001	20:48:14	68.2	65.8	77.2429	14
F16	A	12L	MSP	5	9/21/2006	15:44:37	76.3	71.7	82.0479	11
F16	A	12L	MSP	6	9/20/2001	14:33:22	85.8	78.6	91.4654	19
F16	A	12L	MSP	6	10/7/2001	19:14:04	88.5	77.7	93.5201	38
F16	A	12L	MSP	6	10/12/2001	10:11:23	88.2	80.7	92.5592	16
F16	A	12L	MSP	6	10/12/2001	20:00:33	85.6	78.5	92.6139	26
F16	A	12L	MSP	6	10/30/2001	20:48:19	84.8	78.7	91.7232	20
F16	A	12L	MSP	6	9/5/2003	14:36:18	88.6	79.4	92.7889	22
F16	A	12L	MSP	6	5/28/2004	13:59:56	92.5	83.3	96.5232	21
F16	A	12L	MSP	6	11/8/2004	14:27:13	100.6	92.8	106.023	21
F16	A	12L	MSP	6	9/21/2006	15:44:23	91.0	84.2	96.996	19
F16	A	12L	MSP	28	10/12/2001	20:00:30	70.1	66.3	79.0429	19

F16	A	12R	MSP	1	10/30/2001	17:35:16	86.1	79.5	93.7504	27
F16	A	12R	MSP	1	12/21/2001	12:12:05	88.8	80.2	94.8207	29
F16	A	12R	MSP	1	3/25/2002	9:47:05	75.6	69.4	86.2895	49
F16	A	12R	MSP	1	9/12/2004	11:53:20	83.5	77.2	91.8498	29
F16	A	12R	MSP	1	10/5/2006	10:03:29	75.3	70.7	84.0045	21
F16	A	12R	MSP	1	10/5/2006	10:04:05	72.1	68.6	80.7467	16
F16	A	12R	MSP	1	10/3/2006	10:19:04	78.5	74	87.8873	25
F16	A	12R	MSP	1	10/3/2006	10:19:36	75.9	70.5	85.7623	34
F16	A	12R	MSP	1	10/7/2006	13:12:41	76.7	71.9	86.7232	31
F16	A	12R	MSP	1	12/5/2006	13:52:05	82.3	76.1	90.1139	25
F16	A	12R	MSP	2	12/21/2001	12:12:53	73.9	69.6	81.1126	14
F16	A	12R	MSP	2	10/3/2006	10:19:35	68.3	66.3	75.9104	9
F16	A	12R	MSP	2	10/7/2006	13:13:22	74.6	71.4	81.8939	11
F16	A	12R	MSP	2	10/7/2006	13:13:34	71.6	68.7	77.7298	8
F16	A	12R	MSP	3	10/30/2001	17:36:02	94.1	85.2	101.068	39
F16	A	12R	MSP	3	12/21/2001	12:12:51	78.8	74.3	86.5136	17
F16	A	12R	MSP	3	12/21/2001	12:13:16	68.6	67	76.6464	9
F16	A	12R	MSP	3	3/25/2002	9:47:47	88.7	81	94.912	24
F16	A	12R	MSP	3	9/12/2004	11:54:03	85.8	78.2	91.9129	23
F16	A	12R	MSP	3	10/5/2006	10:04:11	80.2	76.2	88.8417	18
F16	A	12R	MSP	3	10/3/2006	10:19:41	83.1	76.8	89.4432	18
F16	A	12R	MSP	3	10/7/2006	13:13:22	86.1	78.7	93.2792	29
F16	A	12R	MSP	3	12/5/2006	13:52:47	85.1	81.5	94.5136	20
F16	A	12R	MSP	4	10/30/2001	17:36:20	76.7	70.9	80.5729	9
F16	A	12R	MSP	4	10/30/2001	17:36:31	68.7	67	76.3932	9
F16	A	12R	MSP	4	12/21/2001	12:13:18	71.0	68.3	77.6464	9
F16	A	12R	MSP	5	10/30/2001	17:36:38	86.6	81.7	94.8601	21

AIRCRAFT TYPE	A/D FLAG	RUNWAYNAME	AIRPORTID	RMTID	START DATE	START TIME	MAXLEVEL	LEQ	SEL	DURATION
