FINAL

Environmental Assessment

For

Fireworks Display and Cleanup for the Luke Air Force Base, Arizona, Fourth of July Celebrations

Prepared for:

Department of the Air Force
56th Fighter Wing
Luke Air Force Base, Arizona

FINDING OF NO SIGNIFICANT IMPACT

ENVIRONMENTAL ASSESSMENT FOR FIREWORKS DISPLAY AND CLEANUP FOR THE LUKE AIR FORCE BASE, ARIZONA, FOURTH OF JULY CELEBRATIONS

AGENCY: 56th Fighter Wing (FW), Luke Air Force Base (AFB), Arizona.

BACKGROUND: Luke AFB prepared an Environmental Assessment (EA) addressing potential environmental impacts from a Fireworks Display and Cleanup (Proposed Action). This display serves as a finale for the Fourth of July celebrations called Freedom Fest that are held by the installation. The purpose of the action is to continue to provide a finale to the Freedom Fest, which draws over 2,000 spectators comprised of Airmen and their families.

PROPOSED ACTION: Under the Proposed Action, a pyrotechnics contractor (contractor) for Luke AFB would set up all equipment required for the fireworks display at the proposed launch site located on private land adjacent to Luke AFB. On July 4th, the fireworks display would begin at sunset and last for approximately 20 minutes. The contractor would remain at the launch site throughout the night to sweep the area for duds and remove all associated equipment and debris. Locating the launch site on private property is needed to provide a safe location from which to launch fireworks where there are limited flammable hazards within proximity of the public viewing venue at Fowler Park on Luke AFB.

SUMMARY OF FINDINGS FOR PROPOSED ACTION:

Land Use. Implementation of the Proposed Action will not result in any changes to the Base operations nor would it conflict with the existing land use. The proposed launch site was selected as a result of a coordinated planning process and takes into account siting issues such as adjacent land uses (both on- and off-base), the noise environment, and airfield safety criteria. Therefore, there will be no significant impacts to on-base or off-base land uses.

Air Quality. The Proposed Action will result in short-term emissions during the combustion of the pyrotechnic products (i.e., fireworks). The proposed launch site is located in the part of Maricopa County designated marginal non-attainment for ozone (O_3), serious non-attainment for particulate matter equal to or less than 10 micrometers in diameter (PM_{10}), and a maintenance area for carbon monoxide (CO). The CO, PM_{10}, and O_3 precursors (nitrogen oxides and volatile organic compounds) emissions are subject to General Conformity requirements. The annual emission increases associated with the Proposed Action will be less than the *de minimus* thresholds for General Conformity applicability. Therefore, there will be no significant impacts to air quality.

Biological Resources. No significant or adverse impacts to biological resources are anticipated.

Earth Resources. Under the Proposed Action, contaminated debris falling on the ground surface could potentially cause impacts to earth resources. However, potential for contaminants entering the soil as a result of the Proposed Action will be minimized by implementation of standard

practices including: launching fireworks from a tray or base structure and the physical removal of all visible debris on the ground surface. Impacts to earth resources will not be significant.

Water Resources. Under the Proposed Action, contaminated debris falling on the ground surface and subsequently entering groundwater or a surface water feature could potentially cause impacts to water resources. However, potential for contaminants impacting a water resource as a result of the Proposed Action will be minimized by implementation of standard practices including: launching fireworks from a tray or base structure and the physical removal of all visible debris on the ground surface. Impacts to water resources will not be significant.

Hazardous Materials and Wastes. Hazardous materials and wastes will be managed in compliance with Luke AFB, local, state, and federal plans and regulations. The proposed action will not occur within nor affect Environmental Restoration Program (ERP) sites or Areas of Concern (AOCs). Significant impacts to hazardous materials and wastes or ERP/AOC sites are not anticipated.

Infrastructure and Utilities. No significant or adverse impacts to infrastructure or utilities are anticipated.

Safety. Under the Proposed Action, the potential for increased safety risks would be minimized through adherence with the relevant sections of National Fire Protection Association Code 1123 and Air Force Manual 91-201; patrol and monitoring by the 56th Security Forces and Fire Emergency Services personnel; and coordination between 56th Force Support Squadron, Base Operations, and the Airfield Management to ensure no interference with aircraft operations.

SUMMARY OF FINDINGS FOR THE ALTERNATIVE ACTION: Under the Alternative Action, Luke AFB would conduct a laser light show at Fowler Park at the conclusion of the Freedom Fest celebrations and there would be no adverse impact. The laser light show would consist of projected multi-colored laser beams shot into the sky above the park. Impacts associated with this alternative would not be significant.

SUMMARY OF FINDINGS FOR NO ACTION ALTERNATIVE: Under the No Action Alternative there would be no fireworks display or laser light show during the Luke AFB Fourth of July celebrations.

SUMMARY OF CUMULATIVE IMPACTS: The cumulative impact of implementing the Proposed Action, along with other past, present, and future projects in the region, were assessed in the attached EA. No significant cumulative impacts were identified.

ENVIRONMENTAL JUSTICE: There is a minority population present within the area that could potentially be impacted by the Proposed Action. However, all of the impacts associated with the Proposed Action and alternatives would be localized, both spatially and temporally, to the project site and would not directly or indirectly impact the minority population.

MITIGATIVE MEASURES: No mitigation measures would be required to avoid potentially significant impacts. Measures that could be implemented to limit potential impacts are stated in the attached EA, this Finding of No Significant Impact, and all applicable attachments.

DECISION: I conclude that the proposed decision of the Air Force to provide a fireworks display under the Proposed Action will not have a significant direct, indirect, or cumulative impact upon the human or natural environment.

JEREMY T. SLOANE
Colonel, USAF
Vice Commander, 56th Fighter Wing

21 Apr 15
DATE

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COVER SHEET

Responsible Agency: 56th Fighter Wing, Luke Air Force Base (AFB), Arizona (AZ).

Proposed Action: Fireworks Display and Cleanup for the Luke AFB, AZ, Fourth of July Celebrations

Point of Contact: Charles Rothrock, 56 CES/CEIE, 13970 Gillespie Drive, Luke AFB, AZ 85309-1149; (623) 856-3832.

Report Designation: Final Environmental Assessment (EA)

Abstract: Luke AFB is preparing an Environmental Assessment (EA) addressing potential environmental impacts from a Fireworks Display and Cleanup (Proposed Action). This display serves as a finale for the Fourth of July celebrations called Freedom Fest which are held by the installation. The purpose of the action is to continue to provide a finale to the Freedom Fest which draws over 2,000 spectators comprised of Airmen and their families.

Under the Proposed Action, a pyrotechnics contractor (contractor) for Luke AFB would set up all equipment required for the fireworks display at the proposed launch site located on private land adjacent to Luke AFB. On July 4th, the fireworks display would begin at sunset and last for approximately 20 minutes. The contractor would remain at the launch site throughout the night to sweep the area for duds and remove all associated equipment and debris. Locating the launch site on private property is needed to provide a safe location from which to launch fireworks where there are limited flammable hazards within proximity of the public viewing venue at Fowler Park on Luke AFB.

The following resources were identified for study in this EA: land use, air quality, biological resources, earth resources, water resources, hazardous materials and wastes, infrastructure and utilities, and safety.

PRIVACY ADVISORY

Letters or other public comment documents provided may be published in the Final EA. Information provided will be used to improve the analysis of issues identified in the Draft EA. Comments will be addressed in the Final EA and made available to the public. However, only the name of the individual and specific comment will be disclosed.

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ACRONYMS AND ABBREVIATIONS

ACM	asbestos containing material
ADEQ	Arizona Department of Environmental Quality
AETC	Air Education and Training Command
AFB	Air Force Base
AFI	Air Force Instruction
AFMAN	Air Force Manual
AFPD	Air Force Policy Directive
AGL	above ground level
AOC	Area of Concern
APE	Area of Potential Effect
APS	Arizona Public Service
ARPA	Archaeological Resources Protection Act
A.R.S.	Arizona Revised Statutes
AQCR	Air Quality Control Region
AZGFD	Arizona Game and Fish Department
AZPDES	Arizona Pollutant Discharge Elimination System
bgs	below ground surface
BMPs	best management practices
CAAA	Clean Air Act Amendments
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CES	Civil Engineer Squadron
CFR	Code of Federal Regulations
CH_4	Methane
CO	carbon monoxide
CO_2	Carbon dioxide
CO_{2e}	CO2 equivalent
COC	Community of Comparison
CWA	Clean Water Act
dB	decibels
DoD	Department of Defense
DOT	Department of Transportation
EA	Environmental Assessment
EIAP	Environmental Impact Analysis Process
EO	Executive Order
ERP	Environmental Restoration Program
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FSS	Force Support Squadron
FW	Fighter Wing
HFC	Hydroflourocarbons
GHG	Greenhouse Gas
GWP	Global Warming Potential
IICEP	Intergovernmental and Interagency Coordination for Environmental Planning

ACRONYMS AND ABBREVIATIONS (CONT.)

ILDA	International Laser Display Association
INRMP	Integrated Natural Resources Management Plan
MDEP	Massachusetts Department of Environmental Protection
MBTA	Migratory Bird Treaty Act
MFU	middle fine-grained unit
MS4	Municipal Separate Storm Sewer System
MSA	Munitions Storage Area
MSDS	material safety data sheet
N_2O	nitrous oxide
NAA	non-attainment area
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NFPA	National Fire Protection Association
NHPA	National Historic Preservation Act
NPDES	National Pollutant Discharge Elimination System
NO_2	nitrogen dioxide
NOx	nitrogen oxides
NRCS	Natural Resource Conservation Service
O_3	ozone
OSHA	Occupational Safety and Health Administration
Pb	lead
$PM_{2.5}$	particulate matter equal or less than 2.5 micrometers in diameter
PM_{10}	particulate matter equal or less than 10 micrometers in diameter
POTW	Publicly Owned Treatment Works
PPE	personal protective equipment
PFC	perfluorocarbon
ppm	parts per million
RCRA	Resource Conservation and Recovery Act
ROI	Region of Influence
SARA	Superfund Amendments and Reauthorization Act
SDS	State Disposal System
SF_6	sulfur hexafluoride
SIP	State Implementation Plan
SO_2	sulfur dioxide
SOx	sulfur oxides
tpy	tons per year
$\mu g/m^3$	micrograms per cubic meter
UAU	Upper Alluvial Unit
UMD	University of Massachusetts, Dartmouth
U.S.	United States
USACE	United States Army Corps of Engineers
USAF	United States Air Force
USC	United States Code
USCB	United States Census Bureau

ACRONYMS AND ABBREVIATIONS (CONT.)

USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
VOC	volatile organic compound
WWTP	Waste Water Treatment Plant
WRAP	Western Regional Air Partnership
WSCA	Wildlife Species of Concern in Arizona

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CHAPTER 1: PURPOSE OF AND NEED FOR ACTION

This chapter has six parts: a statement of the purpose of and need for action; a description of the location of the proposed and alternative actions; 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.

1.1 PURPOSE OF AND NEED FOR ACTION

The purpose of the aciton is to continue to provide a finale to the Freedom Fest, which draws over 2,000 spectators comprised of Airmen and their families. Each year, the 56th Force Support Squadron (FSS) at Luke Air Force Base (AFB), Arizona (AZ) hosts the Freedom Fest Independence Day Celebration at Fowler Park, which typically includes a fireworks display as the finale. Prior to 2012, the fireworks display launch site was located on the base. Fallout from the 2011 fireworks display resulted in a fire at the tent structure over the dog kennels and another location had to be identified as the launch site. No suitable locations for the display on the base could be identified. Locating the launch site on private property is needed to provide a safe location from which to launch fireworks where there are limited flammable hazards within proximity of the public viewing venue at Fowler Park on Luke AFB. Therefore, private property immediately adjacent to Luke AFB was identified as the proposed fireworks display launch site.

1.2 LOCATION OF THE PROPOSED AND ALTERNATIVE ACTIONS

Luke AFB is located in Maricopa County, approximately 20 miles northwest of downtown Phoenix (Figure 1-1). The base is a fully operational military installation that includes 3,054 acres owned by Luke AFB (Figure 1-2).

The proposed fireworks launch site is located immediately adjacent to the north of the eastern-most portion of the base; west of Dysart Road and south of Northern Parkway (Figure 1-3). Under the Alternative Action, Luke AFB would conduct a laser light show at Fowler Park (Figure 1-3).

1.3 DECISION TO BE MADE

The analysis in this Environmental Assessment (EA) evaluates the potential environmental consequences of the proposed and alternative actions. Based on this information, the Air Force would determine whether to implement the Proposed Action, Alternative Action, or take no action (No Action Alternative). As required by the National Environmental Policy Act (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 of the potential environmental impacts of selecting the Proposed Action, Alternative Action, or the No Action Alternative.

1.4 SCOPE OF THE ENVIRONMENTAL REVIEW

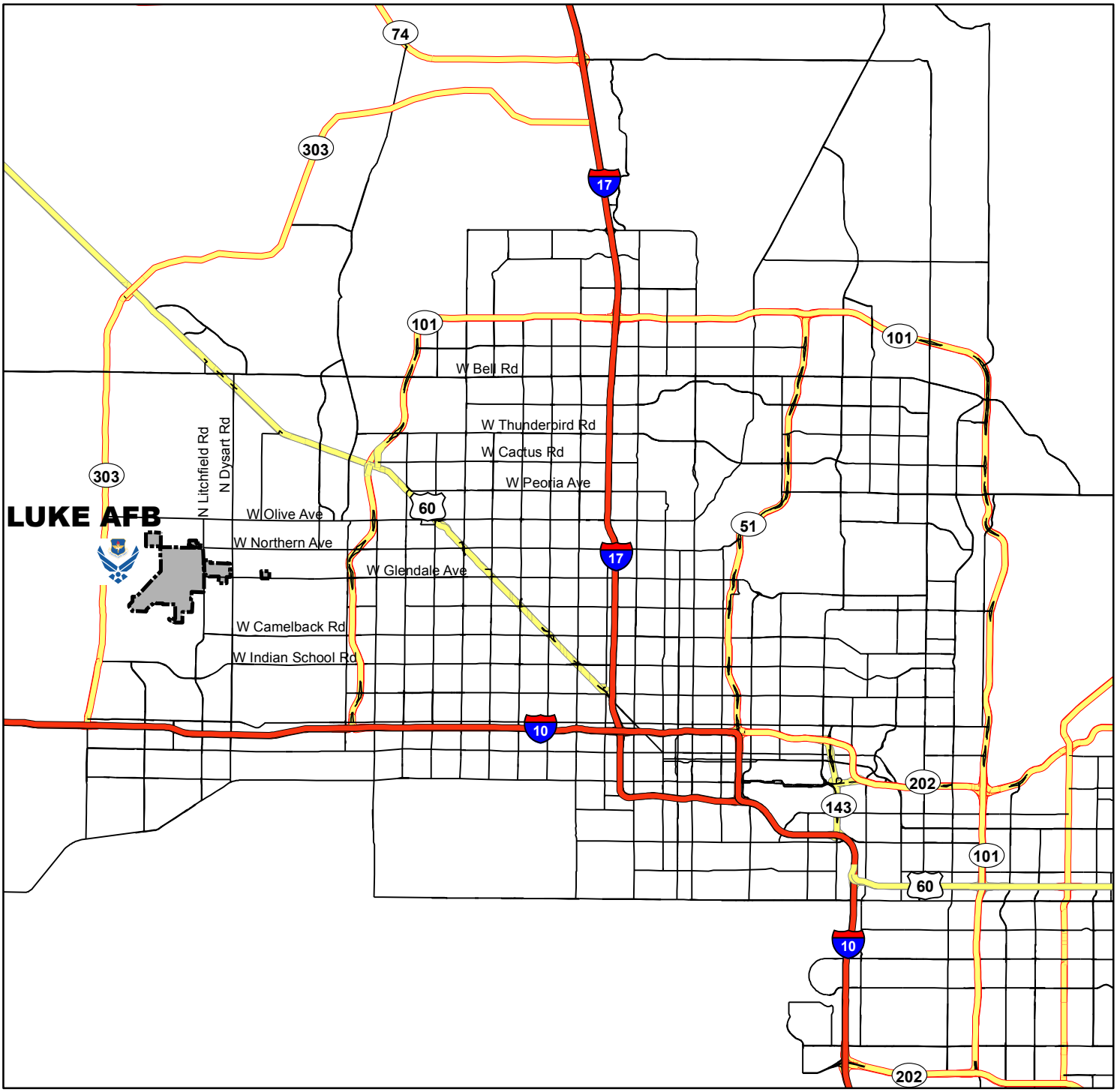
The 1969 NEPA, as amended, requires federal agencies to consider environmental consequences in their decision-making process. The President's Council on Environmental Quality (CEQ) has issued regulations to implement NEPA that include provisions for both the content and procedural

aspects of the required environmental impact analysis. The Air Force Environmental Impact Analysis Process (EIAP) is accomplished through adherence to the procedures set forth in CEQ regulations (40 Code of Federal Regulations [CFR] Sections 1500-1508) and 32 CFR 989 (*Environmental Impact Analysis Process*), 15 July 1999, and amended 28 March 2001. These federal regulations establish both the administrative process and substantive scope of the environmental impact evaluation designed to ensure that deciding authorities have a proper understanding of the potential environmental consequences of a contemplated course of action.

This EA identifies, describes, and evaluates the potential environmental impacts that are associated with the proposed fireworks display on Luke AFB, taking into consideration possible cumulative impacts from other actions. The potential environmental effects of taking no action are also described. 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.

Executive Order (EO) 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, was issued by the President on 11 February 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.'" This EA will determine if the proposed or alternative actions would result in adverse effects to low-income or minority populations.

The Air Force has announced other independent actions for Luke AFB concurrent with the proposed or alternative actions. The environmental impacts of these other actions, in most cases, have been or will be analyzed in separate NEPA documents, as appropriate. In addition, other actions are planned for the surrounding community (see Section 2.6). Through Intergovernmental and Interagency Coordination for Environmental Planning (IICEP), requests have been made for information on these and other planned actions in the surrounding community. This EA addresses the environmental impacts of these other actions only in the context of potential cumulative impacts, if any. 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."



Legend

- Interstate
- US Route
- State Route
- Local Roads
- Luke Air Force Base

Figure 1-1
Regional Location Map
Environmental Assessment, Fireworks Display
Luke Air Force Base, Maricopa County, AZ

0 5 10

Approximate scale in miles

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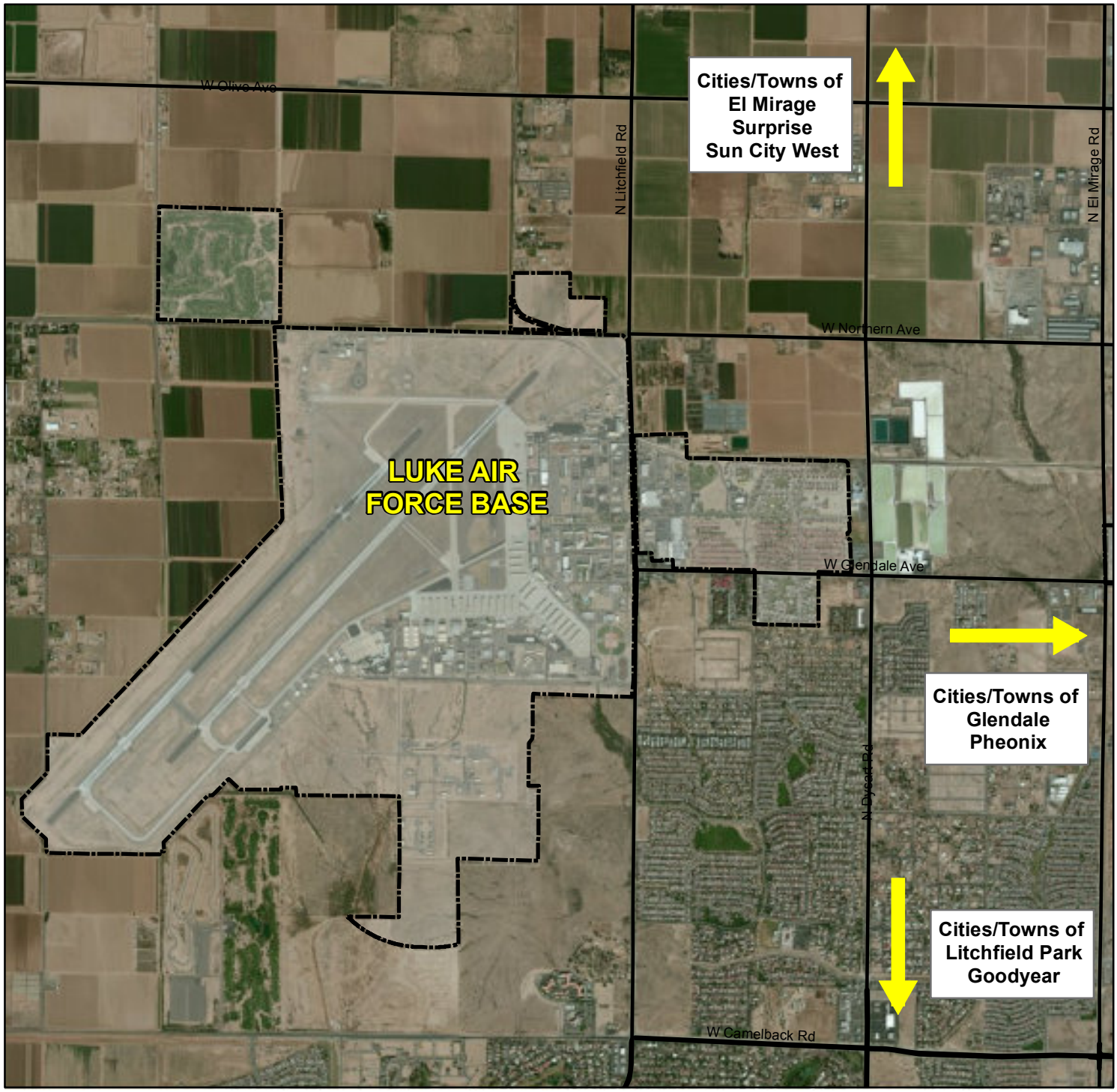

Legend

Local Road

Luke Air Force Base

Figure 1-2
Site Vicinity Map
Environmental Assessment, Fireworks Display
Luke Air Force Base, Maricopa County, AZ

0 3,250 6,500

Approximate scale in feet

N

Aerial Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
Date: 11/2010
Coordinates: UTM NAD83 12N

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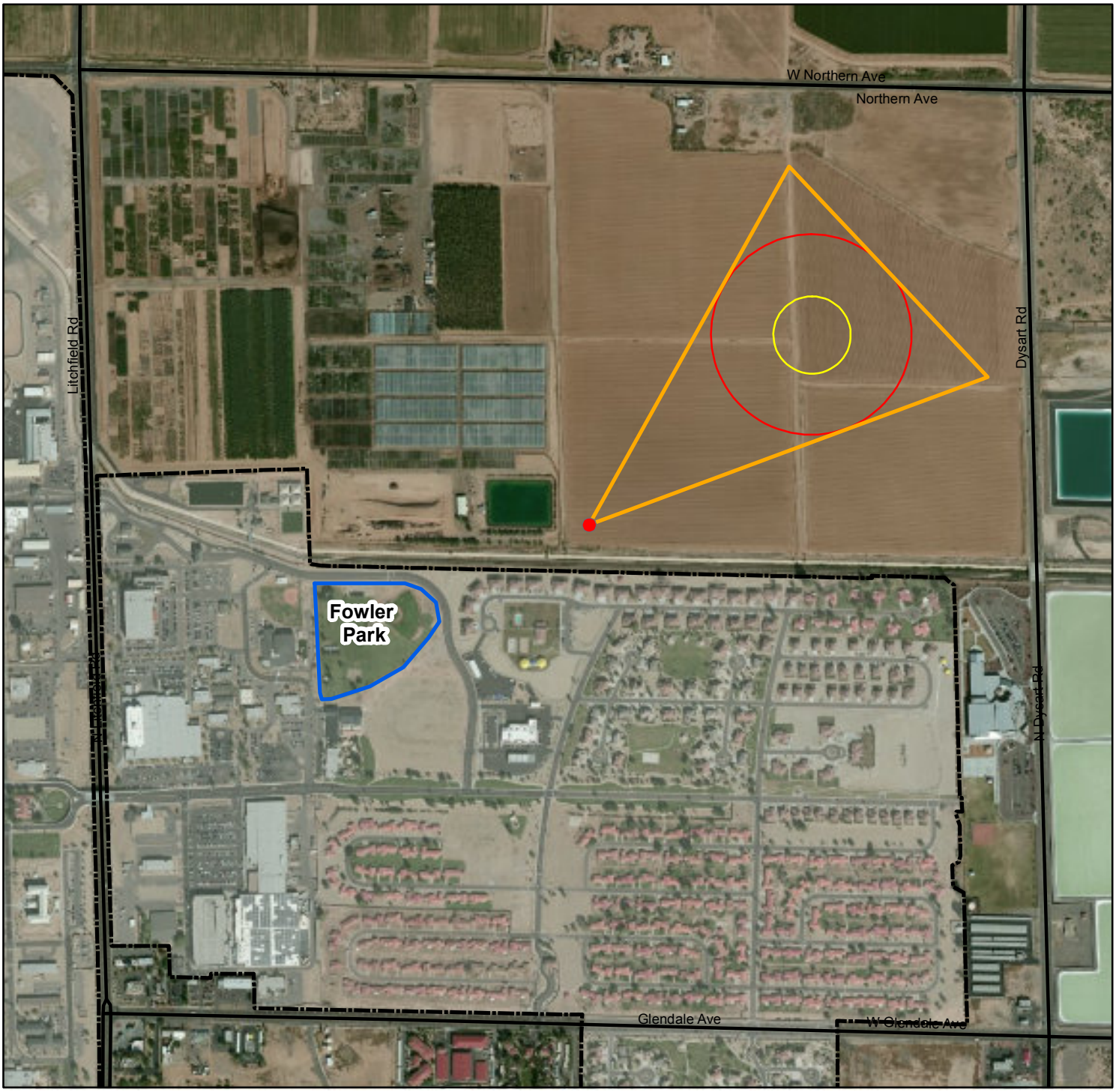

Legend

- Local Road
- Alternative Action
- Proposed Action
- Display Site
- Fallout Zone
- Firing Point
- Luke Air Force Base

Aerial Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
Date: 11/2010
Coordinates: UTM NAD83 12N

Figure 1-3
Location of Proposed and Alternative Actions
Environmental Assessment, Fireworks Display
Luke Air Force Base, Maricopa County, AZ

0 800 1,600
Approximate scale in feet

N

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1.4.1 Resource Areas Addressed in Detail

Resource areas that could be affected by the proposed or alternative actions have been selected to allow for a comprehensive analysis of potential impacts. The following resource areas are discussed in detail in the EA:

- Land Use
- Air Quality
- Biological Resources
- Earth Resources
- Water Resources
  - Surface Water
  - Groundwater
  - Floodplains
  - Wetlands
- Hazardous Materials and Wastes
- Infrastructure and Utilities
  - Solid Waste
  - Electricity
- Safety

1.4.2 Resource Topics Eliminated from Detailed Analysis

Some resources would not be affected by the proposed or alternative actions. Resources that have been eliminated from further study in this document and the rationale for eliminating them are presented below.

- Cultural Resources. The proposed project areas are previously disturbed (i.e., agricultural field and park) and it is unlikely that any cultural resources exist at the proposed project sites. In addition, no intrusive activities will occur under the Proposed Action or Alternative. Therefore, no impacts to cultural resources would be anticipated under the proposed and alternative actions and cultural resources were not considered for detailed analysis.

  Section 106 of the National Historic Presevation Act (NHPA) requires that federal agencies consider the impact of a proposed action on cultural resources. Since the land has been disturbed for forty years, and no intrusive activities will be conducted, Luke AFB recommended a finding of "No Historic Properties Affected" in consultation with the State Historic Preservation Office (SHPO) and 16 Native American groups. The SHPO replied and concurred. Five Native American groups responded that they concurred. No groups responded

with a non-concurrence. The groups consulted are listed in Section 6 of this document and copies of correspondences are included in Appendix A.

- Noise. The Proposed Action would result in short-term, temporary noise impacts occurring in "bursts" over the course of 20 minutes on each July 4th. Noise levels associated with fireworks have been recorded with a peak of 136.9 decibels (dB) at the source (Tingay 2011). According to an EA prepared by Eglin AFB, the Monterey Bay National Marine Sanctuary and United States Fish and Wildlife Service (USFWS) monitored the decibel level of a July 4 City of Monterey fireworks display using a hand-held decibel meter located approximately one-half mile from the fireworks launch site. The highest sound pressure level reading observed on the decibel meter during the fireworks display was 82 dB (Eglin AFB 2008).

  One of the key factors of impacts to humans related to the noise level of fireworks is the distance of the individual from the "burst" or noise-creating explosion associated with fireworks. Using the above example to calculate sound pressure level at various distances (using 140 dB as a the peak noise level and 82 dB at one-half mile as inputs), an individual would need to be approximately 40 feet from the explosion to limit single event exposure to less than 120 dB, or the recommended limit of exposure for children according to the World Health Organization (Wittrock 2014). Under the Proposed Action, on-base residents in the neighborhood, immediately south of the fireworks display would be over 1,300 feet away from the noise generated by the explosion. At this distance, the sound pressure level would be approximately 88 dB. Spectators viewing the fireworks in Fowler Park would be approximately 2,952 feet away from the explosion and would be anticipated to be exposed to a sound pressure level of approximately 81 dB.

  Other than Fowler Park, the other sensitive receptor within proximity of the proposed fireworks display would be Luke Elementary which is 1,706 feet away from the anticipated point of the burst. As the Proposed Action would occur at sunset, outside of normal hours of operation, this receptor would not be affected by noise from the fireworks display.

  Based on the information presented above, no adverse impacts to human receptors related to noise would be anticipated under the Proposed Action. Discussion on noise related to wildlife and potential impacts are discussed in Section 4.3.3.2.

- Asbestos and Lead Based Paint. Within the location of the Proposed Action, asbestos is not present aboveground or belowground locations due to the absence of aboveground structures or underlying utilities or buried structures. The existing structures at Fowler Park are not anticipated to contain asbestos containing material (ACM) as they were all constructed after 1980. ACM could be present in belowground utilities underlying the park, where present. However, no intrusive activities would be conducted during implementation of the Alternative Action; therefore, no impacts related to ACM would be anticipated under the Alternative Action and asbestos was not considered for detailed analysis.

  Within the location of the Proposed Action, there are no structures or painted surfaces. The existing structures at Fowler Park are not anticipated to contain lead-based paint as they were all constructed after 1980. Therefore, no impacts related to lead based paint would be anticipated under the proposed or alternative actions and lead based paint was not considered for detailed analysis.

- Wetlands. Wetlands are protected from development under EO 11990, *Protection of Wetlands*. Guidance from the EO requires federally funded activities associated with wetlands to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the natural beneficial values of wetlands. A site must display evidence of all three wetland indicators: hydric soils, hydrophytic vegetation, and hydrology to be considered a wetland, or, in the case of a problem area, such as arid regions, hydric soil indicators are considered a constant factor during the drier times of the growing season (USAF 2006b).

  No wetlands have been identified at Luke AFB or the proposed fireworks display location, and therefore, no wetlands are present in the proposed project areas and were not considered for detailed analysis.

- Floodplains. EO 11988, Floodplain Management, requires that federal agencies provide leadership and take action to reduce the risk of flood loss; minimize the impacts of floods on human safety, health, and welfare; and restore and preserve the natural and beneficial values of floodplains when acquiring, managing, or disposing of federal lands. The Federal Emergency Management Agency (FEMA) designated that a large majority of Luke AFB is located within a 100-year floodplain. However, the 100-year floodplain does not occur within the footprint of either the proposed or alternative actions (see Figure 3-2).

- Visual Resources. The proposed and alternative actions are, by design, intended to be viewed from areas on the base. The fireworks or laser light show displays would be expected to have a positive impact for spectators enjoying the Freedom Fest Independence Day Celebration and would be short-term and temporary. No impacts to visual resources would be anticipated under the proposed and alternative actions. Therefore, the effects on visual resources were not considered for detailed analysis.

- Socioeconomics and Environmental Justice. In order to determine if minority and low-income populations would be disproportionately impacted by the proposed or alternative actions, two areas of comparison must first be determined:

  - The area potentially affected by the action (i.e., Region of Influence [ROI]); and
  - The larger regional community that includes the affected area and serves as a Community of Comparison (COC).

  For this analysis, City of Glendale is considered the ROI, and Maricopa County is considered the COC. Table 1-1 shows the percent minority and low-income populations for the ROI and COC.

Table 1-1 Percent Minority and Low-Income Populations

Demographic Area	Total Population	Total Hispanic/ Latino Population	Percent Hispanic/ Latino	Total Minority Race Population	Percent Minority Race	All Income Levels [b]	Total Low-Income Population	Percent Low Income
Glendale City	218,812	54,343	24.8	45,935	**21.0**	110,824	25,688	23.2
Maricopa County	3,072,149	763,341	24.8	606,321	19.7	1,504,252	355,668	23.6
State of Arizona	5,130,632	1,295,617	25.3	1,110,495	21.6	2,387,139	698,669	29.3
United States	281,421,906	35,305,818	12.5	63,135,052	22.4	138,820,935	33,899,812	24.4

Source: United States Census Bureau (USCB) 2010a-2010d
Notes:
[a] Minority Race includes Black or African American; American Indian and Alaska Native; Asian; Native Hawaiian and Other Pacific Islander; and some other race.
[b] All income levels includes everyone except those in institutions, military group quarters, and college dormitories, and unrelated individuals under 15 years old.

- At least one criteria listed below must be met to determine if an environmental justice population is present:
  - If the affected area's percentage of minority or low-income population is greater than that of the general population, the affected area is considered to be a minority or low-income population.
  - If the minority population (including Hispanics or Latinos) or low-income population is greater than 50 percent, it is considered a majority-minority or majority low-income population.
- Based on the criteria above, there is a minority population present within the area that could potentially be impacted by the fireworks display (i.e., Glendale City). However, all of the impacts associated with the proposed and alternative actions would be localized, both spatially and temporally, to the vicinity of the proposed project site and would not be expected to create disproportionate and adverse impacts to the minority population. Therefore, no impacts to socioeconomics or environmental justice would be anticipated under the proposed and alternative actions and no further socioeconomic or environmental justice analysis is warranted.

1.5 APPLICABLE REGULATORY REQUIREMENTS

This EA is part of the EIAP for the proposed project as set forth in 32 CFR 989, 15 July 1999, and amended 28 March 2001; CEQ regulations; Department of Defense (DoD) Directive 6050.1 (*Environmental Effect in the United States of DoD Actions, July 30, 1979*); as well as DoD 4715.9 (*Environmental Planning and Analysis*).

NEPA, as amended, requires federal agencies to consider, as part of the decision-making process, the environmental consequences of their proposed and alternative actions. The Air Force considers in its decision the potential environmental impacts identified during the EIAP. The following paragraphs describe the laws and regulations that apply, or may apply, to the proposed and alternative actions.

1.5.1 Interagency and Intergovernmental Coordination

Federal, state, and local agencies with jurisdiction that could be affected by the proposed or alternative actions have been notified and consulted. A complete listing of the agencies and tribes consulted may be found in Chapter 6, and IICEP letters and responses are presented in Appendix A. This coordination fulfills the Interagency Coordination Act, which require federal agencies to cooperate with and consider state and local views in implementing a federal proposal.

1.5.2 Public Involvement

The public in the vicinity of Luke AFB that could be affected by the proposed or alternative actions have been notified and consulted. A public notice was published in the Arizona Republic on 8 February 2015 and copies of the Draft EA were maintained at three local libraries for a minimum of 30 days.

The public comment period began following publication of the public notice advertisement and ended on 10 March 2015; no comments were received. The public notice, as published, and the Affidavit of Publication are included in Appendix B.

1.5.3 Permits

Because the location of the Proposed Action falls in unincorporated Maricopa County, rather than the City of Glendale, no permit is required from City of Glendale. It would be the pyrotechnic contractor's responsibility to submit a courtesy "request for permit" to Rural Metro Fire Department which has jurisdiction over the area.

The location of the laser display at Fowler Park, on Luke AFB, is within the permitting jurisdiction of the City of Glendale. Therefore, Luke AFB would have to coordinate with City of Glendale to determine if the City would require a permit application be completed.

Further, Maricopa County does not require a burn permit for fireworks displays; this is an exception from the usual requirement of obtaining a burn permit for outdoor open fires. In accordance with Maricopa County Air Pollution Control Regulations, Rule 314, Section 303.1.d., a permit is not required for the "display of fireworks for recreational purposes or pyrotechnics for musical or cinematic/theatrical functions."

1.5.4 Other Regulatory Requirements

The EA considers all applicable laws and regulations, including but not limited to the following:

- Clean Air Act (42 United States Code [USC] 7401 et seq.);
- AFI 32-7040, Air Quality Compliance;
- EO 11990, Protection of Wetlands; EO 11988, Floodplain Management;
- Clean Water Act (CWA) (33 USC 1251 et seq.);
- Endangered Species Act (ESA) (16 USC 1531-1542);

- Migratory Bird Treaty Act of 1918 (16 USC 703-712; Ch. 128; July 13, 1918; 40 Stat. 755);
- Pollution Prevention Act of 1990 (42 USC 13101 and 13102 et seq.);
- Archaeological Resources Protection Act;
- NHPA of 1966;
- Native American Graves Protection and Repatriation Act of 1991 (25 USC 3001 et seq.);
- EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations;
- National Fire Protection Association (NFPA), NFPA 1123, Code for Fireworks Display.

1.6 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, the location of the proposed and alternative actions, 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 document.

Chapter 2 Describes the history of the formulation of alternatives, identifies alternatives eliminated from further consideration, provides a detailed description of the Proposed Action, describes the other action alternative, describes the No Action Alternative, summarizes other actions announced for Luke AFB and the surrounding community, provides a comparison matrix of environmental effects for all alternatives, identifies the preferred alternative, and describes measures to reduce potential impacts.

Chapter 3 Contains a general description of the current conditions of the resources that could be affected by the proposed or alternative actions.

Chapter 4 Provides an analysis of the environmental consequences of the proposed and alternative actions.

Chapter 5 Lists preparers of this document.

Chapter 6 Lists persons and agencies consulted in the preparation of this EA.

Chapter 7 Lists source documents relevant to the preparation of this EA.

CHAPTER 2: DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

This chapter has nine parts: a brief history of the formulation of alternatives, identification of alternatives eliminated from further consideration, a description of the Proposed Action, a description of the other action alternative, a description of the No Action Alternative, identification of other proposed actions planned for Luke AFB and the surrounding community, a summary of environmental impacts of all alternatives, identification of the preferred alternative, and a table of proposed best management practices (BMPs) that could be implemented to minimize potential impacts.

2.1 HISTORY OF THE FORMULATION OF ALTERNATIVES

The Freedom Fest Independence Day Celebration at Fowler Park, sponsored by the 56th FSS typically includes a fireworks display as the finale. Prior to 2012, the fireworks display launch site was located on the base but fallout from the 2011 fireworks display resulted in a fire at the tent structure over the dog kennels and an alternate location had to be identified as the launch site.

Two criteria were developed during the formulation of alternatives. These criteria are as follows:

- Provide a spectator event to conclude the Freedom Fest Independence Day Celebration.
- Conduct the finale event in a manner that provides a safe location from which to launch fireworks where there are limited flammable hazards within proximity of the public viewing venue at Fowler Park.

2.2 ALTERNATIVES ELIMINATED FROM FURTHUR CONSIDERATION

In preparation for the development of this EA, several alternative locations were considered but eliminated from further consideration.

The Falcon Dunes Golf Course was considered as an alternate location for the fireworks display. The golf course is not within close enough proximity to Fowler Park for spectators to remain at the festival grounds to view the display.

As with the golf course location, all other on-base alternative locations identified that could safely accommodate a fireworks launch site and fallout zone were not within close enough proximity to Fowler Park to allow for spectator viewing of the display.

2.3 DETAILED DESCRIPTION OF THE PROPOSED ACTION

The proposed fireworks display would occur at the conclusion of the Freedom Fest Independence Day Celebration and would be located on private property north of Fowler Park (the location of Freedom Fest) (Figure 1-3). This location was selected to provide a safe location from which to launch fireworks where there are limited flammable hazards within proximity of the public viewing venue. Under the Proposed Action, a pyrotechnic contractor (Contractor) for Luke AFB would set up all equipment required for the fireworks display, conduct the fireworks display, sweep the area for duds, and conduct cleanup activities.

Within three days prior to the scheduled event, equipment setup without explosives would begin. Equipment would be unloaded at the launch site by the Contractor. The day of the event, trucks containing explosives for the fireworks display would arrive at the launch site. Setup would be complete by nightfall. On July 4th, Contractor staff would wire the show. The fireworks display would begin at a predetermined time, usually upon sunset, and would last for 20 minutes.