F16	A	12R	MSP	5	12/21/2001	12:13:24	86.9	79.3	92.5164	21
F16	A	12R	MSP	5	3/25/2002	9:48:14	86.7	79.6	91.7195	16
F16	A	12R	MSP	5	9/12/2004	11:54:33	88.3	82.2	95.9436	23
F16	A	12R	MSP	5	10/3/2006	10:20:09	85.6	78.9	90.6026	15
F16	A	12R	MSP	5	10/7/2006	13:13:56	86.7	79.6	93.4229	24
F16	A	12R	MSP	5	12/5/2006	13:53:18	85.1	79.1	91.1642	16
F16	A	12R	MSP	6	10/30/2001	17:37:12	70.7	66	79.8639	24
F16	A	30L	MSP	5	10/4/2006	12:21:22	77.1	71.7	87.7667	40
F16	A	30L	MSP	13	3/18/2002	12:41:20	70.1	67.5	77.6495	10
F16	A	30L	MSP	14	2/21/2002	12:57:36	85.3	80.3	91.1551	12
F16	A	30L	MSP	14	2/21/2002	12:57:56	79.6	75.3	86.6473	14
F16	A	30L	MSP	14	6/5/2003	18:50:07	70.6	67.9	79.0123	13
F16	A	30L	MSP	14	10/4/2006	9:54:39	85.9	78.5	93.2495	30
F16	A	30L	MSP	14	8/20/2004	12:50:47	76.8	70.8	84.6626	24
F16	A	30L	MSP	14	10/4/2006	12:20:05	85.0	77.5	90.7026	21
F16	A	30L	MSP	16	2/21/2002	12:57:49	94.1	87.7	100.842	21
F16	A	30L	MSP	16	6/4/2003	15:57:32	82.6	75.3	87.8845	18
F16	A	30L	MSP	16	6/4/2003	15:57:51	75.8	71.2	83.072	15
F16	A	30L	MSP	16	6/5/2003	18:50:24	74.2	70.9	81.7673	12
F16	A	30L	MSP	16	10/4/2006	9:55:00	86.2	77.7	92.0451	27
F16	A	30L	MSP	16	8/20/2004	12:51:05	86.4	80.1	92.7251	18
F16	A	30L	MSP	16	10/4/2006	12:20:23	84.3	78.4	90.8811	18
F16	A	30L	MSP	22	2/21/2002	12:56:20	77.0	72.1	84.8898	19
F16	A	30L	MSP	22	6/4/2003	15:56:15	78.3	71.4	86.2873	31
F16	A	30L	MSP	22	10/4/2006	9:53:38	85.1	74.5	89.0839	29
F16	A	30L	MSP	22	8/20/2004	12:49:44	72.5	68.2	81.4667	21
F16	A	30L	MSP	22	10/4/2006	12:19:00	73.2	68.1	83.9198	38
F16	A	30L	MSP	23	3/18/2002	12:41:48	68.2	66.8	77.4529	12
F16	A	30L	MSP	24	2/21/2002	12:57:10	82.1	74	85.5267	14
F16	A	30L	MSP	24	6/4/2003	15:56:53	66.1	64.9	74.0429	8
F16	A	30L	MSP	24	6/5/2003	18:49:48	70.1	67.7	78.496	12
F16	A	30L	MSP	24	10/4/2006	9:54:16	80.4	72.7	85.8801	21
F16	A	30L	MSP	24	10/4/2006	9:54:38	90.2	84.1	94.8098	12
F16	A	30L	MSP	24	8/20/2004	12:50:20	73.8	69.5	83.492	25
F16	A	30L	MSP	24	10/4/2006	12:19:39	77.5	71.3	83.8098	18
F16	A	30L	MSP	25	2/21/2002	12:57:58	74.9	70.6	80.1936	9
F16	A	30L	MSP	25	6/4/2003	15:57:01	70.3	65.8	86.1182	108
F16	A	30L	MSP	25	10/4/2006	9:54:42	73.0	67.6	87.6929	102
F16	A	30L	MSP	25	10/4/2006	12:20:05	71.8	66.3	84.1226	61
F16	A	30L	MSP	26	3/18/2002	12:40:48	70.5	68.2	78.9286	12
F16	A	30R	MSP	13	11/21/2001	15:36:19	88.3	82.3	95.6407	22
F16	A	30R	MSP	14	10/3/2001	15:36:28	81.0	73	88.1176	33
F16	A	30R	MSP	14	10/14/2001	16:43:35	76.6	69.5	83.7661	27
F16	A	30R	MSP	14	10/14/2001	16:44:03	69.6	65.8	76.1723	11
F16	A	30R	MSP	14	10/15/2001	14:56:04	73.8	68.2	82.5629	27
F16	A	30R	MSP	14	10/18/2001	10:09:48	87.2	74.6	93.2348	73
F16	A	30R	MSP	14	10/24/2001	13:35:39	69.6	66.6	79.8207	21
F16	A	30R	MSP	14	10/24/2001	13:36:55	79.1	74	87.6567	23
F16	A	30R	MSP	14	11/12/2001	5:04:39	71.3	67.9	79.6332	15
F16	A	30R	MSP	14	11/21/2001	9:59:49	77.9	72.7	88.2426	36
F16	A	30R	MSP	14	11/21/2001	15:36:20	76.0	71.4	84.3989	20
F16	A	30R	MSP	14	2/26/2002	14:16:24	78.5	74.5	85.9989	14
F16	A	30R	MSP	14	5/13/2006	16:05:59	84.9	76.8	90.8979	26
F16	A	30R	MSP	14	9/18/2006	9:58:53	83.7	75.4	88.8198	22
F16	A	30R	MSP	14	9/28/2006	10:08:14	73.2	68.8	80.226	14
F16	A	30R	MSP	14	11/13/2006	16:07:45	79.2	72.9	88.3542	35
F16	A	30R	MSP	14	11/13/2006	16:08:24	82.1	75.6	87.9635	17
F16	A	30R	MSP	15	10/3/2001	15:37:15	70.5	67.2	76.3651	8
F16	A	30R	MSP	15	10/14/2001	16:43:48	71.3	68.2	81.8964	24
F16	A	30R	MSP	15	10/24/2001	13:36:18	72.5	69.4	81.5214	16

AIRCRAFT TYPE	A/D FLAG	RUNWAYNAME	AIRPORTID	RMTID	START DATE	START TIME	MAXLEVEL	LEQ	SEL	DURATION
F16	A	30R	MSP	15	11/21/2001	15:36:25	80.7	74.4	88.5682	26
F16	A	30R	MSP	16	10/14/2001	16:43:50	70.9	67	81.1689	26
F16	A	30R	MSP	16	10/18/2001	10:10:25	73.3	69.2	78.536	9
F16	A	30R	MSP	16	2/26/2002	14:16:48	69.4	66.1	76.1232	10
F16	A	30R	MSP	16	11/13/2006	16:08:31	68.0	66.2	75.5764	9
F16	A	30R	MSP	22	10/3/2001	15:35:21	71.8	67.7	79.6007	15
F16	A	30R	MSP	22	10/14/2001	16:42:27	76.3	70.5	83.1867	19
F16	A	30R	MSP	22	10/15/2001	14:54:51	67.1	65.4	77.7726	17
F16	A	30R	MSP	22	10/24/2001	13:34:37	73.4	69	84.3429	35
F16	A	30R	MSP	22	10/24/2001	13:35:24	71.5	67.1	82.9132	38
F16	A	30R	MSP	22	11/21/2001	9:58:37	79.5	74.4	90.0695	36
F16	A	30R	MSP	22	2/26/2002	14:15:17	70.7	67.4	78.0851	12
F16	A	30R	MSP	22	5/13/2006	16:04:55	73.1	69.2	82.6082	22
F16	A	30R	MSP	22	9/18/2006	9:57:47	70.6	67.3	79.6854	17
F16	A	30R	MSP	22	11/13/2006	16:07:08	73.1	70.2	79.8026	9
F16	A	30R	MSP	23	10/3/2001	15:37:04	77.8	73.1	87.6404	28