The pyrotechnics used in the display would consist of an assortment of different types of shells such as fireworks shells that produce singular or multiple colors (referred to herein as "Chinese Fancy's"), fireworks shells that change colors and/or create patterns (referred to herein as "Specials"), and fireworks shells that produce only white light and a "burst" of sound (referred to herein as "Titanium Salutes"). An example of the amount and types of fireworks that would be used for the fireworks display is provided in Table 2-1.

Table 2-1 Example Shot Count for Proposed Fireworks Display

Shell Size (inches)	Main Body	Finale	Total
3	30 - Chinese Fancy's and Specials with Titanium Salutes		30
5	35 – Chinese Fancy's and Specials		35
6	18 – Chinese Fancy's and Specials		18
3	180 - Chinese Fancy's and Specials		180
4	72 - Chinese Fancy's and Specials		72
4	36 – Designer Specials		36
8	2 - Chinese Fancy's and Specials		2
3		35 - Shells	35
4		20 – Shells	20
5		3 – Shells	3
3		14 – Titanium Salutes	14
Total Shot Count			445

Specific information describing the pyrotechnic ingredients would be provided on Material Safety Data Sheets (MSDS) specific to the fireworks used. Generally, fireworks consist of six ingredients: fuel, oxidizing agents, reducing agents, regulators, binders and coloring agents. Charcoal or thermite is typically used as the fuel; oxidizers can be nitrates, chlorates or perchlorates; reducing agents can be sulfur and charcoal; metals can be added to regulate the speed of reaction; starch is typically used as a binder; and metals such as strontium, copper, aluminum, barium, sodium, calcium, and cadmium can be added to produce the firework colors.

During the fireworks display, spectators would assemble on Luke AFB in Fowler Park, where the full day of Freedom Fest activities occur. Spectators associated with Freedom Fest would not be assembling in the vicinity of the proposed launch site. The vicinity of the proposed launch site is not easily accessible by foot traffic but could be accessed by vehicles via dirt roads. Security and fire prevention services will be provided at Fowler Park by Luke AFB Fire Emergency Services and the 56th Security Forces. Off-base security would be provided by the Maricopa County Sheriff's Department. The 56th Security Forces and the Maricopa County Sheriff's Department would work together to ensure no unauthorized access to the proposed launch site and display area. Luke AFB Fire Emergency Services would respond to any fires either on- or off-base resulting from the proposed fireworks display through a Mutual Aid Agreement with the City of Glendale.

Immediately following the fireworks display, the Contractor would sweep the entire area within the fallout zone (depicted in Figure 1-3) and perimeter for duds and any other debris or trash associated with the fireworks display and remove all weather sensitive equipment, such as electric firing boards, electric cable, and junction boxes.

2.4 DESCRIPTION OF OTHER ACTION ALTERNATIVE

Under the alternative action, Luke AFB would conduct a laser light show at Fowler Park at the conclusion of the Freedom Fest celebration (Figure 1-3). The laser light show would consist of projected multi-colored laser beams shot into the sky above the park. The show would be projected from the stage that is erected at Fowler Park as the venue for live music that occurs as part of the Freedom Fest celebration. The show would be powered from a standard wall outlet (e.g., 110 volts in the U.S.), and would be air-cooled by a standard fan.

The laser contractor would be required to certify both their equipment (the laser and projector) and the actual laser show (where the audience is in relation to the lasers, how the equipment is used, etc.) to demonstrate compliance with the Center for Devices and Regulatory Health, a division of the Food and Drug Administration (FDA). The laser show would be laid out such that beams are kept 10 feet above where the audience can stand and 8 feet laterally from where the audience could reach out. In the U.S., audiences cannot normally be exposed to direct or reflected laser light.

2.5 DESCRIPTION OF THE NO ACTION ALTERNATIVE

Under the No Action Alternative, there would be no fireworks display or laser light show during the Luke AFB Fourth of July celebrations.

2.6 OTHER ACTIONS ANNOUNCED FOR LUKE AFB AND SURROUNDING COMMUNITY

This EA also considers the effects of cumulative impacts (40 CFR 1508.7) and concurrent actions (40 CFR 1508.25[1]), if any are applicable to the proposed or alternative actions. A cumulative impact, as defined by the CEQ (40 CFR 1508.7), is the "impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of which agency (federal or non-federal) or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time." Other actions announced for the vicinity that could occur during the same time period as the proposed or alternative actions include:

- In 2014, 28 Fourth of July celebrations were conducted in Maricopa County. For the sake of cumulative impacts analysis, it is assumed that a similar number of events would be hosted annually and that each would generally include a fireworks display. The locations (and approximate distance from the Proposed and Alternative Actions) are listed in Table 2-2.

Table 2-2 Locations of Fourth of July Celebrations in Maricopa County (2014)

Location	Distance (miles)	Location	Distance (miles)
Loop 101 and Glendale Avenue Glendale, Arizona	6	6101 North 83rd Avenue Peoria, Arizona	7

Location	Distance (miles)	Location	Distance (miles)
15850 North Bullard Avenue Surprise, Arizona	6	3600 North 51st Avenue Phoenix, Arizona	13
8601 West Van Buren Street Tolleson, Arizona	13	Third Street and Indian School Road Phoenix, Arizona	17
2603 North 43rd Avenue Glendale, Arizona	17	3000 South Apache Road Buckeye, Arizona	22
8708 West Harbor Boulevard Peoria, Arizona	26	Mill Avenue and Rio Salado Parkway Tempe, Arizona	27
7555 North Pima Road Scottsdale, Arizona	28	455 North Galvin Parkway Phoenix, Arizona	29
7575 East Princess Drive Scottsdale, Arizona	32	7333 East Indian Plaza Scottsdale, Arizona	33
41730 North Gavilan Peak Parkway Anthem, Arizona	33	16601 North Pima Road Scottsdale, Arizona	35
12432 South 48th Street Phoenix, Arizona	36	37622 North Cave Creek Road Cave Creek, Arizona	36
12925 North Saguaro Boulevard Fountain Hills, Arizona	38	520 East Brown Road Mesa, Arizona	38
263 North Center Street Mesa, Arizona	38	5700 West North Loop Road Gila River Reservation, Arizona	40
5594 West Wild Horse Pass Boulevard Gila River Reservation, Arizona	42	2250 South McQueen Road Chandler, Arizona	47
965 E. Germann Road Gilbert, Arizona	50	2525 South Ironwood Drive Apache Junction, Arizona	55
24810 South Rittenhouse Road Queen Creek, Arizona	63	16802 N.E. Highway 88 Tortilla Flat, Arizona	69

- Construction on Northern Parkway;
- Several renovation projects throughout the base;
- Repairs to various infrastructure features throughout the base;
- Paving operations throughout the base;
- Several large construction project related to the F-35 Program; and
- Construction of a 30-Unit Temporary Living Facility adjacent to Fowler Park.

The actions identified above are addressed from a cumulative perspective in this EA. The impacts of past actions are included in the baseline and, thus, considered in this EA.

2.7 COMPARISON OF ENVIRONMENTAL EFFECTS OF ALL ALTERATIVES

Table 2-3 summarizes the impacts of the Proposed Action, Alternative Action, and the No Action Alternative.

2.8 IDENTIFICATION OF THE PREFERRED ALTERNATIVE

The preferred alternative is the Proposed Action.

2.9 MEASURES TO REDUCE IMPACTS

Table 2-4 presents BMPs that could be implemented to minimize potential impacts that could be incurred under the Proposed Action, Alternative Action, and the No Action Alternative.

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Table 2-3 Summary of Environmental Impacts

Resource	Proposed Action	Alternative Action	No Action Alternative
Land Use	• Impacts on land use are not anticipated.	• Same as Proposed Action.	• No change from baseline conditions.
Air Quality	• Would result in short-term emissions during the combustion of the pyrotechnic products (fireworks). • Annual emission increases associated with the Proposed Action would be less than the de minimus thresholds for General Conformity applicability. • The fireworks emissions would be a trivial long-term source to regional emissions and would not be expected to contribute to adverse impacts on local air quality. • No long-term impacts.	• No change from baseline conditions.	• No change from baseline conditions.
Biological Resources	• Impacts to vegetation or wildlife are not anticipated.	• Same as the Proposed Action.	• No change from baseline conditions.
Earth Resources	• The potential for contaminants entering the soil as a result of the Proposed Action would be minimized by implementation of operational practices and cleanup measures.	• No change from baseline conditions.	• No change from baseline conditions.
Water Resources	• The potential for contaminants entering a water resource as a result of the Proposed Action would be minimized by implementation of operational practices and cleanup measures.	• No change from baseline conditions.	• No change from baseline conditions.
Hazardous Materials and Wastes	• Contractor would manage hazardous materials and wastes according to installation, local, state, and federal plans and regulations. • Project activities would not occur within nor affect ERP sites or AOCs.	• No change from baseline conditions.	• No change from baseline conditions.
Infrastructure and Utilities	• Impacts to infrastructure and utilities are not anticipated.	• Same as Proposed Action.	• No change from baseline conditions.
Safety	• The potential for increased safety risks would be minimized by adherence to applicable standards and regulations as well as implementation of additional safety measures.	• Same as Proposed Action.	• No change from baseline conditions.

Notes:
AOC = Area of Concern
ERP = Environmental Restoration Program

Table 2-4 Summary of Mitigation Measures or Best Management Practices

Resource	Mitigation Measures or Best Management Practices
Land Use	No mitigation measures or BMPs are necessary.
Air Quality	No mitigation measures or BMPs are necessary.
Biological Resources	No mitigation measures or BMPs are necessary.
Earth Resources	BMPs include launching the fireworks from a tray/base platform to catch all of the duds; and conducting a sweep of the entire fallout area, perimeter, and all other areas where debris is visible or was observed by the Contractor spotters falling to the ground to remove potential residue-containing debris immediately after the fireworks show.
Water Resources	BMPs include launching the fireworks from a tray/base platform to catch all of the duds; and conducting a sweep of the entire fallout area, perimeter, and all other areas where debris is visible or was observed by the Contractor spotters falling to the ground to remove potential residue-containing debris immediately after the fireworks show.
Hazardous Materials and Wastes	Hazardous materials and wastes would be managed according to installation, local, state, and federal plans and regulations.
Infrastructure and Utilities	No mitigation measures or BMPs are necessary.
Safety	The Contractor and any supporting Air Force personnel would conduct all activities associated with the fireworks display in accordance with the relevant sections of NFPA 1123 and AFMAN 91-201; the 56th Security Forces monitoring the perimeter of the launch site and associated fallout zone to prohibit access by unauthorized personnel; Luke Fire Emergency Services personnel, in coordination with the Rural Metro Fire Department personnel, patrolling the area during and after the event to observe and respond to any fires; traffic safety monitoring conducted by 56th Security Forces on base and Maricopa County Sheriff's Department off base; and coordination between 56th FSS, Base Operations, and the Airfield managers to ensure no interference with aircraft operations.

CHAPTER 3: AFFECTED ENVIRONMENT

3.1 INTRODUCTION

This chapter describes the current conditions of the environmental resources, either man-made or natural, that would be affected by implementation of the Proposed Action or alternatives. Section 3.3 focuses on the conditions at Luke AFB and the location of the actions. The baseline conditions presented in this chapter are described to the level of detail necessary to support analysis of potential impacts presented in Chapter 4, Environmental Consequences.

3.2 INSTALLATION LOCATION, HISTORY, AND CURRENT MISSION

Luke AFB is a U.S. Air Force (USAF) education and training base under the Air Education and Training Command (AETC), and headquarters to the 56th FW. Luke AFB's mission is to train the world's greatest F-16 pilots while deploying mission-ready warfighters. Luke AFB is located in Maricopa County, within the city limits of Glendale, Arizona, and 20 miles northwest of downtown Phoenix, Arizona (Figures 1-1 and 1-2) (USAF 2002). Luke AFB includes approximately 3,054 acres.

In 1941, the United States (U.S.) Army established Luke AFB, originally known as Litchfield Park Air Base. During World War II, Luke AFB was the largest fighter training base in the Army Air Force, giving it the nickname of "Home of the Fighter Pilot." Luke AFB was deactivated in 1946 then reactivated in 1951 as part of the Air Training Command under the USAF. Since that time, Luke AFB has continued to train fighter pilots. Currently, units flying at Luke AFB under the 56th FW are the 21st, 61st, 308th, 309th, 310th, and 425th Fighter Squadrons. These units are training pilots and maintaining F-16 C/Ds with the exception of the 61st, which is training F-35A pilots. Luke AFB is transitioning to become the sole pilot training center for the F-35A, the Air Force's newest multi-role aircraft.

Approximately 3,396 active duty military personnel; 731 military reservists; and 1,156 civilian personne are assigned to the Base. The host unit for Luke AFB is also the 56th FW, under AETC's 19th Air Force, which is responsible for providing base-level operations, services, and support. Tenant organizations at Luke AFB are the 944th FW, Detachment 1 Air Combat Command Training Support Squadron, Detachment 9 Air Combat Command Training Support Squadron, Detachment 12 372nd Training Squadron, Detachment 421 Air Force Office of Special Investigations, the Navy Operations Support Center, and the U.S. Marine Corps Bulk Fuel Company C.

3.3 DESCRIPTION OF THE AFFECTED ENVIRONMENT

3.3.1 Land Use

3.3.1.1 Proposed Action

The launch site for the proposed fireworks display is located off-base in unincorporated Maricopa County in an agricultural field, north of a base housing area, south of Northern Parkway, and west of North Dysart Road. The agricultural field encompasses approximately 153 acres of land which

is bound on the south by Luke AFB base housing and to the west by Mountain States Wholesale Nursery. Land to the north and east of the proposed launch site consist of agricultural and industrial uses. The area has been used for agricultural purposes for at least the past 40 years. Currently, the fields are used to plant cover crops in the summer months and potatoes in the winter months. There are no plans for future development or any uses other than agriculture on the property (Gonzalez 2014).

To the east of Luke AFB and the proposed launch site, the City of Glendale contains the diverse land uses expected to be found in a city of approximately 220,000 people (USCB 2010a). The city is a mix of residential units interspersed with some large and many small commercial centers.

3.3.1.2 Alternative Action

Luke AFB encompasses 3,054 acres of base-owned land and an additional 1,788 acres of easements. The Installation Development Plan (USAF 2014) describes the current land use patterns on the installation using the following 11 categories: Administrative; Aircraft Operations and Maintenance; Airfield; Community Commercial; Community Service; Housing Accompanied; Housing Unaccompanied; Industrial; Medical; Open Space; and Outdoor Recreation.

Fowler Park, the location of Freedom Fest, is located on-base, south and west of Lightning Street and east of 137th Avenue. The park includes athletic fields, open space, and restroom facilities. During the Freedom Fest celebration, the 56th FSS sets up a stage within the open space of the park and event staff erect booths and tents for the event's various activities.

Land to the west of Fowler Park is comprised of the Youth Center, Airman and Family Readiness Center, Administration Facilities, Lightning Gate, and North Litchfield Road. The airfield and associated infrastructure is located farther to the west. Land to the east consists of base housing and land to the south is a mix of base commercial and residential areas.

3.3.2 Air Quality

3.3.2.1 Air Quality Standards and Regulations

The United States Environmental Protection Agency (USEPA) has established primary and secondary National Ambient Air Quality Standards (NAAQS) under the Clean Air Act Amendments of 1990 (CAAA). The CAAA also set emission limits for certain air pollutants from specific sources, set new source performance standards based on best demonstrated technologies, and established national emission standards for hazardous air pollutants.

The CAAA specifies two sets of standards – primary and secondary – for each regulated air pollutant. Primary standards define levels of air quality necessary to protect public health, including the health of sensitive populations such as people with asthma, children, and the elderly. Secondary standards define levels of air quality necessary to protect against decreased visibility and damage to animals, crops, vegetation, and buildings. Federal air quality standards are currently established for six pollutants (known as criteria pollutants), including carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), sulfur oxides (SO_x, commonly measured as sulfur

dioxide – SO_2), lead, particulate matter equal to or less than 10 micrometers in aerodynamic diameter (PM_{10}) and particulate matter equal to or less than 2.5 micrometers in aerodynamic diameter ($PM_{2.5}$). Although O_3 is considered a criteria pollutant and is measurable in the atmosphere, it is often not considered as a pollutant when reporting emissions from specific sources, because O_3 is not typically emitted directly from most emissions sources. Ozone is formed in the atmosphere from its precursors – nitrogen oxides (NO_x) and volatile organic compounds (VOCs) – that are directly emitted from various sources. Thus, emissions of NO_x and VOCs are commonly reported instead of O_3.

The NAAQS for the six criteria pollutants are shown in Table 3-1. Units of measure for the standards shown in this table are micrograms per cubic meter of air ($\mu g/m^3$), except for ozone, which is in parts per million (ppm).

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 attainment, non-attainment, or unclassified with regard to the air quality standards for each of the criteria pollutants. "Attainment" describes a condition in which standards for one or more of the six pollutants are being met in an area. The area is considered an attainment area for only those criteria pollutants for which the NAAQS are being met. "Nonattainment" describes a condition in which standards for one or more of the six 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 attainment. An area may have all three classifications for different criteria pollutants.

Table 3-1 National Ambient Air Quality Standards

Pollutant	Standard Value ($\mu g/m^3$)[a]	Standard Type
CO		
1-hr average	40,000	Primary
8-hr average	10,000	Primary
NO_2		
1-hr average	188[b]	Primary and secondary
Annual average	100	
O_3		
8-hr average[c]	0.075	Primary and secondary
Lead		
Rolling		
3 month Average	0.15	Primary
Quarterly average	1.5	
PM_{10}		
24-hr average[d]	150	Primary and secondary
$PM_{2.5}$		
24-hr average[e]	35	Primary
Annual average[f]	12	Primary
SO_2		
3-hr average	1,300	Secondary
1-hr average	196[g]	Primary

CO=carbon monoxide
$\mu g/m^3$=micrograms per cubic meter
NO_2=nitrogen dioxide
O_3=ozone
SO_2=sulfur dioxide
$PM_{2.5}$=particulate matter equal or less than 2.5 micrometers in diameter
PM_{10}= particulate matter equal or less than 10 micrometers in diameter

[a] Units for ozone are ppm.
[b] The 98th Percentile, averaged over 3 years.
[c] To attain the 8-hour ozone 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 0.075 ppm.
[d] The 24-hour standard for PM_{10} is not to be exceeded more than once per year on average over 3 years.
[e] The $PM_{2.5}$ 24-hour standard is based on the 3-year average 98th percentile of 24-hour concentrations at each population-oriented monitor.
[f] The $PM_{2.5}$ annual standard is based on 3-year average of weighted annual mean concentration from single or multiple community monitors.
[g] The 99th percentile of 1-houir daily maximum concentrations, averaged over 3 years.

The CAAA requires federal actions to conform to any applicable state implementation plan (SIP). USEPA has promulgated regulations implementing this requirement (USEPA 2010a and USEPA 2010b). A SIP must be developed to achieve the NAAQS in non-attainment areas (i.e., areas not currently attaining the NAAQS for any pollutant) or to maintain attainment of the NAAQS in maintenance areas (i.e., areas that were non-attainment areas but are currently attaining that NAAQS). General conformity refers to federal actions other than those conducted according to specified transportation plans (which are subject to the Transportation Conformity Rule). Therefore, the General Conformity rule applies only to non-transportation actions in non-attainment or maintenance areas. Such actions must perform a determination of conformity with the SIP if the emissions resulting from the action exceed applicability thresholds specified for each pollutant and classification of non-attainment. Both direct emissions from the action itself and indirect emissions that may occur at a different time or place but are an anticipated consequence of the action must be considered. The Transportation Conformity Rule does not apply to this project.

The applicability thresholds are 100 tons per year (tpy) for criteria pollutants, except for those given in Table 3-2.