F16	A	30R	MSP	23	10/14/2001	16:43:51	67.6	66.1	75.3123	8
F16	A	30R	MSP	23	10/14/2001	16:44:04	71.9	67.6	83.0857	35
F16	A	30R	MSP	23	10/15/2001	14:56:46	70.2	66.2	77.2732	13
F16	A	30R	MSP	23	10/18/2001	10:10:22	76.0	70.4	83.7498	22
F16	A	30R	MSP	23	10/24/2001	13:36:16	86.2	77.8	90.6092	19
F16	A	30R	MSP	23	10/24/2001	13:37:25	68.6	66.1	78.3592	17
F16	A	30R	MSP	23	11/12/2001	5:05:06	74.1	70.2	81.8201	14
F16	A	30R	MSP	23	11/21/2001	10:00:26	78.7	71.5	86.7498	33
F16	A	30R	MSP	23	11/21/2001	15:36:41	81.5	73.7	87.617	25
F16	A	30R	MSP	23	2/26/2002	14:17:01	73.9	69.2	78.867	9
F16	A	30R	MSP	23	5/13/2006	16:06:33	80.8	74.1	86.3101	17
F16	A	30R	MSP	23	9/18/2006	9:59:37	84.3	77.6	87.0161	9
F16	A	30R	MSP	23	11/13/2006	16:08:31	71.6	68.9	78.2098	8
F16	A	30R	MSP	24	10/3/2001	15:35:57	81.5	70.6	86.4329	38
F16	A	30R	MSP	24	10/14/2001	16:43:13	80.6	73.3	91.7142	69
F16	A	30R	MSP	24	10/15/2001	14:55:26	72.4	68	83.9329	39
F16	A	30R	MSP	24	10/18/2001	10:09:09	89.2	82.3	97.8392	36
F16	A	30R	MSP	24	10/24/2001	13:35:18	82.4	76.1	92.3001	42
F16	A	30R	MSP	24	10/24/2001	13:36:12	73.9	68.1	87.3392	84
F16	A	30R	MSP	24	11/21/2001	9:59:19	80.4	74.3	88.9564	30
F16	A	30R	MSP	24	11/21/2001	9:59:50	80.8	76.2	87.9954	15
F16	A	30R	MSP	24	11/21/2001	15:35:44	77.3	70.5	84.9564	28
F16	A	30R	MSP	24	2/26/2002	14:15:47	75.7	71.8	84.8392	20
F16	A	30R	MSP	24	5/13/2006	16:05:36	82.8	76	89.5829	23
F16	A	30R	MSP	24	9/18/2006	9:58:26	84.3	76.2	90.4504	26
F16	A	30R	MSP	24	9/28/2006	10:07:54	69.1	66.6	76.0754	9
F16	A	30R	MSP	26	10/3/2001	15:35:57	70.0	67.3	78.0551	12
F16	A	30R	MSP	26	10/15/2001	14:55:31	69.8	66.1	77.3989	13
F16	A	30R	MSP	26	10/18/2001	10:09:08	77.2	71	86.727	37
F16	A	30R	MSP	26	10/24/2001	13:35:17	81.1	76	90.9364	32
F16	A	30R	MSP	26	10/24/2001	13:36:18	68.9	66.3	78.0301	15
F16	A	30R	MSP	26	11/12/2001	5:03:56	71.0	67.8	79.4207	15
F16	A	30R	MSP	26	11/21/2001	9:59:22	74.7	72	85.9754	25
F16	A	30R	MSP	26	11/21/2001	15:35:32	77.3	70.5	84.1864	23
F16	A	30R	MSP	26	2/26/2002	14:15:43	69.6	67.8	79.1864	14
F16	A	30R	MSP	26	2/26/2002	14:15:58	67.6	65.9	75.6082	9
F16	A	30R	MSP	26	5/13/2006	16:05:54	76.6	72	81.081	8
F16	A	30R	MSP	26	9/18/2006	9:58:14	83.5	75.4	89.8123	28
F16	A	30R	MSP	26	11/13/2006	16:07:06	70.1	66.5	76.992	11
F16	A	30R	MSP	26	11/13/2006	16:07:19	87.5	79.5	95.0154	35

AIRCRAFT TYPE	A/D FLAG	RUNWAYNAME	AIRPORTID	RMTID	START DATE	START TIME	MAXLEVEL	LEQ	SEL	DURATION
F16	D	4	MSP	9	10/4/2006	8:36:50	100.7	93.1	108.6	36
F16	D	4	MSP	10	10/4/2006	8:36:34	103.7	95.2	112.0	48
F16	D	4	MSP	19	10/4/2006	8:36:12	74.4	68.8	84.7	39
F16	D	4	MSP	28	10/4/2006	8:36:00	87.3	80.9	99.8	78
F16	D	12L	MSP	12	11/12/2001	11:34:37	80.3	74.4	91.7	54
F16	D	12L	MSP	23	8/23/2004	10:11:39	90.9	84.8	101.9	51
F16	D	12L	MSP	23	11/14/2006	13:54:43	96.2	89.3	106.7	54
F16	D	12L	MSP	16	11/14/2006	13:54:49	74.4	69.5	87.1	57
F16	D	12R	MSP	6	6/7/2003	15:37:49	65.0	64.1	73.7	9
F16	D	12R	MSP	13	6/7/2003	15:39:12	70.9	68.1	78.6	11
F16	D	12R	MSP	14	6/7/2003	15:39:00	84.3	77.5	95.8	66
F16	D	12R	MSP	14	11/9/2004	14:09:37	96.4	86.3	102.7	44
F16	D	12R	MSP	14	10/7/2006	12:23:33	86.1	78.5	98.3	95
F16	D	12R	MSP	16	12/14/2001	12:15:20	91.9	84.3	100.2	39
F16	D	12R	MSP	16	6/7/2003	15:38:46	90.3	83.2	101.3	64
F16	D	12R	MSP	16	9/13/2004	8:55:35	93.5	84.2	102.7	70
F16	D	12R	MSP	16	11/9/2004	14:09:27	86.3	81.4	97.4	40
F16	D	12R	MSP	21	11/9/2004	14:10:08	87.3	81.5	97.9	44
F16	D	12R	MSP	23	12/14/2001	12:15:17	80.0	74.1	90.9	48
F16	D	12R	MSP	23	6/7/2003	15:38:53	75.1	70.4	86.0	36
F16	D	12R	MSP	23	11/9/2004	14:09:25	91.4	81.1	98.4	54
F16	D	12R	MSP	24	6/7/2003	15:39:33	76.4	72.3	89.2	49
F16	D	12R	MSP	24	9/13/2004	8:55:54	87.4	80.8	98.7	62
F16	D	12R	MSP	25	6/7/2003	15:38:56	74.8	68.9	87.9	79
F16	D	12R	MSP	26	6/7/2003	15:39:44	76.4	71.6	86.9	34
F16	D	12R	MSP	26	11/9/2004	14:09:48	91.7	83.9	101.4	57
F16	D	12R	MSP	28	11/9/2004	14:08:45	78.6	73.4	89.1	37
F16	D	12R	MSP	28	10/7/2006	12:22:46	83.3	74.8	93.4	72
F16	D	30L	MSP	1	9/15/2003	8:54:23	85.6	81.4	97.3	38
F16	D	30L	MSP	2	9/15/2003	8:54:16	84.4	77.7	94.6	48
F16	D	30L	MSP	3	9/15/2003	8:54:04	96.6	88.7	105.0	43
F16	D	30L	MSP	4	9/15/2003	8:54:04	87.8	80.8	98.0	53
F16	D	30L	MSP	5	9/7/2003	8:42:47	90.8	84.8	100.9	41
F16	D	30L	MSP	5	9/15/2003	8:53:54	103.3	95.2	111.2	40
F16	D	30L	MSP	6	9/7/2003	8:42:43	89.6	81.4	97.5	41
F16	D	30L	MSP	7	9/7/2003	8:42:56	83.8	77.8	97.0	84
F16	D	30L	MSP	27	9/15/2003	8:54:09	84.9	77.2	94.4	52
F16	D	30L	MSP	28	9/7/2003	8:42:45	82.7	77.4	94.6	53

AIRCRAFT TYPE	A/D FLAG	RUNWAYNAME	AIRPORTID	RMTID	START DATE	START TIME	MAXLEVEL	LEQ	SEL	DURATION