Table 3-2 General Conformity Applicability Thresholds

NAAQS Pollutant	Type of Non-attainment or Maintenance Area	Applicability Threshold (tpy)
Ozone	Extreme NAAs	10 tpy VOC or NO_x
	Severe NAAs	25 tpy VOC or NO_x
	Serious NAAs	50 tpy VOC or NO_x
	Marginal or moderate NAAs inside an ozone transport region	50 tpy VOC (100 tpy NO_x)
	Maintenance areas inside an ozone transport region	50 tpy VOC (100 tpy NO_x)
CO	All NAAs	100 tpy
SO_2	All	100 tpy
PM_{10}	Serious NAAs	70 tpy
	Moderate NAAs	100 tpy
	All Maintenance areas	100 tpy
$PM_{2.5}$	All	100 tpy
Lead	All NAAs	25 tpy Pb
	All Maintenance areas	25 tpy Pb

CO = carbon monoxide
NAA = nonattainment area
NO_x = nitrogen oxides
O_3 = ozone
Pb = lead
$PM_{2.5}$ = particulate matter equal to or less than 2.5 micrometers in diameter
PM_{10} = particulate matter equal to or less than 10 micrometers in diameter
SO_2 = sulfur dioxide
tpy = tons per year

3.3.2.2 Existing Conditions

An accurate emissions inventory is needed for assessing the potential contribution of a source or group of sources to regional air quality. An emissions inventory is an estimate of the actual and potential pollutant emissions generated by a source or sources over a period of time, normally a calendar year. The inventory accounts for permitted sources that are required to report annual emissions to Maricopa County Air Quality Department. Maricopa County emissions include emissions from point, area, non-road mobile, and on-road mobile sources. Stationary emission sources at Luke AFB include boilers, generators, surface coating, paint booths, storage tanks, fueling operations, and woodworking operations, among others. Mobile and biogenic emission sources are not included in the emission total for Luke AFB. Table 3-3 compares the 2012 actual emissions for Luke AFB and the 2011 Maricopa County emissions (Maricopa 2014a and 2014b). As shown in Table 3-3, Luke AFB contributes a small amount to the Maricopa County emission totals.

Table 3-3 Luke AFB 2012 Actual Air Emissions and Maricopa County Emissions (tons per year)

	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC
2011 Maricopa County Emissions[a]	387,934	89,872	64,088	14,757	977	154,755
2012 Luke AFB Actual - Stationary Sources[b]	11.6	19.7	4.6	1.5	0.32	7.5
Percent of Regional Emissions	0.007	0.022	0.010	0.033	0.005	0.003

Notes:
[a] Includes emissions from point, area, on-road, non-road mobile sources, and biogenic sources. Source: (Maricopa County Environmental Service Department 2014).
http://www.maricopa.gov/aq/divisions/planning_analysis/emissions_inventory/reports/Default.aspx
[b] Actual emissions are the air pollutant emissions that result from the actual operation and material usage quantities during a 1-year period (i.e., typically a calendar year). For Luke AFB these represent only stationary sources. Source: 2012 Air Permit Information Management System (APIMS) Report.

3.3.2.3 Regional Air Quality

Luke AFB is located within the Maricopa Intrastate AQCR, which consists of the territorial area encompassed by Maricopa County. The Maricopa Intrastate AQCR is classified as marginal non-attainment for O_3, serious nonattainment for PM_{10} and a maintenance area for CO. Therefore, Luke AFB is subject to the General Conformity regulations (40 CFR Parts 6, 51 and 93), which requires a conformity demonstration where the total direct and indirect emissions from the federal action exceeds the corresponding de minimis levels for CO, PM_{10}, NO_x, and VOC.

3.3.2.4 Greenhouse Gases

There are six primary Greenhouse Gases (GHGs) of concern: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). The emissions of each GHG are measured based on their global warming potential (GWP), the universal unit of measurement to express how much a given mass of

greenhouse gas is estimated to contribute to climate change. Table 3-4 lists the GWP (USEPA 2013) of the six primary GHGs.

Table 3-4
Global Warming Potential of GHGs

Gas	Chemical Formula	GWP
Carbon dioxide	CO_2	1
Methane	CH_4	25
Nitrous oxide	N_2O	298
Hydrofluorocarbons	HFCs	various
Perfluorocarbons	PFCs	various
Sulfur hexafluoride	SF_6	22,800

CH_4 = methane
CO_2 = carbon dioxide
GWP = global warming potential
HFCs = hydrofluorocarbons
N_2O = nitrous oxide
PFCs = perfluorocarbons
SF_6 = sulfur hexafluoride

The three GHGs, CO_2, CH_4, and N_2O, represent the majority of CO_{2eq} emitted to the atmosphere from typical stationary sources. The other GHGs are emitted by specific industries: HFCs are most commonly used in refrigeration and air conditioning systems; PFCs and SF_6 are predominantly emitted from various industrial processes including aluminum smelting, semiconductor manufacturing, and magnesium casting.

Direct emissions of CO_2, CH_4 and N_2O occur naturally to the atmosphere but human activities have increased global GHG atmospheric concentrations. The 2012, total U.S. GHG emissions were 6,526,000,000 metric tons of CO_{2eq} (USEPA 2014). U.S. total GHG emissions decreased by 3.4 percent from 2011 to 2012 (USEPA 2014).

Luke AFB is not subject to the annual reporting requirements of CO_{2eq} from stationary source fuel combustion, as required by 40 CFR Part 98 - Mandatory Greenhouse Gas Reporting.

3.3.3 Biological Resources

3.3.3.1 Vegetation

The proposed project locations are situated in the Lower Colorado River Valley Subdivision of the Sonoran Desert (Brown and Lowe 1980). The Lower Colorado River Valley Subdivision is the largest and most arid subdivision of the Sonoran Desert (Turner and Brown 1982). This subdivision typically dominates to broad, intermontane plains of alluvial soils, although it is not restricted to this physical setting. Vegetation is generally open and simple, often with many hundreds of square miles dominated by one or two species of low-growing shrubs. The ground surface between shrubs may be fine-textured soil, or desert pavements consisting of gravel or rock. Plants are drought-resistant with hardened leaves and shortened distances between leaves along the stems to retard transpiration. Creosote bush (*Larrea tridentata)* is the dominant plant species at most localities and typically forms monotonous, uniform growth on the flat intermontane plains broken by different varieties of palo verde and mesquite trees along washes.

3.3.3.1.1 Proposed Action

The Proposed Action would occur entirely within an agricultural field which is fallow at the time of the action and is later planted with a cover crop (Sudangrass, *Sorghum x drummondii)* during the summer months followed by a planting of potatoes in December. The potatoes are harvested in May (Gonzalez 2014).

3.3.3.1.2 Alternative Action

The Alternative Action is located at Fowler Park, a landscaped area consisting of landscape grasses and few ornamental and native trees.

3.3.3.2 Wildlife

Characteristic mammal species at Luke AFB and the vicinity are nocturnal burrowers, such as kangaroo rats (*Dipodomys deserti* and *Dipodomys merriami*) and pocket mice (*Perognathus amplus cineris* and *Perognathus longimembris*). Large ungulates are typically absent, and carnivores are small and nocturnal. A diverse assemblage of reptiles and migratory and resident bird species are also characteristic, although creosote bush habitats, dominant on Luke AFB, are not generally inhabited by birds (Turner and Brown 1982). Amphibians are limited because of arid conditions, although several species of highly adapted toads occur within the region.

3.3.3.2.1 Proposed Action

Field reconnaissance was conducted in the agricultural field that is the location of the Proposed Action. No wildlife was observed in during the time of the reconnaissance. However, wildlife could have been present beneath the vegetation (Sudangrass) on the site. Wildlife species that could be expected to occur would include mice and bird species that prey on the mice species or forage on the crops.

3.3.3.2.2 Alternative Action

Field reconnaissance was conducted at Fowler Park, the location of the Alternative Action. No wildlife was observed in during the time of the reconnaissance. Wildlife species that could be expected to occur would include mice and resident bird species.

3.3.3.3 Threatened, Endangered and Other Protected Species

Special status species are species of plants and animals that, because of their scarcity or documented declining population numbers in the state or nation, have been placed on lists of endangered, threatened, proposed, candidate, or otherwise sensitive species. The USFWS and Arizona Game and Fish Department (AZGFD) maintain such lists. The USFWS has the authority to list species of plants and animals as endangered or threatened for protection under the ESA (16 U.S.C. 1531 et seq.) of 1973, as amended. Species that are proposed for listing as endangered or threatened are also protected by the ESA. All federal agencies are required to consult with the USFWS if actions they propose may affect a listed species (USAF 2006b).

The Wildlife Species of Concern in Arizona (WSCA) list identifies wildlife of concern to the AZGFD because their occurrence in Arizona is, or may be, in jeopardy. Its focus is the degree to which habitats or populations have been impacted, and each species' probability of extirpation from Arizona. Known threats and documented population decline are now more important factors than a limited distribution. The WSCA list reflects the best information available. Many native plant species are afforded protection under the Arizona Native Plant Law, and are categorized as highly safeguarded, salvage restricted, export restricted, salvage assessed, and harvest restricted (ADA 1994). Arizona contains more rare and unusual plants than anywhere else in the U.S. Under Arizona Native Plant Law (Arizona Revised Statutes [A.R.S] Title 3, Chapter 7, *Arizona Native Plants*), native plants cannot be removed from any Arizona land without the permission of the landowner and a permit from the Arizona Department of Agriculture.

Table 3-5 contains listings of WSCA, threatened, endangered, proposed, and candidate species, and designated and proposed critical habitat, that may occur within the same USGS 7.5 minute quadrangle as the proposed and alternative action. It should be noted that a quadrangle covers, at minimum, 49 square miles.

Table 3-5
Species of Concern

Common Name	Scientific Name	Status	Habitat
California Least tern	*Sterna antillarum browni*	E	Open, bare or sparsely vegetated sand, sandbars, gravel pits, or exposed flats along shorelines of inland rivers, lakes, reservoirs, or drainage systems.
Southwestern Willow flycatcher	*Empidonax traillii extimus*	E, Final Designation Critical Habitat, WSC	Cottonwood/willow and tamarisk vegetation communities along rivers and streams.
Sprague's Pipit	*Anthus spragueii*	C	Strong preference to native grasslands with vegetation of intermediate height and lacking woody shrubs.
Yellow-Billed Cuckoo	*Coccyzus americanus*	PT, Proposed Critical Habitat	Large blocks of riparian woodlands (cottonwood, willow, or tamarisk galleries).
Roundtail chub	*Gila robusta*	C	Cool to warm waters of rivers and streams, often occupy the deepest pools and eddies of large streams.
Lesser Long-Nosed bat	*Leptonycteris curasoae yerbabuenae*	E	Desert scrub habitat with agave and columnar cacti present as food plants.
Sonoran desert tortoise	*Gopherus morafkai*	C	Primarily rocky (often steep) hillsides and bajadas of Mohave and Sonoran desertscub but may encroach into desert grassland, juniper woodland, interior chaparral habitats, and even pine communities. Washes and valley bottoms may be used in dispersal.
Great Plains Narrowmouth Toad	*Gastrophryne olivacea*	WSC	Mesquite semi-desert grassland to oak woodland, in the vicinity of streams,

Common Name	Scientific Name	Status	Habitat
			springs and rain pools. They are more terrestrial than aquatic in habits. They can be found in deep, moist crevices or burrows, often with various rodents, and under large flat rocks, dead wood, and other debris near water.
Lowland Leopard Frog	*Lithobates yavapaiensis*	WSC	Aquatic systems in desert grasslands to pinyon-juniper.
Great Egret	*Ardea alba*	WSC	Marshes, swampy woods, tidal estuaries, lagoons, mangroves, streams, lakes, rivers and ponds; also in fields and meadows.
Western Burrowing Owl	*Athene cunicularia hypugaea*	SC	Variable in open, well-drained grasslands, steppes, deserts, prairies, and agricultural lands, often associated with burrowing mammals.
Western Snowy Plover	*Charadrius nivosus nivosus*	WSC	In Arizona, Snowy plovers may occasionally nest along temporary lakes on sandy playas.
Snowy Egret	*Egretta thula*	WSC	Marshes, lakes, ponds, lagoons, mangroves and shallow coastal habitats.
American Peregrine Falcon	*Falco peregrinus anatum*	WSC	Near cliffs (their preferred habitat) that support sufficient abundance of prey. As Arizona's population grows, peregrines seem to be breeding in less optimal habitat; either small broken cliffs in ponderosa pine forest or large, sheer cliffs in very xeric areas. The presence of an open expanse is critical.
Cactus Ferruginous Pygmy Owl	*Glaucidium brasilianum cactorum*	WSC	Streamside cottonwoods and willows and adjacent mesquite bosques, usually with saguaros on nearby slopes. Less often it has been found along dry washes where large mesquite, paloverde, ironwood, and saguaro thrive.
Bald Eagle	*Haliaeetus leucocephalus*	SC, WSC	Breeding habitat of bald eagles in Central Arizona is found mainly within 2 of the biotic life zones: 1) Lower Sonoran Life Zone is from the desert valley surrounding Phoenix upstream into lower portions of the Canyon country of the Salt and Verde Rivers. This habitat is of the saguaro-paloverde community type between 200-800 meters, in valley floors and hillsides. 2) Upper Sonoran Life Zone is found farther upstream in the canyons and on the surrounding hillsides, and is characterized by coarse-soiled, rocky hillsides, talus and cliffs. It is

Common Name	Scientific Name	Status	Habitat
			composed of desert grassland and transition community types. Lower slopes possess perennial bunch grass, jojoba, cactus, yucca and agave. Middle and upper slopes often grade into the chaparral community type. Upper slopes are of the pinyon pine habitat type. Bald Eagles nesting in Arizona typically nest on cliff faces, ledges, and pinnacles
Mississippi Kite	*Ictinia mississippiensis*	WSC	Riverine forest, open woodland, and prairies near riparian woodland; regularly in wooded suburbs in some portions of range.
Osprey	*Pandion haliaetus*	WSC	In Arizona, nests in coniferous trees, alongside or near rivers and lakes in the White Mountains and across the Mogollon Plateau. A few occur year round at lower elevations along the Salt and Gila Rivers, but no desert nest sites have yet been documented.
Yuma Clapper Rail	*Rallus longirostris yumanensis*	WSC	Lower Colorado Subdivision of the Sonoran Desertscrub biome. Territories appear to be distributed along a zone where standing water gives way to saturated soil within marsh.
(Mexican) Spotted Owl	*Strix occidentalis lucida*	WSC	In Arizona, they occur primarily in mixed-conifer, pine-oak, and evergreen oak forests; also occurs in ponderosa pine forest and rocky canyonlands. They generally forage in virgin mixed-conifer forests.
California Leaf-Nosed Bat	*Macrotus californicus*	WSC	Ponderosa pine, pinyon-juniper, Mexican woodland and riparian areas of sycamores, cottonwoods and willows.
Arizona agave	*Agave x arizonica*	HS	Open, rocky slopes and mesas in Sonoran desertscrub, chaparral, or juniper-grassland.

No species listed as threatened, endangered or WSCA are known to occur on either of the proposed project areas. According to the Luke AFB Integrated Natural Resource Management Plan (INRMP), though no species listed as threatened or endangered are known to occur on Luke AFB, potential habitat could exist for such species. There is also potential for occurrence of other special status species, such as the Western burrowing owl *(Athene cunicularia)* in areas throughout the Base. Western burrowing owls have been known to occur on the Base. This species nests in ground burrows abandoned by other wildlife species such as the round-tailed ground squirrels found in the area (USAF 2006b). Several Western burrowing owls, occupying nests along the perimeter road in proximity to the runway, were relocated in the late 1990s. None have been sighted in that area since. No surveys have been conducted to identify the presence of Western burrowing owls;

however, during the site reconnaissance, no burrows were observed within either of the proposed project locations. Though not a threatened, endangered, or WSCA listed species, all owls are protected by Arizona state law (ARS Title 17) and by Federal law under the Migratory Bird Treaty Act (MBTA).

3.3.4 Earth Resources

A geotechnical study is not currently available for the proposed project areas. Soils information for this section is derived from the Natural Resource Conservation Service (NRCS) Soil Survey spatial and tabular database for the proposed project locations (Figure 3-1).

One distinct soil type dominates both the proposed and alternative action project areas: Estrella Loam. Estrella soils are moderately extensive in southern Arizona and are typically used for livestock grazing and farmland. These soils are characteristically found on alluvial fans ranging in elevation from 100 to 2,700 feet and have slopes of zero to five or six percent. The Estrella soil formed in stratified and mixed alluvium from mixed sources that can include sedimentary, metamorphic, granitic and volcanic rock. The Estrella series consists of well drained soils with slow to medium runoff and moderate permeability. Estrella loam has been noted down to approximately 24 inches. Beneath the loam is subsoil characterized as reddish brown clay loam to approximately 25 inches (NCSS 2016).

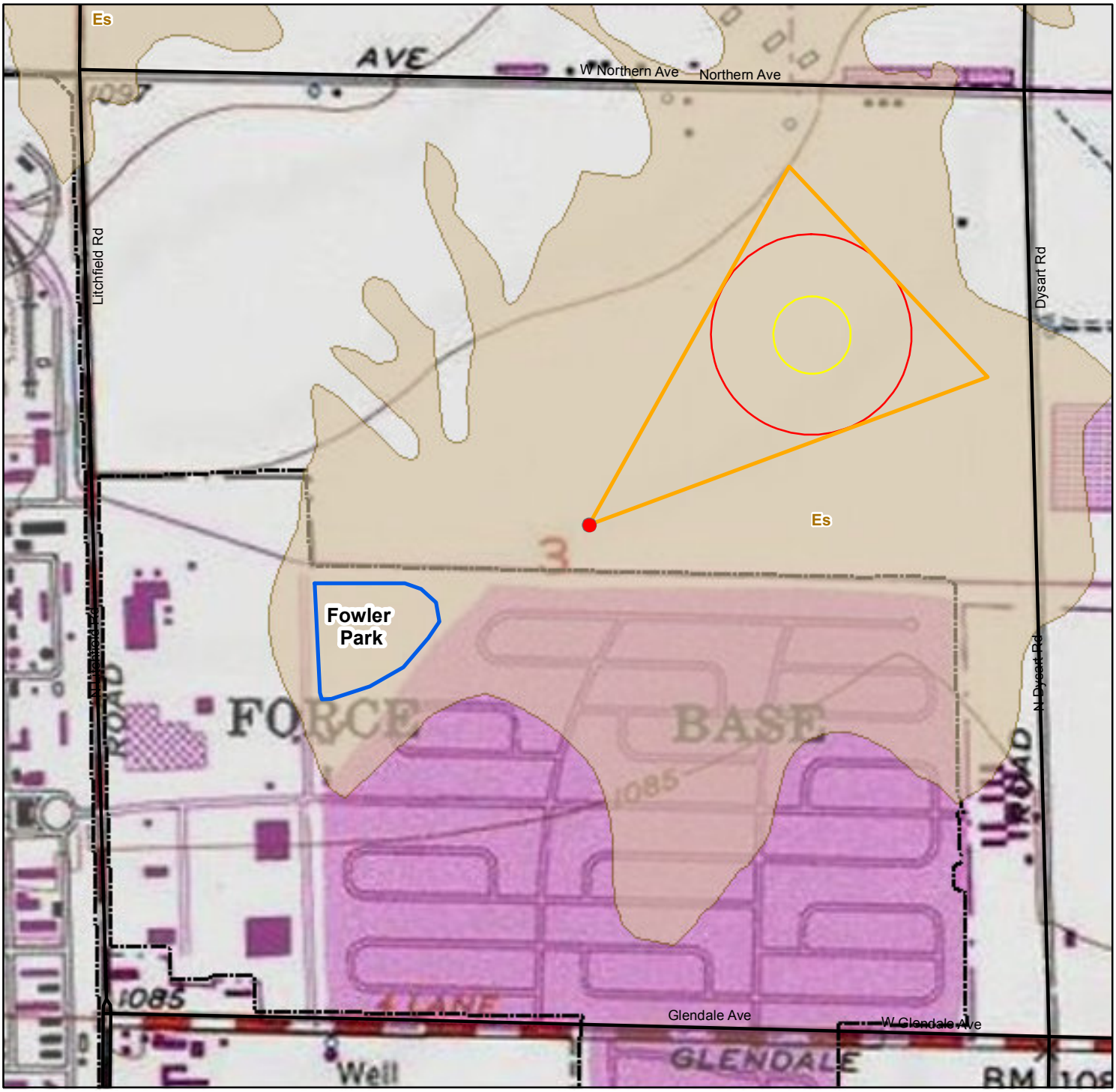
Estrella soil is classified as "Prime Farmland if irrigated" in the NRCS database. NCRS defines Prime farmland as "land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses." In general, prime farmland has: an adequate/dependable supply of moisture from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, an acceptable salt and sodium content, few or no rocks, is permeable to water and air, and is not saturated/flooded for long periods of time, and not easily eroded (NRCS 2014).

3.3.4.1 Proposed Action

The location of the Proposed Action is an agricultural field which is irrigated farmland. Topography on the proposed site is generally flat, with a slight down slope from the northwest to the southeast (Figure 3-1). Elevations on the agricultural field range from 1,086 to 1,092 feet above mean sea level.

3.3.4.1 Alternative Action

The location of the Alternative Action is Fowler Park on Luke AFB. No agricultural activities occur on Fowler Park or anywhere else on Luke AFB. Topography on Luke AFB, including Fowler Park is generally flat, with a slight down slope from the north to the south (Figure 3-1). Elevations on the Base range from 1,070 to 1,105 feet above mean sea level (USAF 2002a). The elevation of Fowler Park is approximately 1,086 feet above mean sea level.