F16	D	30R	MSP	4	5/19/2005	9:36:20	80.9	73.7	88.8	33
F16	D	30R	MSP	4	5/16/2006	9:08:37	99.6	88.1	107.5	88
F16	D	30R	MSP	6	5/19/2005	9:36:01	98.6	91.9	107.0	32
F16	D	30R	MSP	6	5/16/2006	9:08:25	116.2	99.1	119.5	108
F16	D	30R	MSP	8	5/19/2005	9:36:14	87.8	80.6	97.1	45
F16	D	30R	MSP	8	5/16/2006	9:08:35	88.4	79.8	98.1	67
F16	D	22	MSP	2	11/9/2001	11:38:05	74.3	71.5	87.1	37
F16	D	22	MSP	3	11/9/2001	11:37:52	82.7	78.4	95.4	50
F16	D	22	MSP	3	1/25/2002	11:26:02	77.4	72.4	87.6	32
F16	D	22	MSP	4	11/9/2001	11:37:56	88.5	81.7	97.9	42
F16	D	22	MSP	4	1/25/2002	11:26:04	86.6	78.7	93.5	30
F16	D	22	MSP	5	1/25/2002	11:25:44	81.6	74.4	91.0	45
F16	D	22	MSP	5	3/29/2002	11:06:07	89.6	81.8	101.4	90
F16	D	22	MSP	6	1/25/2002	11:25:31	82.5	77.2	92.6	34
F16	D	22	MSP	7	11/9/2001	11:37:35	93.5	86.7	103.3	46
F16	D	22	MSP	10	10/23/2001	8:41:45	66.6	65.1	74.4	8
F16	D	22	MSP	10	12/9/2001	10:20:32	67.4	65.5	75.3	10
F16	D	22	MSP	10	9/18/2006	8:34:14	66.5	64.8	74.0	8
F16	D	22	MSP	11	10/10/2001	0:55:41	79.4	73.1	92.7	91
F16	D	22	MSP	12	11/8/2001	17:53:12	78.8	70.9	88.4	57
F16	D	22	MSP	12	1/11/2002	10:40:25	82.9	76.1	93.6	56
F16	D	22	MSP	17	10/12/2001	0:51:52	94.8	87.9	106.0	65
F16	D	22	MSP	17	10/15/2001	9:20:10	96.2	87.1	105.9	75
F16	D	22	MSP	17	10/23/2001	8:41:44	89.8	83.4	102.7	85
F16	D	22	MSP	17	11/18/2001	15:51:03	96.6	86.9	103.9	50
F16	D	22	MSP	17	1/11/2002	10:41:05	89.0	83.0	98.9	39
F16	D	22	MSP	17	6/5/2003	17:58:09	92.7	85.0	100.6	36
F16	D	22	MSP	17	6/9/2003	10:11:59	102.3	93.6	113.5	99
F16	D	22	MSP	17	12/6/2006	13:58:36	82.0	75.4	92.0	45
F16	D	22	MSP	18	10/10/2001	0:56:07	109.9	96.5	115.8	85
F16	D	22	MSP	18	10/10/2001	14:57:29	101.0	91.5	108.8	53
F16	D	22	MSP	18	10/23/2001	8:41:50	97.8	90.2	109.2	79
F16	D	22	MSP	18	11/9/2001	11:37:21	102.1	94.2	112.1	62
F16	D	22	MSP	18	11/15/2001	12:37:41	104.9	94.5	112.7	65
F16	D	22	MSP	18	11/16/2001	15:00:35	103.2	95.4	109.2	24
F16	D	22	MSP	18	11/18/2001	15:50:51	105.8	93.6	111.0	54
F16	D	22	MSP	18	11/21/2001	11:06:48	106.5	91.8	111.5	93
F16	D	22	MSP	18	12/6/2001	14:22:33	105.0	93.5	111.5	63
F16	D	22	MSP	18	12/9/2001	10:21:00	103.9	92.2	110.3	65
F16	D	22	MSP	18	1/11/2002	10:40:55	100.5	91.1	107.8	47
F16	D	22	MSP	18	3/12/2002	11:48:03	95.8	86.5	106.9	110
F16	D	22	MSP	18	6/5/2003	17:58:00	111.4	100.0	115.3	33
F16	D	22	MSP	18	10/10/2006	14:55:41	102.4	92.1	111.7	92
F16	D	22	MSP	18	10/18/2006	14:53:17	99.4	89.0	108.9	98
F16	D	22	MSP	18	12/6/2006	13:58:26	100.2	92.4	105.5	21
F16	D	22	MSP	19	10/10/2001	0:56:16	94.5	86.5	105.9	87
F16	D	22	MSP	19	10/15/2001	9:20:05	97.1	85.4	104.1	74
F16	D	22	MSP	19	10/23/2001	8:41:39	94.8	87.9	106.3	69
F16	D	22	MSP	19	11/16/2001	15:00:45	81.6	74.2	87.5	21
F16	D	22	MSP	19	11/18/2001	15:50:58	91.7	85.1	99.6	28
F16	D	22	MSP	19	12/6/2001	14:22:41	88.5	80.5	98.3	61
F16	D	22	MSP	19	12/9/2001	10:21:07	93.2	85.0	102.0	50
F16	D	22	MSP	19	1/11/2002	10:40:38	88.7	79.3	97.1	61
F16	D	22	MSP	19	6/5/2003	17:58:06	93.7	80.5	100.7	104
F16	D	22	MSP	19	9/18/2006	8:34:44	91.5	86.1	103.8	59
F16	D	22	MSP	19	9/28/2006	8:30:41	92.7	85.7	103.7	64
F16	D	22	MSP	19	12/6/2006	13:58:29	86.0	77.6	90.7	21
F16	D	22	MSP	20	10/10/2001	0:56:13	93.5	85.2	104.9	93
F16	D	22	MSP	20	11/18/2001	15:50:59	82.4	75.9	91.2	34
F16	D	22	MSP	20	1/11/2002	10:41:03	80.4	75.9	91.4	35
F16	D	22	MSP	20	6/5/2003	17:58:08	90.4	79.6	99.8	105

AIRCRAFT TYPE	A/D FLAG	RUNWAYNAME	AIRPORTID	RMTID	START DATE	START TIME	MAXLEVEL	LEQ	SEL	DURATION
F16	D	22	MSP	20	9/28/2006	8:30:45	85.4	79.6	98.9	85
F16	D	22	MSP	20	10/3/2006	8:27:38	82.3	76.9	95.7	75
F16	D	22	MSP	20	10/18/2006	12:37:30	83.4	75.9	95.8	99
F16	D	22	MSP	20	10/18/2006	14:53:28	81.6	76.7	95.5	74
F16	D	22	MSP	20	12/6/2006	13:58:34	73.9	69.1	78.9	10
F16	D	22	MSP	27	11/9/2001	11:37:48	78.7	72.2	89.1	50
F16	D	22	MSP	28	10/23/2001	8:41:49	84.3	78.6	96.2	58
F16	D	22	MSP	28	11/9/2001	11:37:16	90.1	81.6	100.2	73
F16	D	22	MSP	28	11/14/2001	15:17:33	87.9	80.1	97.1	51
F16	D	22	MSP	28	11/15/2001	12:37:35	88.8	80.4	99.9	88
F16	D	22	MSP	28	1/25/2002	11:25:39	93.3	85.7	101.5	37
F16	D	22	MSP	28	3/12/2002	11:47:58	94.4	85.8	105.5	93
F16	D	22	MSP	28	10/18/2006	14:53:13	79.8	73.8	92.1	67
F16	D	22	MSP	28	12/6/2006	13:58:34	68.9	66.9	76.0	8
F16	D	22	MSP	30	6/5/2003	17:58:09	86.0	80.9	96.4	35
F16	D	22	MSP	30	6/8/2003	14:58:46	73.1	66.5	86.7	103
F16	D	22	MSP	32	6/9/2003	10:12:23	85.1	78.4	98.7	108
F16	D	22	MSP	32	10/5/2006	8:25:20	85.1	78.4	96.2	60

2006 F-16 Arrival Utilization				2006 F-16 Departure Utilization		