Legend

- Local Road
- Alternative Action
- Proposed Action
- Display Site
- Fallout Zone
- Firing Point
- NRCS Soil: Estrella Loam (Es)
- Luke Air Force Base

Topographical Map Copyright:© 2013 National Geographic Society, i-cubed
Coordinates: UTM NAD83 12N

Figure 3-1
NRCS Soil Map
Environmental Assessment, Fireworks Display
Luke Air Force Base, Maricopa County, AZ

0 800 1,600
Approximate scale in feet

N

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3.3.5 Water Resources

Water resources analyzed in this EA include surface water and groundwater. This section provides descriptions of the qualitative and quantitative characteristics of water resources. Drinking water wells and wastewater facilities are not included in this EA, as they were determined not applicable to this analysis.

Surface water found in the proposed project areas is limited to the Dysart Drain (Figure 3-2), a Municipal Separate Storm Sewer System (MS4). Stormwater discharges associated with MS4s are subject to regulation under the National Pollutant Discharge Elimination System/State Disposal System (NPDES/SDS). According to 40 CFR 122.26((b)(8)) an MS4 is a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, an-made channels, or storm drains) that is:

- Owned or operated by a state, city, town, borough, county, parish, district, association, or other public body (created to or pursuant to state law) including special districts under state law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the Clean Water Act that discharges into waters of the United States.
- Designated or used for collecting or conveying stormwater;
- Which is not a combined sewer; and
- Which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.2.

3.3.5.1 Surface Water

Luke AFB is located in the Middle Gila Watershed. The Middle Gila Watershed covers 12,250 square miles. The Middle Gila Watershed has its northernmost point just east of Prescott, Arizona. Its easternmost point is just south of the San Carlos Reservoir. Its westernmost point is just west of Salome, Arizona. Precipitation landing in the Middle Gila Watershed ends up in the Gila River (ADEQ 2009). The Gila River exits the Middle Gila Watershed after passing through the Painted Rock Reservoir.

Precipitation falling on the proposed project areas either evaporates, infiltrates, or flows to the adjacent drainage. The Dysart Drain, an MS4 bordering the proposed project areas, is considered a "secondary stream" and terminates in the Agua Fria River (Figure 3-2). The Agua Fria River flows to the Gila River, which is an impaired stream for concentrations of selenium, boron, suspended sediments, DDT metabolites, toxaphene and chlordane in fish tissue, E. coli, and lead. (ADEQ 2011).

Stormwater regulation in the State of Arizona is under the purview of the ADEQ and is referred to as the AZPDES. Surface Water quality standards are found in the Arizona Administrative code, Title 18, Chapter 11, Article 1. The regulation (40 CFR 122.26) covers specific types of industries, and storm sewer systems for municipalities with a population greater than 100,000. The regulation is meant to identify, permit, and limit storm water discharges from point and nonpoint sources from entering streams, lakes and rivers as a result of residential, commercial and industrial activities. Luke AFB has a general permit for a small MS4.

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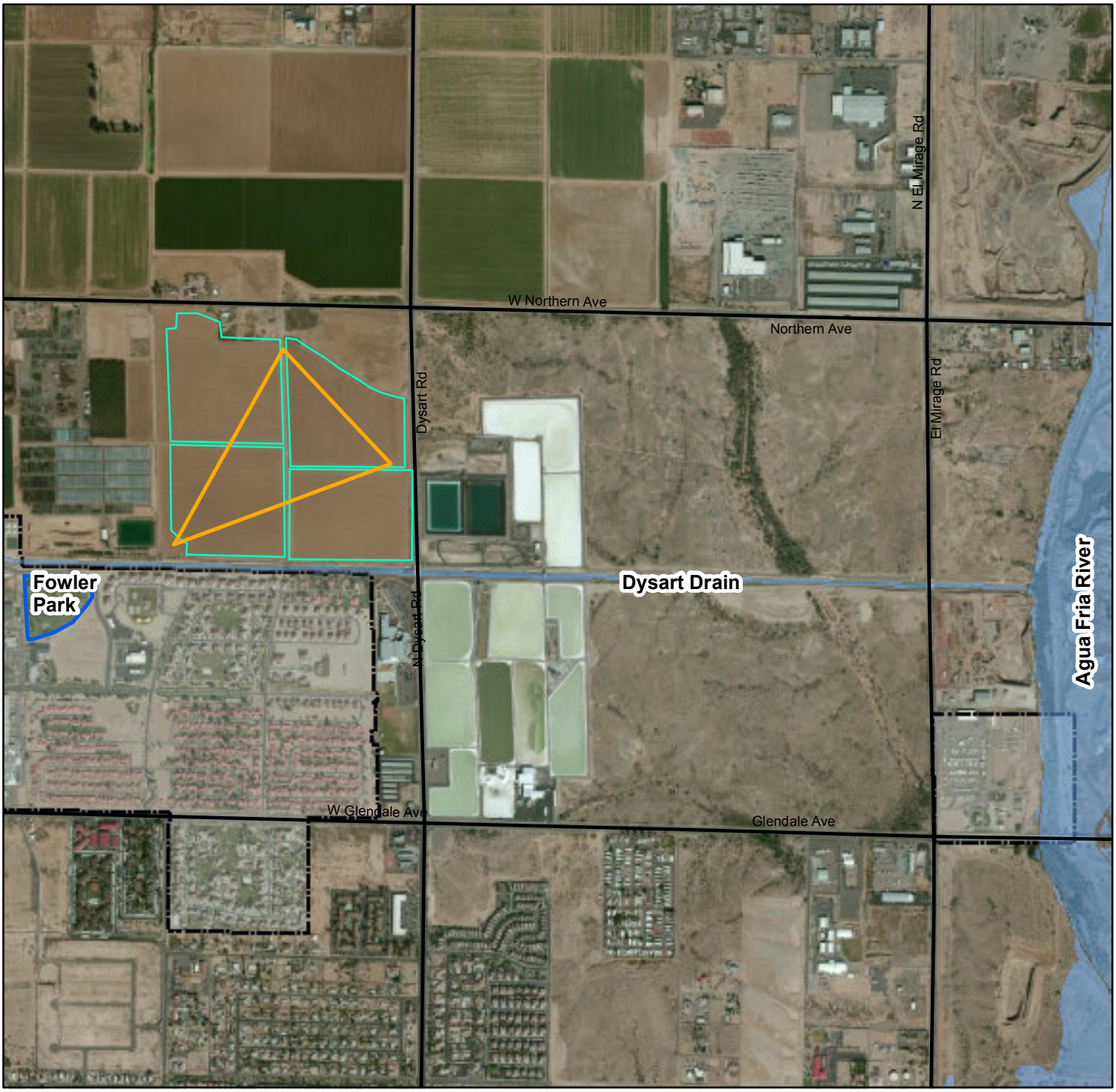

Legend

- Local Road
- Alternative Action
- Proposed Action
- Irrigation ditches
- Flood Plain
- Luke Air Force Base

Aerial Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
Date: 11/2010
Coordinates: UTM NAD83 12N

Figure 3-2
Surface Water Map
Environmental Assessment, Fireworks Display
Luke Air Force Base, Maricopa County, AZ

0 1,500 3,000
Approximate scale in feet

N

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3.3.5.2 Groundwater

The Basin and Range aquifers are the principal sources of groundwater in western Utah and southern Arizona (Figure 3-3). Groundwater occurs in the area at approximately 250 feet below ground surface (bgs). The occurrence and movement of groundwater near the proposed project area is affected by hydraulic characteristics of the aquifer units, and the magnitude and distribution of groundwater recharge and discharge for agriculture and other uses. Aquifer units include the upper alluvial unit (UAU), middle fine-grained unit (MFU) and lower conglomerate unit. Withdrawals in excess of recharge have created declines in water levels around the proposed project area (USGS 1995). The Luke Salt Body, a ridge-like salt mass that is approximately ten miles long and six miles wide, is the major evaporite deposit in the basin and has a pronounced local effect on the salinity of the groundwater and an indirect effect on the transmissivity of the basin fill (USGS 2010). Structural changes in basin fill sediments associated with the Luke Salt Body significantly affect local groundwater flow and conditions in the area of Luke AFB. Several irrigation and supply wells have been abandoned as the result of low yields or high salinity in the area. In general, a trend of increasing total dissolved solids is documented as a function of depth and proximity to the salt mass. However, water quality can be highly variable, both laterally and vertically (ADEQ 2004).

Studies have indicated that the UAU has been completely dewatered in and around the property, except for localized areas along the Agua Fria River, near the Luke AFB Waste Water Treatment Plant (WWTP). Partial dewatering of the MFU has also occurred in the Luke AFB area. The upper most aquifer is now the MFU, which is present at approximate depths between 250 and 350 feet bgs. Rapid dewatering of the UAU has resulted in a consolidation of sediments at depth. This in turn, has resulted in fissures due to differential subsidence (ADEQ 2010).

Groundwater recharge in the West Salt River Valley is affected by natural as well as artificial sources. Groundwater is naturally recharged by infiltration. Artificial sources of groundwater recharge include infiltration of excess irrigation water applied to fields, and seepage losses from irrigation channels and canals. Infiltration of treated effluent from the WWTP may also provide recharge through the beds of river channels during storm water events or releases from upstream impoundments in the immediate area of the releases to the Agua Fria River floodplain (USGS 1995).

Groundwater levels declined more than 300 feet in the vicinity of the proposed project areas over more than 40 years from 1923 to the late 1970s, primarily because of significant overdraft in response to pump rates for irrigation requirements. The greatest declines occurred west, north, and south of Luke AFB. A large area of depression has existed southwest of Luke AFB since prior to 1964. The regional groundwater flow direction is to the south-southwest, modified by the area of depression.

The agricultural field where the proposed launch site and display and fallout areas are located is irrigated during the growing seasons using an irrigation well on the northwestern corner of the agricultural fields. The irrigation water is pumped into the irrigation ditches (Figure 3-2) and is gravity fed through furrows throughout the fields (Gonzalez 2014).

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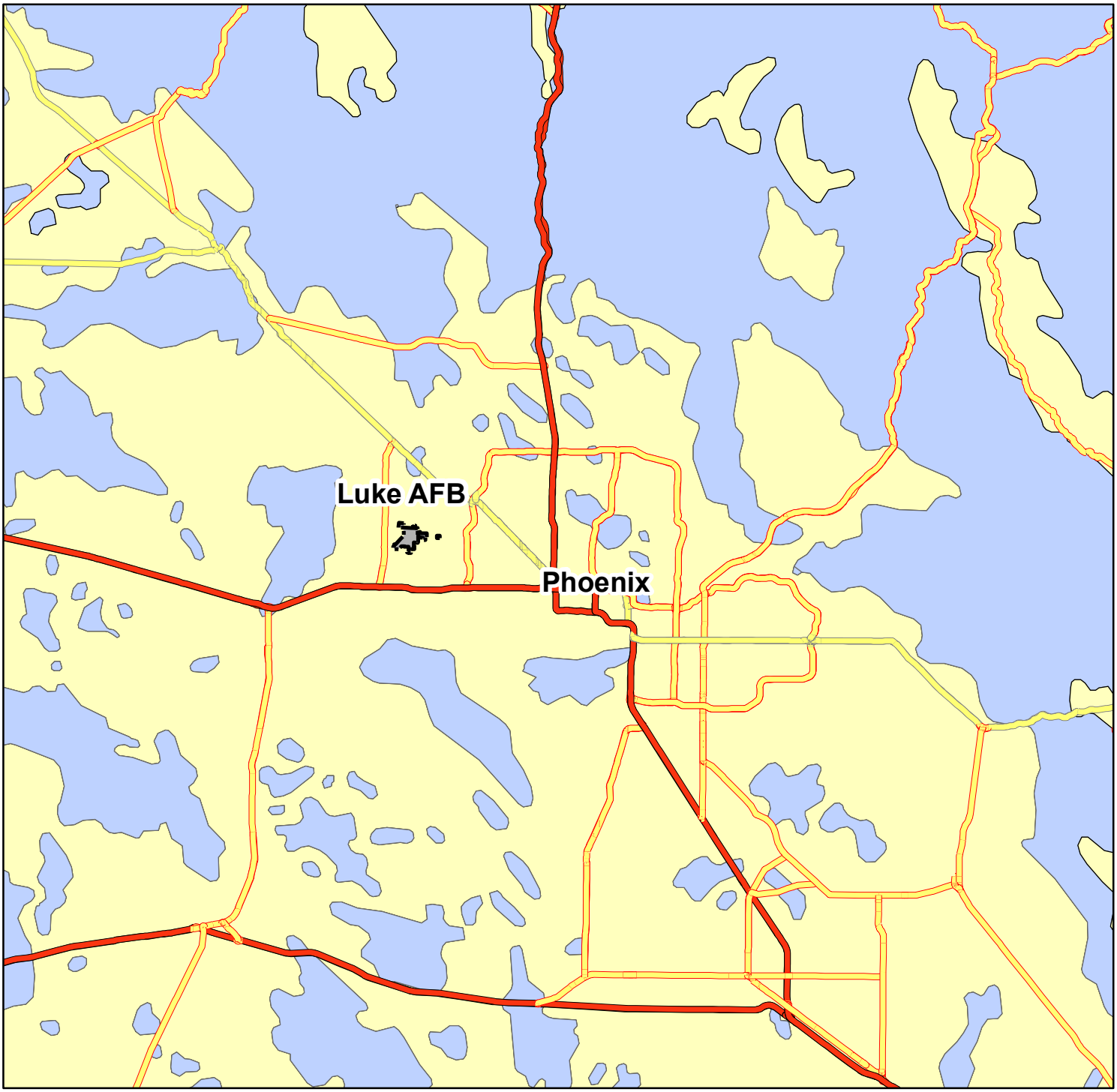

Legend

- Interstate
- US Route
- State Route
- Luke Air Force Base
- Basin and Range aquifers
- Not a principal aquifer

Figure 3-3
Aquifers Located in Arizona
Environmental Assessment, Fireworks Display
Luke Air Force Base, Maricopa County, AZ

0 15 30

Approximate scale in miles

N

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3.3.6 Hazardous Materials and Wastes

3.3.6.1 Hazardous Materials

Hazardous material use and management at Luke AFB are regulated under the Toxic Substances Control Act (TSCA), Occupational Safety and Health Administration (OSHA) the Emergency Planning and Community Right-to-Know Act, and Air Force Occupational Safety and Health Standards 127-43. Similarly, hazardous material use and management for the City of Glendale and Maricopa County are regulated under the same acts and agencies except the Air Force Occupational Safety and Health Standards do not apply. The regulations require personnel using hazardous materials to be aware of the possible dangers, to know the locations of material safety data sheets (MSDSs) for all hazardous materials that they are using on site and on city/county-owned property, and to wear the correct personal protective equipment (PPE) required for materials that are being used. The Luke AFB Hazardous Materials Management Program maintains a list of all hazardous chemicals, including MSDSs, used on-base (USAF 2006a). The City of Glendale maintains lists of all hazardous chemicals, including MSDSs, within their respective buildings and department.

Current operations at Luke AFB and in the City of Glendale require the use of hazardous materials in varying quantities. Hazardous materials are used by military personnel and on-base contractors at Luke AFB; City of Glendale employees use and apply hazardous materials on City of Glendale property. The location of hazardous materials, the procedures and equipment at Luke AFB to prevent and clean up a release, and the actions to take in the event of a release, are located in the Luke AFB Hazardous Waste Management Plan. Off-base, the City of Glendale's Fire Department and Hazardous Materials teams maintain procedures and equipment to prevent and cleanup a release, including the actions to be taken in the event of a release.

Fireworks displays have occurred previously on Luke AFB as well as at the proposed launch site. Prior to and during these displays the Contractor was responsible for properly storing and using any hazardous materials. Fireworks can contain black powder combined with potassium carbonate, potassium sulfate, potassium sulfide, unreacted sulfur, barium, lithium, rubidium, strontium, aluminum, aluminum perchlorate, cadmium and potassium nitrate (Conklin 2010).

3.3.6.2 Hazardous Waste

Hazardous wastes are defined by the Solid Waste Disposal Act as amended by the Resource Conservation and Recovery Act (RCRA), which was further amended by the Hazardous and Solid Waste Amendments, RCRA Subtitle C (40 CFR, Parts 260 through 270). USEPA regulatory authority is subsequently delegated to the State of Arizona. Hazardous waste at Luke AFB is also regulated under AFI 32-7013, *Hazardous Waste Management and Minimization*.

These regulations are implemented at Luke AFB through hazardous permitting procedures and the Luke AFB Hazardous Waste Management Plan. The plan details hazardous waste packaging, turn-in, transportation, storage, record keeping, and emergency procedures. Hazardous waste is generated at Luke AFB from aircraft maintenance, spent hazardous materials, and spills. Luke AFB does not currently maintain any active permitted hazardous waste storage facilities. Air Force

waste management operations at Luke AFB are registered with the USEPA under identification number AZ0570024133.

Fireworks displays have occurred previously on Luke AFB as well as at the proposed launch site. During and after each of these displays the Contractor was responsible for properly storing and disposing of any hazardous waste. Fireworks can contain black powder combined with potassium carbonate, potassium sulfate, potassium sulfide, unreacted sulfur, barium, lithium, rubidium, strontium, aluminum, aluminum perchlorate, cadmium and potassium nitrate (Conklin 2010).

3.3.6.3 Environmental Restoration Program

The ERP (formerly known as the Installation Restoration Program) was implemented by the DoD to identify and evaluate areas and constituents of concerns of toxic and hazardous material disposal and spill sites on military installations. Once the areas and constituents had been identified, the ERP was tasked to remove the hazards in an environmentally responsible manner. All response actions are based upon provisions of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), and the Superfund Amendments and Reauthorization Act (SARA) of 1986 as clarified in 1991 by EO 12580, Superfund Implementation.

Luke AFB has a total of 33 ERP or Area of Concern (AOC) sites on base. Of the 33 ERP or AOC sites, none are located within the footprint of the proposed or alternative actions.

3.3.7 Infrastructure and Utilities

3.3.7.1 Electricity

The Arizona Public Service (APS) provides electricity from an electrical substation on Luke AFB. Electricity is fed to the main base and military family housing areas through five distribution circuits and electrical substations. Throughout the base, the 12.47-kilovolt feeders are approximately 70 percent underground and 30 percent overhead, and remaining overhead lines are being converted to underground. Luke AFB consumes approximately 60 million kilowatt hours on an annual basis.

3.3.8 Safety

Emergency medical facilities at Luke AFB are provided by emergency medical technicians who are on staff 24 hours a day. Transport time to a hospital is approximately 12 to 17 minutes by ambulance. Serious injuries or illness are treated at one of the four emergency rooms closest to Luke AFB. The 56th Security Forces provides law enforcement personnel and security services. Fire protection at Luke AFB is provided by Luke Fire Emergency Services and, in the vicinity of the proposed off-base launch site location, in conjunction with the Rural Metro Fire Department.

Safety standards have been developed to ensure the safety of the general public and the administrators of fireworks displays. The NFPA administers NFPA 1123, Code for Fireworks Display. The standard is not published as an instrument of law; however, it has been adopted by the Luke Fire Emergency Services. The code applies to the construction, handling, and use of fireworks and equipment intended for outdoor fireworks display as well as the general conduct and operation of the display. The purpose of the code is to provide requirements for the reasonably

safe conduct of outdoor fireworks displays as well as to provide recommended local permit regulations (NFPA 2010). The key requirements of NFPA 1123 are included here:

- Any storage, handling, assembly, testing, or transportation of fireworks materials and devices intended for outdoor display prior to their delivery to the display site shall be in accordance with NFPA 1124, Code for the Manufacture, Transportation, and Storage of Fireworks and Pyrotechnic Articles; Title 27 CFR 18, Bureau of Alcohol, Tobacco and Firearms, Part 181, Commerce in Explosives, and Title 49 CFR 171-177, U.S. Department of Transportation.
- The display site for the outdoor land or water display shall have at least a 70-foot/inch radius of internal mortar diameter of the largest aerial shell to be fired. The minimum secured diameter of the display site should have a 140-foot/inch of internal mortar diameter of the largest aerial shell to be fired as shown in Table 3.6 and depicted in Figure 3-4 in relation to the Proposed Action display site.

Table 3-6 Distances for Outdoor Fireworks Display Sites: Minimum Separation Distances from Mortars to Spectators for Land Displays

Shell Size (inches)	Minimum Secured Diameter of Site (feet)
3	420
4	560
5	700
6	840
8	1120

- No spectators or spectator parking areas shall be located within the display site.
- Ground display pieces shall be located a minimum distance of 75 feet from spectator viewing areas and parking areas.
- The fallout area shall be a large open area.
- Spectators, unauthorized vehicles, watercraft, or readily combustible materials shall not be located within the fallout area during the display.
- The sponsor of the display shall make provisions for adequate fire protection for the display.
- The sponsor shall consult with the authority having jurisdiction and the operator to determine the level of fire protection required.
- Monitors whose sole duty shall be the enforcement of crowd control shall be located around the display area and at other locations as determined by the sponsor. The authority having jurisdiction and the operator shall approve the provisions for crowd control.
- Monitors shall be positioned around the discharge site to prevent spectators or any other unauthorized persons from entering the discharge site. The discharge site shall be so restricted throughout the display and until the discharge site has been inspected after the

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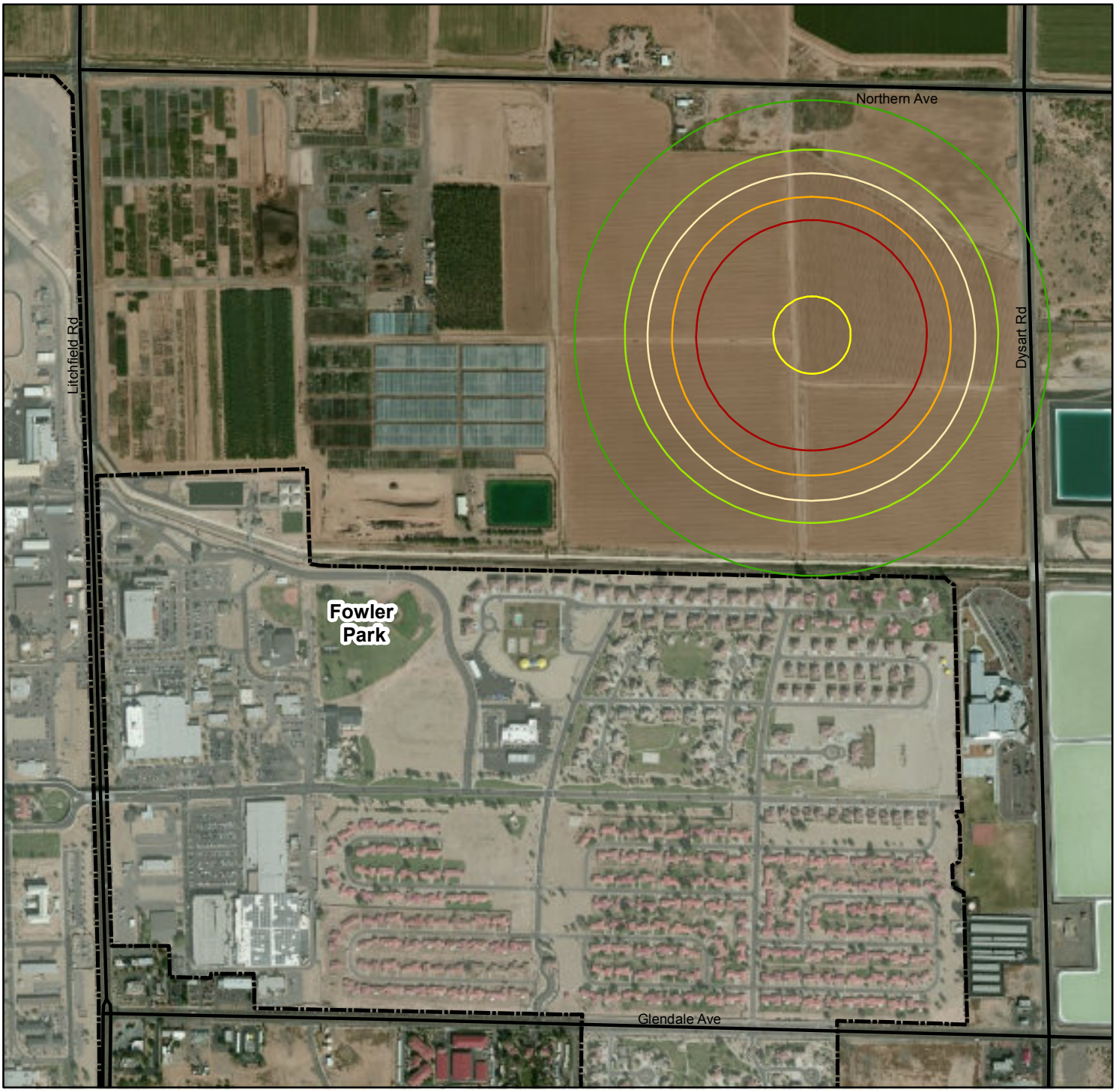

Legend

- Local Road
- Display Site
- Luke Air Force Base

Fireworks Display Separation Distance

- 420 foot (3-inch Mortar)
- 560 foot (4-inch Mortar)
- 700 foot (5-inch Mortar)
- 840 foot (6-inch Mortar
- 1,120 foot (8-inch Mortar)

Aerial Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
Date: 11/2010
Coordinates: UTM NAD83 12N

Figure 3-4
Minimum Secured Diameter of Site
Environmental Assessment, Fireworks Display
Luke Air Force Base, Maricopa County, AZ

0 800 1,600

Approximate scale in feet

N

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- display. Where required by the authority having jurisdiction, approved delineators or barriers shall be used to aid in crowd control.
- The operator shall have primary responsibility for safety. While the operator shall be permitted to participate actively in the firing of the fireworks display, safety shall be the primary concern of the operator.
- Personal protective equipment, as necessary, shall be worn by the operator and assistants during the setup and cleanup of the display.
- If high winds, precipitation, or other adverse weather conditions prevail such that a significant hazard exists in the opinion of the operator or authority having jurisdiction, the fireworks display shall be postponed until weather conditions improve to a reasonable level.

Air Force Manual (AFMAN) 91-201, Explosives Safety Standards implements Air Force Policy Directive (AFPD) 91-2, Safety Programs, and DoD 6055.09-M, Volumes 1–8, DoD Ammunition and Explosives Safety Standards. AFMAN 91-201 establishes a central source for explosive safety criteria and identifies hazards and states safety precautions and rules when working with explosives. Section 7.22 of AFMAN 91-201 discusses Fireworks Displays and states the following (excerpted here):

- Commercial fireworks are extremely hazardous, even in the hands of trained experts. Safety personnel will ensure all safety requirements are provided to the base contracting office prior to the selection of the commercial firm that will be conducting the demonstration.
- Active duty Air Force personnel (on- or off-duty) and on-duty Air Force civilian personnel must not take part in the transportation, storage, setup or functioning of commercial fireworks for on-base fireworks displays.
- Commercial explosives must have a MSDS, Department of Transportation (DOT) or other federally recognized certification identifying the items hazard division and net explosive weight.
- Commercial explosives must be packaged in the original shipping configuration.
- Commercial explosives will be handled, stored and transported by the commercial firm responsible for the explosives demonstration. Munitions personnel will only escort contract personnel to/from the storage facility and open the facility for contractor access.
- Commercially purchased explosives will not be handled or transported by DoD (civilian or military) personnel on or off-duty.
- Over flight of the explosives demonstration site will be restricted to no closer than 500’ above ground level (AGL) by either DoD or commercial aircraft.

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CHAPTER 4: ENVIRONMENTAL CONSEQUENCES

4.1 INTRODUCTION

This chapter describes the potential environmental consequences that are likely to occur as a result of implementation of the proposed or alternative actions. The No Action Alternative provides a baseline against which the impacts of the proposed and alternative actions can be compared. Discussion of measures that could be implemented to minimized potential impacts are included as necessary. If the actions result in irreversible or irretrievable results, it is noted within the sections below. Criteria and assumptions used to evaluate potential impacts are discussed at the beginning of each section.

4.2 CHANGE IN CURRENT MISSION

The activities associated with implementation of the proposed or alternative actions would not change the current or future mission of the installation.

4.3 DESCRIPTION OF THE EFFECTS OF ALL ALTERNATIVES ON THE AFFECTED ENVIRONMENT

4.3.1 Land Use

The following factors were considered in evaluating potential land use: (1) the degree to which the action would adversely affect existing sensitive land uses; and (2) the degree to which road routes would interfere with the activities or functions of adjacent existing or proposed land uses. The proposed or alternative Actions could have a significant effect if they: (1) conflict in substantial fashion with existing land uses and master planning efforts undertaken by the installation, or (2) conflict in substantial fashion with off-base land uses and master planning efforts of surrounding jurisdictions.

4.3.1.1 Proposed Action

The Proposed Action would be located off-base in an agricultural field, north of a base housing area, south of Northern Parkway, and west of North Dysart Road. The Proposed Action would not result in any changes to the Base operations nor would it conflict with the existing land use. The proposed launch site was selected as a result of a coordinated planning process and take into account siting issues such as adjacent land uses (both on- and off-base), the noise environment, and airfield safety criteria.

The proposed launch site and associated fallout zone is an undeveloped agricultural field in unincorporated Maricopa County and would not be incompatible with existing or future land use plans for that area. No significant impacts to current or future planned land uses are anticipated as a result of the Proposed Action.

4.3.1.2 Alternative Action

Under the Alternative action, Luke AFB would conduct a laser light show at Fowler Park at the conclusion of the Freedom Fest celebration. The laser light show would consist of projected multi-

colored laser beams shot into the sky above the park and would not be incompatible with existing or future land use plans for the area. No significant impacts to current or future planned land uses are anticipated as a result of the Alternative Action.

4.3.1.3 No Action Alternative

Under the No Action Alternative, there would be no change in the baseline conditions described in Section 3.3.1.

4.3.1.4 Measures to Reduce Impacts

No measures to reduce impacts would be required as a result of the Proposed or Alternative Actions.

4.3.2 Air Quality

The following factors were considered in evaluating air quality: (1) the short- and long-term air emissions generated from the combustion of fireworks; (2) the type of emissions generated; and (3) the potential for emissions to result in ambient air concentrations that exceed one of the NAAQS or SIP requirements. A conformity analysis is not required if the emissions of CO, NO_x, VOC, and PM_{10} are emitted in quantities less than the corresponding de minimus level. Impacts to air quality would be considered significant if an action results in emissions to ambient air concentrations that exceed one of the NAAQS or SIP requirements.

4.3.2.1 Proposed Action

The Proposed Action would result in short-term emissions during the combustion of the pyrotechnic products (i.e., fireworks). No significant impacts to air quality are anticipated as a result of the Proposed Action.

Specific information describing the pyrotechnic ingredients and their amounts is not easily determined. The MSDS on pyrotechnic products list the ingredients and amounts as trade secrets, and they do not list the break down products after combustion.

The MSDS may list single decomposition products found during controlled incineration but the individual chemical incineration can be quite different from those found when two or more compounds are mixed and ignited together. Fireworks consist of six ingredients: fuel, oxidizing agents, reducing agents, regulators, binders and coloring agents. Charcoal or thermite is typically used as the fuel; oxidizers can be nitrates, chlorates or perchlorates; reducing agents can be sulfur and charcoal; metals can be added to regulate the speed of reaction; starch is typically used as a binder; and metals such as strontium, copper, aluminum, barium, sodium, calcium and cadmium can be added to produce the firework colors.

Little data is available for quantifying the emissions from fireworks. While studies have tried to show direct and indirect impacts of fireworks on airborne particles (Vecchi et al., 2007; Joly et al., 2009; Tian et al., 2014), they have not produced a comprehensive method of estimating the actual emissions of pollutants to the atmosphere from the combustion of fireworks. In addition, many of these studies have been conducted in areas experiencing rapid urbanization growth and

industrialization that have contributed significantly to the deterioration of regional air quality in these areas.

The combustion of fireworks would contribute to short term localized emissions of mainly particulate emissions with considerably smaller amounts of gaseous pollutants. These emissions would be short term in nature, occur in the direct vicinity of the fireworks detonation, detonate at high altitudes in a large volume of air, quickly deposit or dissipate through transport. For these reasons, it is unlikely that the emissions from the fireworks pose any significant public health hazard (Perry, 1999; Dutcher et al, 1999). The fireworks emissions would be a trivial long-term source to regional emissions and would not be expected to contribute to adverse impacts on local air quality.

In the unlikely event that the fireworks display was shown to have an adverse impact on local short term air quality monitoring data, it would not have any impact on the attainment status for Maricopa County. Federal regulations [40 CFR 50.14(b)(2)] indicates that fireworks displays qualify as "exceptional events" and, with USEPA concurrence of Arizona Department of Environmental Quality (ADEQ) documentation, would not be used in the design value calculations that show compliance with NAAQS for Maricopa County.

It is not anticipated that fugitive dust will be generated by the vehicles used to move the fireworks onto the site or during set up of the fireworks display. To comply with the Maricopa County Air Quality Rule 310.01 (fugitive dust), and not cause/allow visible emission of fugitive dust beyond the property line (field area shown beyond the fallout area in in Figure 1-3), Contractor vehicles entering and exiting the field for setup and cleanup would drive slowly while maneuvering in and out of the launch area and would stay on the established dirt roads near the launch site to the extent practicable. If the area is particularly dry, a water truck may be used to eliminate visible emissions of particulate matter from leaving the property line.

Expected fugitive dust and combustion emissions from the firework display transport/setup vehicles are shown in Table 4-1, calculations are included in Appendix C.

Table 4-1

Expected Short-Term Emissions from Proposed and Alternative Actions

Action	VOC	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	CO_2
Proposed Action (tpy)	4.60E-04	4.60E-04	1.89E-03	2.11E-03	2.27E-04	2.20E-06	0.23
Alternative Action (tpy)	4.60E-04	4.60E-04	1.89E-03	2.11E-03	2.27E-04	2.20E-06	0.23
No Action Alternative (tpy)	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Notes:
CO = carbon monoxide
CO_2 = carbon dioxide
NO_x = nitrogen oxides
$PM_{2.5}$ = particulate matter equal or less than 2.5 micrometers in diameter
PM_{10} = particulate matter equal or less than 10 micrometers in diameter
SO_x = sulfur oxides
tpy = tons per year
VOC = volatile organic compound

4.3.2.2 Alternative Action

Under the Alternate Action, the laser light show at Fowler Park would produce no air pollutant emissions. Therefore, no significant impacts to air quality are anticipated as a result of the Alternative Action.

4.3.2.3 No Action Alternative

Under the No Action Alternative, there would be no change in the Luke AFB emissions described in Section 3.3.2.

4.3.2.4 General Conformity

The General Conformity rule is set forth in the 40 CFR 51 Subpart W – Determining Conformity of General Federal Action to State and Federal Implementation Plans. According to 40 CFR 51.853(b), federal actions require a conformity determination for each pollutant where the total of direct and indirect emissions in a nonattainment or maintenance area caused by a federal action would equal or exceed any of the rates in paragraphs 40 CFR 51.853(b)1 or 2.

The Proposed Action would be located in the part of Maricopa County, which is designated marginal non-attainment for O_3, serious nonattainment for PM_{10} and a maintenance area for CO. The O_3 precursor (NO_x and VOC) emissions are subject to General Conformity requirements. In accordance with the requirements of 40 CFR 51.853(b)1, the de minimis thresholds are: 100 tpy for O_3 nonattainment areas (outside of an ozone transport region) for each of the precursor pollutants NO_x and VOC; 70 tpy for PM_{10} in a serious nonattainment area; and 100 tpy for a CO maintenance area.

The trivial emissions of VOCs, CO, NO_x, and PM_{10} during the fireworks would be less than the de minimis thresholds. Therefore, no further analysis is required.

4.3.2.5 Greenhouse Gas

Under the Proposed Action: the potential net long term annual emissions of CO_{2eq} per year would be insignificant. The insignificant amount of CO_{2eq} emissions from the fireworks would not contribute significantly to climate change.

The fireworks show under the Proposed Action is not subject to the requirements of 40 CFR Part 98 - Mandatory Greenhouse Gas Reporting.

4.3.2.6 Measures to Reduce Impacts

No measures to reduce impacts would be required as a result of the Proposed or Alternative Actions.

4.3.3 Biological Resources

Evaluation of impacts is based upon 1) the importance (legal, commercial, recreational, ecological, or scientific) of the resource, 2) the rarity of a species or habitat regionally, 3) the sensitivity of the resource to proposed activities, and 4) the duration of the impact. Impacts to biological resources would be considered significant if priority species or habitats are adversely affected over relatively large areas and/or disturbances cause reductions in population size or distribution of a priority species.

4.3.3.1 Vegetation

4.3.3.1.1 Proposed Action

Implementation of the Proposed Action would not require the disturbance of any currently vegetated areas. The fireworks display would occur outside of the planting/growing season; therefore, the ground surface would be fallow or bare ground and no flammable vegetation is anticipated to be present at the proposed launch site or associated fallout zone. Following the fireworks display, the Contractor would remove all debris resulting from the fireworks display such that no trash or potential chemicals associated with the fireworks debris would remain on the ground surface for subsequent uptake by agricultural crops, once planted. No significant impacts to vegetation are anticipated as a result of the Proposed Action.

4.3.3.1.2 Alternative Action

Under the Alternative Action, there would be no change in the baseline conditions described in Section 3.3.3.1.

4.3.3.1.3 No Action Alternative

Under the No Action Alternative, there would be no change in the baseline conditions described in Section 3.3.3.1.

4.3.3.2 Wildlife

4.3.3.2.1 Proposed Action

No wildlife species are known to occur on either of the proposed project sites. A plant nursery is located immediately adjacent to the proposed project site to the west. The nursery grows a variety of ornamental and native plant species that could be considered habitat for wildlife species. Particularly, a 7-acre plot of *Acacia stenophylla* is located approximately 1,706 feet from the proposed display site (or the location where the "burst" of noise would occur). This plot of trees has been observed to house various roosting bird species. However, in previous fireworks displays that have occurred on-base, in closer proximity to the trees, as well as at the proposed display site, the birds have never been observed being flushed from their roost (Hoffman 2014). Additionally, as noted in the Eglin AFB EA, species within the immediate vicinity of the fireworks display area would likely exhibit a startle response to the noise. However, foraging species would typically move on to other areas, while nesting species would return after the general disturbance. These activities would also likely scare other species such as predators (e.g., feral cats, coyotes, etc.) from the area, thus reducing the chances of nest predation should nesting/roosting birds be flushed (Eglin AFB 2008).

Impacts to wildlife species as a result of the Proposed Action would be anticipated to be short-term and temporary and would not result in significant impacts to populations of wildlife.

4.3.3.2.2 Alternative Action

Under the Alternative Action, the laser light show would consist of lights projected ~10 feet above where the audience would be standing. The only wildlife receptor in the vicinity of Fowler Park at this height in the sky would be resident birds which would be roosting during the evening when the event would occur. Therefore, the Alternative Action would not result in significant impacts to populations of wildlife.

4.3.3.2.3 No Action Alternative

Under the No Action Alternative, there would be no change in the baseline conditions described in Section 3.3.3.2.

4.3.3.3 Threatened, Endangered, and Other Protected Species

4.3.3.3.1 Proposed Action

No species or critical habitat for species listed as federally threatened, federally endangered, or WSCA are known to occur within the proposed display site. As a result of the Proposed Action, no significant impacts to WSCA or federally listed threatened or endangered species would be anticipated.

Though no WSCA, federally threatened, or federally endangered species are known to occur on the proposed project site, there is potential for occurrence of the Western burrowing owl, a special status species, in the vicinity. However, no Western burrowing owls or signs of Western burrowing owls (i.e., burrows) were observed within the proposed project area. As a result of the

Proposed Action, no significant impacts to the Western burrowing owl or any other special status species would be anticipated. Additionally the INRMP does not require any actions connected with this Proposed Action.

4.3.3.3.2 Alternative Action

Under the Alternative Action, there will be no potential for impacts to species listed as federally threatened, federally endangered, or WSCA. Therefore, no change to the baseline conditions described in Section 3.3.3.3 would be anticipated under the Alternative Action.

4.3.3.3.3 No Action Alternative

Under the No Action Alternative, there would be no change in the baseline conditions described in Section 3.3.3.3

4.3.3.3.4 Measures to Reduce Impacts

Procedures outlined in the MBTA and National Defense Authorization Act will be followed for the protection of migratory birds, as applicable.

4.3.4 Earth Resources

Impacts to soil resources can result from earth disturbance that would expose soil to wind or water erosion as well as from the chemical constituents resulting from implementation of an action. Impacts on geology and soils could be considered significant if they substantially alter the lithology, stratigraphy, and geological structures or change the soil composition, structure, or function within the environment. Methods to minimize these potential impacts are considered when evaluating impacts to earth resources.