Rwy	**Number**	**Percent**		**Rwy**	**Number**	**Percent**
4	7	7.8%		4	1	3.7%
22	39	43.3%		22	16	59.3%
12L	11	12.2%		12L	2	7.4%
12R	10	11.1%		12R	4	14.8%
30L	7	7.8%		30L	2	7.4%
30R	16	17.8%		30R	2	7.4%
Total	90	100.0%		Total	27	100.0%

RMT		Arrival SEL							Departure SEL					
		4	22	12L	12R	30L	30R		4	22	12L	12R	30L	30R
1				84.4	90.1								97.3	
2				97.5	79.8					87.1			94.6	
3				80	94.4					93.1			105	
4				90.7	78.6					96.3			98	104.6
5				80.2	93.3	87.8				98.7			108.6	
6				98.3	79.9					92.6		73.7	97.5	116.7
7										103.3			97	
8														97.6
9			95.6						108.6					
10			101.8						112.2	74.6				
11			87.9							92.7				
12			81.9							91.7	91.7			
13						77.6	95.6					78.6		
14						89.6	87.4					99.9		
15							84.2							
16						94.1	78.4				87.1	100.8		
17		91.5	78.8							106.6				
18		91.7	94.6							111.4				
19			80.6						84.7	102.3				
20		85.8								98.4				
21												97.9		
22						85.9	83.6							
23						77.5	85.2				104.9	94.6		
24						87.9	90.5					96.1		
25						85.3						87.9		
26						78.9	87					98.6		
27										89.1			94.4	
28			84.2	79					99.8	100		91.8	94.6	
29														
30										93.8				
31														
32		86.2								97.6				
33														
34														
35														
36														
37														
38														
39														

RMT	2006	F-16	Proposed	Change
	Existing	Only	Action	
	DNL	DNL	DNL	
1	57.7	35.2	57.7	0.02
2	59.2	38.7	59.2	0.04
3	64.5	43.7	64.5	0.04
4	62.2	45.1	62.3	0.08
5	71.6	47.9	71.6	0.02
6	72.2	53.5	72.3	0.06
7	62.8	49.0	63.0	0.18
8	59.4	34.1	59.4	0.01
9	42.3	44.1	46.3	4.02
10	47.1	48.9	51.1	3.99
11	44.2	39.2	45.4	1.20
12	36	38.1	40.2	4.16
13	56	36.0	56.0	0.04
14	63.9	39.9	63.9	0.02
15	57.6	24.5	57.6	0.00
16	67.1	40.9	67.1	0.01
17	48.4	52.2	53.7	5.31
18	55.7	57.0	59.4	3.73
19	52.3	47.9	53.6	1.34
20	47.8	44.0	49.3	1.51
21	52.2	37.4	52.3	0.14
22	57.7	26.4	57.7	0.00
23	64.7	42.3	64.7	0.02
24	61.5	37.1	61.5	0.02
25	53.4	28.5	53.4	0.01
26	57.6	38.5	57.7	0.05
27	58.9	36.2	58.9	0.02
28	60.4	46.2	60.6	0.16
29	55.7		55.7	0.00
30	60.8	39.4	60.8	0.03
31	46.5		46.5	0.00
32	44.6	43.2	47.0	2.37
33	49.2		49.2	0.00
34	45.2		45.2	0.00
35	51.8		51.8	0.00
36	52.3		52.3	0.00
37	46.8		46.8	0.00
38	48.4		48.4	0.00
39	47.1		47.1	0.00