4.3.4.1 Proposed Action

The Proposed Action is unlikely to impact the soil conditions at the fireworks launch site. Because firework displays for Luke AFB are infrequent (planned for only once a year) the potential impact to the earth resources is minimal.

The term “fireworks” includes a wide range of products that are created from variable chemical components. Much remains unknown about the environmental impact of fireworks on the environment (Herzog 2013 and Umwelt-Materialien 2001). Known environmental effects include smoke, noise, debris and light. This section will focus on the impact of the debris and fallout that can affect earth resources.

The immediate effect from fireworks is on the air, but the physical debris falls to the ground. This debris can include the expended shells (trash), fallout from the chemicals inside the firework and any duds (fireworks that do not explode). Most traditional fireworks contain black powder (gunpowder) which is the “burst charge” that launches the firework. Depending on the effect the manufacture wishes to create, fireworks can also emit combustion by-products that include potassium carbonate, potassium sulfate, potassium sulfide, unreacted sulfur, barium, lithium, rubidium, strontium, aluminum, aluminum perchlorate, cadmium and potassium nitrate (Conklin

2010). Some fireworks also contain copper; it is possible for dioxins to be released during the combustion of copper containing fireworks; however, more dioxins are released from large bonfires than are from pyrotechnic devices (Umwelt-Materialien 2001).

A study conducted in Switzerland showed that firework-related depositions do not cause problematic soil and water contents and the evaluation suggested that indirect effects (uptake through the food chain) are not critical. According to model calculations, the resulting soil and water pollution due to deposition of fireworks related elements is negligible (Umwelt-Materialien 2001). Another study completed at the University of Massachusetts, Dartmouth (UMD), indicated that the use of fireworks at UMD may have resulted in the release of perchlorate into the environment from atmospheric deposition and from water removing chemicals from the paper debris left behind after fireworks displays. The study results indicated that perchlorate in soil increased immediately after a fireworks launch (Massachusetts Department of Environmental Protection [MDEP] 2007). However, the study did note that the pre-launch samples did not contain perchlorate, even though the same launch site has been used for several years. This suggests that the perchlorate either migrated with water infiltration or attenuated in the soil environment. The study also indicated that perchlorate concentrations had increased in the groundwater. The groundwater at UMD is an average of 5 feet bgs (MDEP 2007); whereas the groundwater depth at Luke AFB is approximately 250 feet bgs. Although the UMD study did show an increased effect in groundwater, the impact to groundwater at Luke AFB will be minimized by the depth as it will inhibit the perchlorate movement. In addition, the much lower infiltration (rain) rate of Arizona versus Massachusetts will significantly decrease the potential of the perchlorate movement.

The effect of heavy metal fall out from fireworks is unknown; however, generally metal contamination in soil can be persistent and create risk for human health. These risks are usually associated with high concentrations of metals. Concentrations of the chemical compounds (fallout) from fireworks are unknown but not likely to be at levels above human health risk levels based on the infrequency of use and minimal mass that remains after combustion. Additionally, several of the metals used in fireworks are naturally-occurring and are at high concentrations in the native Arizona soils (such as aluminum). Strontium can be radioactive; however, low levels haven't been shown to affect human health.

The Chemical and Material Risk Management Division in the Deputy Under Secretary of Defense, Installations and Environment, developed a series of BMPs for minimizing the release of perchlorate on DoD-owned properties as a result of fireworks displays (Office of the Under Secretary of Defense 2009). The BMPs were approved for implementation by the Emerging Contaminants Governance Council. These BMPs include:

- BMP 1-Low or No-Perchlorate Containing Fireworks: Where not cost prohibitive, DoD installations should use "eco-friendly" perchlorate-free or low perchlorate fireworks of documented quality. Installation personnel may want to collect bids for fireworks shows with both perchlorate-free or low perchlorate fireworks, and regular fireworks to make an informed decision.
- BMP 2 - Post Event Cleanup: The fireworks show contractor should institute rigorous post-event cleanup (i.e., "housekeeping") practices. Fireworks companies or display sponsors

should remove all visible shell debris encountered at the site during the search conducted immediately after the fireworks show. Consider using station forces to augment the fireworks contractor personnel for wider coverage of the show area the next morning. Meteorological conditions at the launch site and charge altitude dynamics should be monitored so that blind stars and duds can be searched for in their most probable location.

- BMP 3 - Managing Duds and Misfires: All "duds" or "misfires" must be removed from the site and disposed of in accordance with applicable local, state, and federal regulations and manufacturers' instructions. Under no circumstances are duds or misfires to be buried. Duds and misfires can be doused in water for safety. Contain and/or promptly address runoff in cases where water is used to douse duds or misfires.
- BMP 4- Managing Un-Ignited Pyrotechnics: Within 24 hours of a fireworks show, the pyrotechnics operators should, to the extent practical, collect any blind stars and un-ignited pyrotechnic material found during the inspection of the entire firing range. Blind stars are often released at high altitudes and can therefore travel great distances from the launch site. They can also be released as a result of the breakage of dud shells. The stars can be the size of a dime and can evade detection during the post-show walkover at night. Station forces should be used to augment the fireworks contractor personnel for maximum and wider coverage of the show area in daylight. The collected material must be managed as appropriate according to local, state, and federal regulations and not buried on site.
- BMP 5 - Citing Events: The location of fireworks must be made to minimize risk to drinking water sources. DoD personnel and the contractor should be aware of the existence of surrounding drinking water supplies and keep fireworks displays as far away from them as possible. Of particular concern are fireworks displays near surface waters used for drinking water supplies and within the recharge areas of public drinking water supply wells.

The Proposed Action would include a relatively small show with a total count of 445 shells. The fireworks would be launched from trays/base structure that would capture some of the direct fallout (duds) from the fireworks. Figure 1-3 depicts the fallout area designed for the Proposed Action calculated based on the size of the fireworks anticipated to be used. The fallout area is based on 70 feet for each inch of diameter of the firework (e.g., a 3-inch diameter firework would require a 210 foot fallout zone) as required by NFPA 1123. The 70 foot multiplier is factored to account for prevailing winds and variation in fireworks manufacturers and should be adequate to capture all associated fallout from the proposed fireworks display. Given the implementation of the BMPs listed above, no significant impacts to earth resources would be anticipated as a result of the Proposed Action.

4.3.4.2 Alternative Action

Under the Alternative Action, there will be no potential for impacts to soil resources as there would be no earth disturbance that would expose soil to wind or water erosion or from the chemical constituents resulting from implementation of the action. Therefore, no change to the baseline conditions described in Section 3.3.5 would be anticipated under the Alternative Action.

4.3.4.3 No Action Alternative

Under the No Action Alternative, there will be no change to the baseline conditions described in Section 3.3.4.

4.3.4.4 Measures to Reduce Impacts

The Proposed Action would not be expected to substantially alter the lithology, stratigraphy, or geological structures, or substantially change the soil composition, structure, or function. The potential for contaminants entering the soil as a result of the Proposed Action would be minimized by implementation of standard practices including:

- Launching the fireworks from a tray/base platform to catch all of the duds; and
- Conducting a sweep of the entire fallout area, perimeter, and all other areas where debris is visible or was observed by the Contractor spotters falling to the ground to remove potential residue-containing debris immediately after the fireworks show.

4.3.5 Water Resources

Impacts on hydrology can result from land clearing activities, disruption of the soil profile, loss of vegetation, introduction of pollutants, new impervious surfaces, and an increased rate or volume of runoff after major storm events. Without proper management controls, these actions can adversely impact the quality and/or quantity of water resources.

Criteria for evaluating impacts related to water resources associated with the Proposed and Alternative Actions are: 1) water availability, 2) water quality, and 3) adherence to applicable regulations. Impacts are measured by the potential to reduce water availability to existing users, endanger public health or safety by creating or worsening health hazards or safety conditions, or violate laws or regulations adopted to protect or manage water resources.

The ADEQ Water Division and the U.S. Army Corps of Engineers (USACE) are the regulatory agencies that govern water resources in the State of Arizona and at Luke AFB. The CWA of 1977 regulates pollutant discharges and development activities that could affect aquatic life forms or human health and safety.

An impact to water resources would be significant if it would: 1) reduce water availability to, or interfere with the supply of, existing users; 2) create or contribute to overdraft of groundwater basins or exceed safe annual yield of water supply sources; 3) adversely affect water quality or endanger public health by creating or worsening adverse health hazard conditions; 4) threaten or damage unique hydrologic characteristics; or 5) violate established laws or regulations that have been adopted to protect or manage water resources of an area.

4.3.5.1 Surface Water

4.3.5.1.1 Proposed Action

With regard to surface water, the primary concern associated with the Proposed Action includes the potential effects on water quality resulting from fallen fireworks debris. This debris can include the expended shells (trash), chemicals inside the fireworks debris, and any duds (fireworks that do not explode) remaining on the ground surface following the event. The debris has a potential to affect the surface water in the proposed project area if the fallout lands in the Dysart Drain or if chemicals associated with the debris fallout is washed into the drain from the soil.

Most traditional fireworks contain black powder (gunpowder) as well as combustion by-products that include potassium carbonate, potassium sulfate, potassium sulfide, unreacted sulfur, barium, lithium, rubidium, strontium, aluminum, aluminum perchlorate, cadmium and potassium nitrate (Conklin 2010). As described in Section 4.3.4.1, concentrations of the chemical compounds (fallout) from fireworks are not likely to be at levels above human health risk levels based on the infrequency of use and minimal mass that remains after combustion. In addition, following the fireworks display, the launch site, fallout area, and perimeter (including the Dysart Drain and irrigation ditches within the proposed project area) would be swept by the Contractor and all debris remaining on the soil surface or within drainage features would be removed to ensure that no fireworks debris remains. Given the employment of debris cleanup activities, no significant impacts to surface water would be anticipated as a result of the Proposed Action.

4.3.5.1.2 Alternative Action

Under the Alternative Action, there would be no change in the baseline conditions described in Section 3.3.5.1. A laser show would have no impact on the surface waters, as there are no debris or chemical remnants of the show being released to the environment.

4.3.5.1.3 No Action Alternative

Under the No Action Alternative, there would be no change in the baseline conditions described in Section 3.3.5.1.

4.3.5.2 Groundwater

4.3.5.2.1 Proposed Action

Groundwater includes the subsurface hydrologic resources of the physical environment and is generally a safe and reliable source of fresh water for the general population. This is especially true for those in areas of limited precipitation, and groundwater is commonly used for potable water consumption, agricultural irrigation, and industrial applications. Groundwater plays an important role in the overall hydrologic cycle. Its properties are often described in terms of depth to aquifer or water table, water quality, and surrounding geologic composition.

With regard to groundwater, the primary concern associated with the Proposed Action includes the potential for direct contamination of groundwater resulting from fallen fireworks debris. As discussed above, given the employment of BMPs discussed in Section 4.3.4.1, no significant

impacts to groundwater would be anticipated as a result of the Proposed Action. Also under the Proposed Action, there would be no withdrawal of groundwater; therefore, there would be no reduction of groundwater availability or overdraft of groundwater basins.

4.3.5.2.2 Alternative Action

Under the Alternative Action, there would be no change in the baseline conditions described in Section 3.3.5.2.

4.3.5.2.3 No Action Alternative

Under the No Action Alternative, there would be no change in the baseline conditions described in Section 3.3.5.2.

4.3.5.3 Measures to Reduce Impacts

The potential for contaminants entering surface water or groundwater as a result of the Proposed Action would be minimized by implementation of standard practices including:

- Launching the fireworks from a tray/base platform to catch all of the duds; and
- Conducting a sweep of the entire fallout area, perimeter, and all other areas where debris is visible or was observed by the Contractor spotters falling to the ground or within the drainages to remove potential residue-containing debris immediately after the fireworks show.

4.3.6 Hazardous Materials and Wastes

The degree to which the Proposed and Alternative Actions could affect the existing environmental management practices was considered in evaluating potential impacts to hazardous materials and wastes. Significant impacts could result if non-hazardous/regulated and hazardous substances were collected, stored, and/or disposed of improperly.

4.3.6.1 Hazardous Materials

4.3.6.1.1 Proposed Action

As discussed in Section 3.3.6.1, fireworks can contain black powder combined with potassium carbonate, potassium sulfate, potassium sulfide, unreacted sulfur, barium, lithium, rubidium, strontium, aluminum, aluminum perchlorate, cadmium, and potassium nitrate (Conklin 2010). Proper storage and use of the fireworks would be the responsibility of the Contractor in accordance with NFPA 1124, Code for the Manufacture, Transportation, and Storage of Fireworks and Pyrotechnic Articles; Title 27 CFR 18, Bureau of Alcohol, Tobacco and Firearms, Part 181, Commerce in Explosives, and Title 49 CFR 171-177, U.S. Department of Transportation. Therefore, no significant impacts are anticipated as a result of the Proposed Action.

4.3.6.1.2 Alternative Action

No hazardous materials would be involved in the implementation of the Alternative Action; therefore, there would be no anticipated changes in baseline conditions described in Section 3.3.6.1.

4.3.6.1.3 No Action Alternative

Under the No Action Alternative, there would be no change in the baseline conditions described in Section 3.3.6.1.

4.3.6.2 Hazardous Waste

4.3.6.2.1 Proposed Action

As discussed above, fireworks can contain black powder combined with potassium carbonate, potassium sulfate, potassium sulfide, unreacted sulfur, barium, lithium, rubidium, strontium, aluminum, aluminum perchlorate, cadmium, and potassium nitrate (Conklin 2010). The expended and non-expended shells (trash) remaining on the ground surface following the event would be the responsibility of the Contractor to properly dispose of in accordance with NFPA 1124, Code for the Manufacture, Transportation, and Storage of Fireworks and Pyrotechnic Articles; Title 27 CFR 18, Bureau of Alcohol, Tobacco and Firearms, Part 181, Commerce in Explosives, and Title 49 CFR 171-177, U.S. Department of Transportation. No significant impacts are anticipated as a result of the Proposed Action.

4.3.6.2.2 Alternative Action

No hazardous waste would be generated as a result of the Alternative Action; therefore, there would be no anticipated changes in baseline conditions described in Section 3.3.6.2.

4.3.6.2.3 No Action Alternative

Under the No Action Alternative, there would be no change in the baseline conditions described in Section 3.3.6.2.

4.3.6.3 Measures to Reduce Impacts

Given the proper storage, use, and disposal by the Contractor of all hazardous materials and waste associated with the Proposed Action, impacts would not be expected from the proposed activities and no mitigation measures would be required.

4.3.7 Infrastructure and Utilities

An impact to infrastructure and utilities would be considered significant based on the following criteria: 1) the degree to which a utility service would have to alter infrastructure, operating practices, and/or personnel requirements; or, (2) the degree to which the change in demands from implementation of the proposed or alternative action would impact the utility system's capacity.

4.3.7.1 Electricity

4.3.7.1.1 Proposed Action

The fireworks display would not utilize any electricity; therefore, under the Proposed Action, there would be no change in the baseline conditions described in Section 3.3.7.1.

4.3.7.1.2 Alternative Action

The solid state lasers used for laser light shows can be run from a standard wall outlet (e.g., 110 volts in the U.S.), and are air cooled by simple fans (International Laser Display Association [ILDA] 2007). The light show would use existing electrical infrastructure. Therefore, under the Alternative Action, there would be no change in the baseline conditions described in Section 3.3.7.1.

4.3.7.1.3 No Action Alternative

Under the No Action Alternative, there would be no change in the baseline conditions described in Section 3.3.7.1.

4.3.8 Safety

The potential to increase or decrease safety risks to the public, the military, and property were analyzed in this section. Safety measures that could be implemented to minimize potential safety risks are also addressed. Significant impacts to safety would occur if there is an increase in the number and/or severity of incidents at the site.

4.3.8.1 Proposed Action

Obvious hazards associated with a pyrotechnics display include injury or death due to direct contact with exploding material. Less obvious hazards involved with the Proposed Action includes vehicular traffic accidents in route to, or within, designated parking areas and non-designated parking areas. Interference with aerial fireworks and aircraft approaching the runway could also be a hazard.

In general, the pyrotechnics contractor would be responsible for conducting all activities associated with the fireworks display in accordance with NFPA 1123. In addition, even though the proposed launch site is not located on Luke AFB, the contractor and Air Force personnel associated with the event would be required to comply with the relevant sections of AFMAN 91-201. During the fireworks display, personnel from 56th Security Forces would be located along the perimeter of the launch site and associated fallout zone to prohibit access by unauthorized personnel (Martin 2014). By restricting access to the area to authorized, trained and licensed pyrotechnics personnel, the potential for direct impact to individuals from exploding materials would be minimized.

Because the proposed launch site and fallout zone are located on bare ground, fires resulting from the Proposed Action would not be anticipated. However, Luke Fire Emergency Services personnel, in coordination with the Rural Metro Fire Department personnel, would patrol the area

during and after the event to observe and respond to any fires that result from the Proposed Action (Martin 2014).

Traffic safety on-base would be monitored and patrolled by the 56th Security Forces. No parking or viewing areas would be permitted outside of the official viewing area at Fowler Park on the base. Traffic and pedestrian traffic or spectators outside of the base, along the perimeter of the proposed launch site along North Dysart Road or Northern Parkway would be monitored and patrolled by the Maricopa County Sheriff's Department (Martin 2014).

Prior to the event, the 56th FSS would coordinate the details of the fireworks display with Base Operations. Base Operations would then coordinate with the Airfield Tower and the Supervisor of Flying would contact all flying groups to ensure that no flights would occur during the fireworks display. As the display would occur during the evening hours on a holiday, no flight operations would be regularly scheduled to occur during the event. The coordination between groups provides additional measures to ensure no interference between the fireworks and aircraft. In the event that aircraft must be deployed from the airfield, the 56th FSS would be contacted and the fireworks display would be postponed or cancelled, as appropriate (Martin 2014).

Given the employment of the safety measures discussed above, no significant impacts to safety would be anticipated as a result of the Proposed Action.

4.3.8.2 Alternative Action

The potential safety risks associated with the Alternative Action, a laser show at Fowler Park, are limited to potential traffic related accidents and interference with aircraft. Risks associate with traffic related accidents would be the same as those discussed above.

With regards to interference with aircraft, at very close ranges the beam may be an eye hazard. At longer distances the brief but bright flash as the plane flies through the beam could temporarily flashblind a pilot (like a bright camera flash). To remain safe, the laser show operator would take into account the direction and power of beams in relation to the airfield and air routes. In addition, the operators could plan for control measures such as spotters, who would turn off the laser temporarily if an aircraft was approaching (ILDA 2014).

As discussed above, the 56th FSS would coordinate the details of the laser light show with Base Operations prior to the event. Base Operations would then coordinate with the Airfield Tower and the Supervisor of Flying would contact all flying groups to ensure that no flights would occur during the light show. As the light show would occur during the evening hours on a holiday, no flight operations would be regularly scheduled to occur during the event. The coordination between groups provides additional measures to ensure no interference from the laser light show on aircraft. In the event that aircraft must be deployed from the airfield, the 56th FSS would be contacted and the laser light show would be altered, as appropriate, to avoid interference with aircraft.

Given the employment of the safety measures discussed above, no significant impacts to safety would be anticipated as a result of the Alternative Action.

4.3.8.3 No Action Alternative

Under the No Action Alternative, there would be no potential to increase or decrease safety risks to the public, the military, and property.

4.3.8.4 Measures to Reduce Impacts

The proposed or alternative actions would not be expected to substantially increase or decrease safety risks to the public, the military, and property. The potential for increased safety risks as a result of the proposed or alternative actions would be minimized by implementation of the following:

- The pyrotechnics contractor and any supporting Air Force personnel would conduct all activities associated with the fireworks display in accordance with the relevant sections of NFPA 1123 and AFMAN 91-201;
- 56th Security Forces would monitor the perimeter of the launch site and associated fallout zone to prohibit access by unauthorized personnel;
- Luke Fire Emergency Services personnel, in coordination with the Rural Metro Fire Department personnel, would patrol the area during and after the event to observe and respond to any fires;
- Traffic safety monitoring would be conducted by 56th Security Forces on base and Maricopa County Sheriff's Department off base; and
- Coordination between 56th FSS, Base Operations, and the Airfield Managers would occur to ensure no interference with aircraft operations.

Given the implementation of the measures listed above, no adverse impacts to safety would be anticipated as a result of the Proposed Action.

4.4 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 Section 2.6, other proposed projects have been announced at Luke AFB and the surrounding community. These actions are not directly related to the proposed or alternative actions evaluated in this EA. This EA addresses the environmental impacts of these other actions only in the context of potential cumulative impacts, if any. It is not practical to catalogue each minor project proposed to occur over the short-term duration of the proposed and alternative actions; therefore, the only projects considered and analyzed are those with a potential for cumulative effects in concert with the proposed or alternative actions. Actions considered for cumulative effects only include the concurrent fireworks displays that would occur at approximately the same time as the proposed or alternative actions each year. An example list of these events is included in Section 2.6.

Land Use. The implementation of the proposed or alternative actions would not be incompatible with the current or future surrounding land uses related to any concurrent or reasonably foreseeable future actions and, therefore, would not contribute to cumulative effects on land use.

Air Quality. The emissions from the Proposed Action would be short term in nature. The emissions would be temporary, localized and would be eliminated after the activity is completed. These emissions quickly dissipate as they are transported from the activity source, thereby preventing contribution to cumulative impacts to air quality.

The cumulative impacts from the Proposed Action, other future projects, and other firework displays are expected to have no significant impact when compared to the total criteria pollutant emissions for Maricopa County. The limited amount of GHG emissions from the Proposed Action would not contribute significantly to climate change, but any emission of GHGs represents an incremental increase in global GHG concentrations.

The Alternative Action would not generate air emissions; therefore, it would not contribute to cumulative effects on air quality.

Biological Resources. No impacts to biological resources are anticipated as a result of the proposed or alternative actions. Additionally, none of the concurrent or reasonably foreseeable future actions are located in areas that would be expected to result in impacts to biological resources. Therefore, the proposed and alternative action would not contribute to cumulative effects to biological resources in or around Luke AFB.

Earth Resources. No impacts to earth resources are anticipated as a result of the proposed or alternative actions. Additionally, none of the concurrent or reasonably foreseeable future actions are located in areas that would be expected to result in impacts to earth resources in the proposed project areas. Therefore, the proposed and alternative action would not contribute to cumulative effects to earth resources in or around Luke AFB.

Water Resources. No impacts to water resources are anticipated as a result of the proposed or alternative actions. Additionally, none of the concurrent or reasonably foreseeable future actions are located in areas that would be expected to result in impacts to water resources in the proposed project areas. Therefore, the proposed and alternative action would not contribute to cumulative effects to water resources in or around Luke AFB.

Hazardous Materials and Wastes. The proposed and alternative actions, as well as concurrent actions would require the management of hazardous materials and wastes. Management of these materials and waste streams would occur under the existing Luke AFB management programs, and according to state and federal regulations; therefore, implementation of the proposed or alternative actions would not contribute to cumulative effects to hazardous materials and wastes in or around Luke AFB.

Infrastructure and Utilities. No impacts to infrastructure and utilities are anticipated as a result of the proposed or alternative actions. Additionally, none of the concurrent or reasonably foreseeable future actions are located in areas that would be expected to result in impacts to infrastructure or utilities in the proposed project areas. Therefore, the proposed and alternative

action would not contribute to cumulative effects to infrastructure and utilities in or around Luke AFB.

Safety. Neither the proposed nor alternative actions would be expected to substantially increase or decrease safety risks to the public, the military, nor property as safety measures would be implemented to minimize impacts. Additionally, none of the concurrent or reasonably foreseeable future actions would occur at the same time of day as the proposed or alternative actions. Therefore, potential impacts related to utilization of security or fire personnel during the proposed or alternative actions would not contribute to cumulative effects on the other actions.

CHAPTER 5: LIST OF PREPARERS

Name/Organization	Degree	Resource Area	Years of Experience
Tana Jones	BS Natural Resource Management	Project Manager; Resource Lead, Land Use; Biological Resources; and Safety	16
Kevin Eldridge	BS Meteorology; MS Atmospheric Sciences	Resource Lead, Air Quality	29
Barry Peterson	BS Meteorology; MS Atmospheric Sciences	Resource Specialist, Air Quality	14
Leigh Ann Kollath	BS Chemical Engineering; MS Chemical Engineering	Resource Specialist, Earth Resources	13
Patricia Beckley	BS Geology/ Hydrogeology	Resource Specialist, Water Resources; Hazardous Materials and Waste; and Infrastructure and Utilities	8
Tamara Carroll	BS Bioenvironmental Science	Technical Review	12
Barbara Wethington	BS Environmental Restoration and Hazardous Waste	Technical Review	16

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CHAPTER 6: LIST OF PERSONS AND AGENCIES CONSULTED

This chapter lists the individuals consulted during the preparation of this EA.

Federal Agencies

Luke Air Force Base, Arizona
Martin, Ronald (Luke Fire Emergency Services)
Mendenhall, Scott (56 CES/CENPL)
Newell, Yvonne (56 CES/CEIE)
Pangelinan, Michael (56 CES/CEIAP)
Rothrock, Charles (56 CES/CEIE)
Shaw, James (56 FSS/FSC)

Native American Organizations

Ak-Chin Indian Community
Manuel, Louis (Chairman)
Antone, Caroline (Cultural Resource Manager)

Cocopah Tribe
Cordova, Sherry (Chairman)
McCormick, Jill (Cultural Resource Manager)

Colorado River Indian Tribes
Patch, Dennis (Chairman)
Fisher-Holt, Wilene (Museum/Cultural Resource Director)

Fort McDowell Yavapai Tribe
Balderas, Ruben (President)
Ray, Karen (Cultural Department)

Fort Mojave Indian Tribe
Williams, Timothy (Chairman)
Otero, Linda (AhaMakav Cultural Preservation Office)

Fort Yuma-Quechan Tribe
Escalanti, Keeny (President)
Kingerv, Arlene (Historic Preservation Officer)

Gila River Indian Community
Mendoza, Gregory (Governor)
Lewis, Barnaby (Tribal Historic Preservation Officer, Cultural Resource Management Program)

Hualapai Tribe
Counts, Sherry (Chairman)
Jackson-Kelly, Loretta (Tribal Historic Preservation Officer, Office of Cultural Resources)

Kaibab Band of Paiute Indians
Maldonado, Roland (Chairman)
Bullets, Charley (Director, Cultural Resources Office)

Pueblo of Zuni
Quetawki, Arlen Sr. (Governor)
Dongoske, Kurt (Tribal Historic Preservation Officer, Zuni Heritage and Historic Preservation Office)

Salt-River Pima-Maricopa Indian Community
Enos, Diane (President)
Anton, Shane (Cultural Preservation Program Supervisor, Cultural & Environmental Services)

San Carlos Apache Tribe
Rambler, Terry (Chairman)
Grant, Vernalda (Tribal Historic Preservation Officer, Historic Preservation and Archaeology Department)

Tohono O'Odham Nation
Norris, Ned (Chairman)
Steere, Peter (Tribal Historic Preservation Officer, Cultural Affairs Department)

Yavapai-Apache Nation
Beauty, Thomas (Chairman)
Coder, Christopher (Archaeologist, Cultural Resources)

Yavapai-Prescott Indian Tribe
Jones, Sr., Ernest (President)
Glassco, Greg (Compliance Officer, Cultural Research Department)

City of Glendale Agencies

City of Glendale Mayor's Office
Weiers, Jerry (Mayor)

City of Glendale Planning Department
Ritz, Thomas (Senior Planner)

City of Glendale Transportation Services Department
Colbath, Cathy (Executive Director)

City of Glendale Water Services Department
Johnson, Craig (Executive Director)

Glendale Chamber of Commerce
Heidt, Robert Jr. (President)

Maricopa County Agencies

Maricopa County Air Quality Department
Frank, Daren (Interim Deputy Director)

Flood Control District of Maricopa County
Wiley, William (Chief Engineer and General Manager)

Maricopa Association of Governments
Smith, Dennis (Executive Director)

Other Agencies and Individuals

Arizona Department of Environmental Quality
Shaffer, Mark (Director of Communications)

Arizona Game and Fish Department
Audrey Owens (Project Evaluation Specialist)

Arizona Department of Transportation
O'Brien, Paul (Transportation and Planning Division)

Arizona Historical Society
Woosley, Anne (Executive Director)

City of Litchfield Park
Ransom, Chuck (Director of Field Operations)

FEMA – Region 9
Angila, Alessandro (Environmental Officer)

State Historic Preservation Office
Garrison, James (State Historic Preservation Officer)

US Army Corps of Engineers – Los Angeles District
Derungs, Joe (Arizona-Nevada Office, Program Manager for Luke AFB)

USEPA-Region 9
Johnson, Kathleen (Director, Enforcement Division)

US Fish and Wildlife – Region 2
Tuttle, Benjamin (Regional Director, Regional Office)

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APPENDIX A – Interagency Coordination and Public Involvement

Note: Only one copy of the Agency and Tribal Scoping Letters is included in this Final EA Appendix.

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DEPARTMENT OF THE AIR FORCE
AIR EDUCATION AND TRAINING COMMAND

26 September 2014

Mr. Mark Shaffer
Arizona Department of Environmental Quality
110 West Washington Street
Phoenix, Arizona 85007

SUBJECT: Fireworks Display and Cleanup at Luke Air Force Base, Arizona

Dear Mr. Shaffer:

Luke Air Force Base (AFB) is preparing an Environmental Assessment (EA) addressing potential environmental impacts from a Fireworks Display and Cleanup (Proposed Action). This display serves as a finale for the Fourth of July celebrations called Freedom Fest which are held by the installation. The purpose of the action is to continue to provide a finale to the Freedom Fest which draws over 2,000 spectators comprised of Airmen and their families. The environmental impact analysis process for this EA is being conducted in accordance with Council on Environmental Quality regulations pursuant to the requirements of the National Environmental Policy Act (NEPA) of 1969.

Under the Proposed Action, a pyrotechnics contractor (contractor) for Luke AFB would set up all equipment required for the fireworks display at the proposed launch site located on private land adjacent to Luke AFB. On July 4th, the fireworks display would begin at sunset and last for approximately 20 minutes. The contractor would remain at the launch site throughout the night to sweep the area for duds and remove all associated equipment and debris. Locating the launch site on private property is needed to provide a safe location from which to launch fireworks where there are limited flammable hazards within proximity of the public viewing venue at Fowler Park on Luke AFB.

Under the alternative action, Luke AFB would conduct a laser light show at Fowler Park at the conclusion of the Freedom Fest celebration. The laser light show would consist of projected multi-colored laser beams shot into the sky above the Park.

As required by NEPA, Luke AFB will also consider taking no action. By taking no action, there would be no fireworks display or laser light show during the Luke AFB Fourth of July celebrations. All alternative strategies, including the No Action Alternative, will be assessed in the EA.

In accordance with EO 12372, *Intergovernmental Review of Federal Programs*, Luke AFB is requesting input from other federal, state, and local agencies on their proposal. Please identify any resources within your agency's purview that could potentially be impacted by implementation of the Proposed Action. To facilitate cumulative impact analysis, we would also appreciate identification of major projects in the vicinity that may contribute to cumulative impacts associated with this proposal.

Please provide any comments or information within 30 days of the date of this letter. Responses should be sent directly to:

Mr. Jeff Rothrock
56 CES/CEIE
13970 Gillespie Drive
Luke AFB, AZ 85309-1149

Your assistance in providing information is greatly appreciated. If you have any questions, please contact me at (623) 856-3832 or charles.rothrock@us.af.mil.

Sincerely,

JEFF ROTHROCK
Environmental Chief

Attachments: Figure 1 - Location of Proposed Action

DEPARTMENT OF THE AIR FORCE
AIR EDUCATION AND TRAINING COMMAND

4 Nov 14

Jeff Rothrock
Environmental Chief
56 CES/CEIE
13970 Gillespie Drive
Luke AFB Arizona 85309-1149

Chairmen Louis J. Manual
Ak-Chin Indian Community
42507 West Peters and Nall Road
Maricopa, Arizona 85239

Re: Section 106 Consultation Luke Air Force Base Fireworks Display -"No Historic Properties Affected"

Dear Chairmen or President

Luke Air Force Base (AFB) is in the process of preparing an Environmental Assessment for our July 4th fireworks display. We are initiating review under Section 106 for the proposed undertaking.

The undertaking consists of a fireworks display which serves as a finale for the Fourth of July celebrations called Freedom Fest. A pyrotechnics contractor for Luke AFB would set up all equipment required for the fireworks display at the proposed launch site located on private land adjacent to Luke AFB (attachment). On July 4th, the fireworks display would begin at sunset and last for approximately 20 minutes. The contractor would remain at the launch site throughout the night to sweep the area for duds and remove all associated equipment and debris. Locating the launch site on private property is needed to provide a safe location from which to launch fireworks where there are limited flammable hazards within proximity of the public viewing venue at Fowler Park on Luke AFB.

The launch site and fallout zone are wholly contained on private property. The property is an undeveloped agricultural field of approximately 153 acres and is actively farmed. The area is constantly disturbed due to the farming activities and has been used for agricultural purposes for at least the past 40 years. Currently, the fields are used to plant nurse crops in the summer months and potatoes in the winter months. No intrusive, ground disturbing activities will occur as part of the fireworks display. Since the land has been disturbed for the last 40 years, and no intrusive activities will be conducted for the fireworks display, Luke recommends a finding of "No Historic Properties Affected".

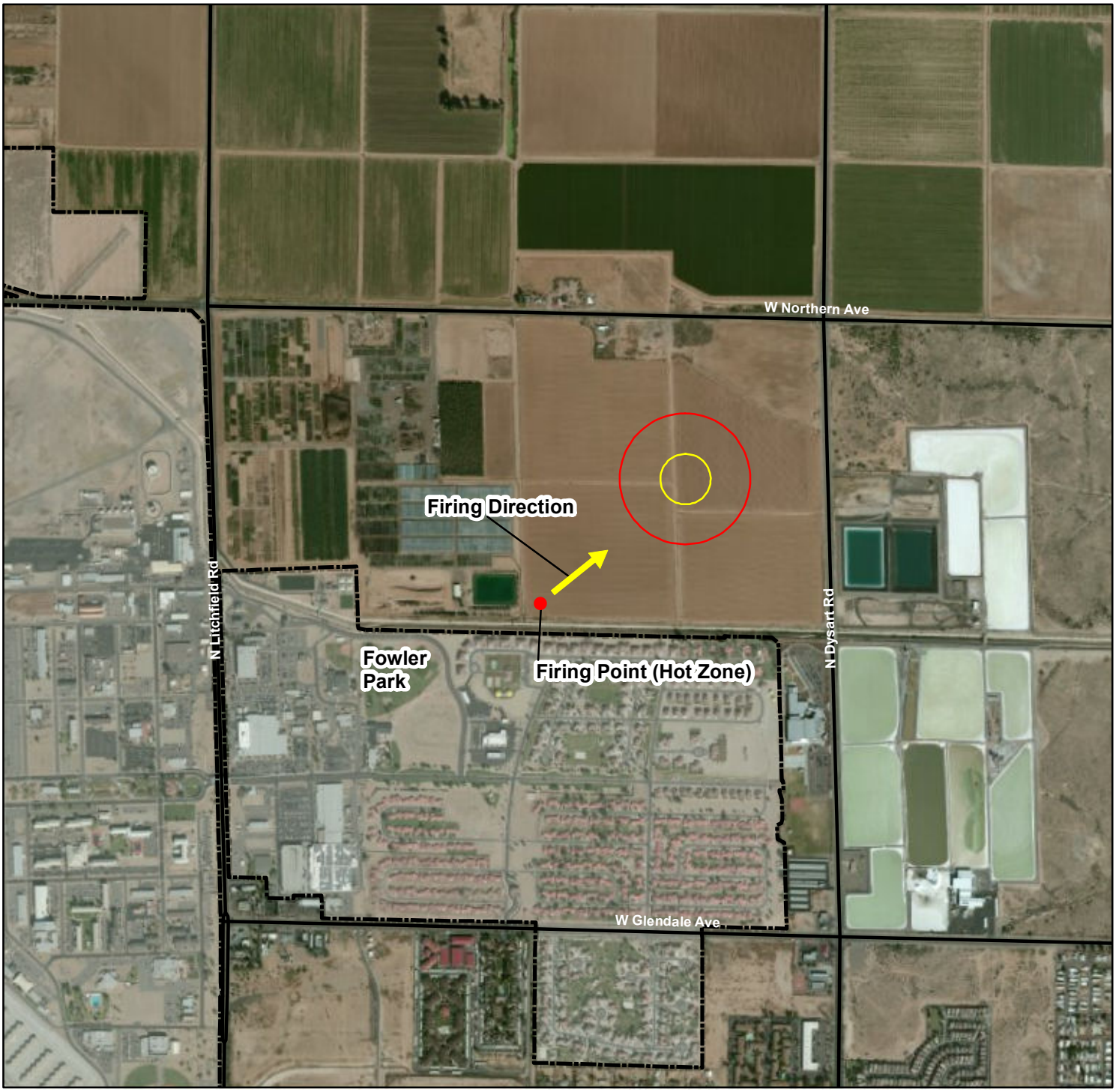
We request that you please provide any comments within 30 days to Mr. Jeff Rothrock at the above address. Should you have any questions or require additional information, please feel free to contact myself at (623) 856-3832 or at charles.rothrock@luke.af.mil.

Sincerely

JEFF ROTHROCK

cc: Caroline Antone, Cultural Resource Manager

Attachment
Location of Fireworks Display



Legend

- Local Road
- Display Site
- Fallout Zone
- Luke Air Force Base

Figure 1
Location of Proposed Action
Luke Air Force Base
Maricopa County, Arizona

0 1,250 2,500

Approximate scale in feet

N

Aerial Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
Date: 11/2010
Coordinates: UTM NAD83 12N

U.S. AIR FORCE

WESTON SOLUTIONS
960 W. Elliot Road, Suite 101
Tempe, AZ 85284

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DEPARTMENT OF THE AIR FORCE
AIR EDUCATION AND TRAINING COMMAND

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26 September 2014

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ARIZONA STATE HISTORIC PRESERVATION OFFICE

Mr. James Garrison
State Historic Preservation Office
1300 West Washington Street
Phoenix, Arizona 85007

SUBJECT: Fireworks Display and Cleanup at Luke Air Force Base, Arizona

Dear Mr. Garrison:

Luke Air Force Base (AFB) is preparing an Environmental Assessment (EA) addressing potential environmental impacts from a Fireworks Display and Cleanup (Proposed Action). This display serves as a finale for the Fourth of July celebrations called Freedom Fest which are held by the installation. The purpose of the action is to continue to provide a finale to the Freedom Fest which draws over 2,000 spectators comprised of Airmen and their families. The environmental impact analysis process for this EA is being conducted in accordance with Council on Environmental Quality regulations pursuant to the requirements of the National Environmental Policy Act (NEPA) of 1969.

Under the Proposed Action, a pyrotechnics contractor (contractor) for Luke AFB would set up all equipment required for the fireworks display at the proposed launch site located on private land adjacent to Luke AFB. On July 4th, the fireworks display would begin at sunset and last for approximately 20 minutes. The contractor would remain at the launch site throughout the night to sweep the area for duds and remove all associated equipment and debris. Locating the launch site on private property is needed to provide a safe location from which to launch fireworks where there are limited flammable hazards within proximity of the public viewing venue at Fowler Park on Luke AFB.

Under the alternative action, Luke AFB would conduct a laser light show at Fowler Park at the conclusion of the Freedom Fest celebration. The laser light show would consist of projected multi-colored laser beams shot into the sky above the Park.

As required by NEPA, Luke AFB will also consider taking no action. By taking no action, there would be no fireworks display or laser light show during the Luke AFB Fourth of July celebrations. All alternative strategies, including the No Action Alternative, will be assessed in the EA.

In accordance with EO 12372, *Intergovernmental Review of Federal Programs*, Luke AFB is requesting input from other federal, state, and local agencies on their proposal. Please identify any resources within your agency's purview that could potentially be impacted by implementation of the Proposed Action. To facilitate cumulative impact analysis, we would also appreciate identification of major projects in the vicinity that may contribute to cumulative impacts associated with this proposal.

Please provide any comments or information within 30 days of the date of this letter. Responses should be sent directly to:

Mr. Jeff Rothrock
56 CES/CEIE
13970 Gillespie Drive
Luke AFB, AZ 85309-1149

Your assistance in providing information is greatly appreciated. If you have any questions, please contact me at (623) 856-3832 or charles.rothrock@us.af.mil.

Sincerely,

JEFF ROTHROCK
Environmental Chief

Attachments: Figure 1 - Location of Proposed Action

for ARIZONA STATE HISTORIC PRESERVATION OFFICE 10-10-14

We look forward to the Section 106 Submittal!

SHPO - 2014-1073 (122537) /NHPA
ARIZONA STATE HISTORIC PRESERVATION OFFICE

DEPARTMENT OF THE AIR FORCE
AIR EDUCATION AND TRAINING COMMAND

31 Oct 14

Jeff Rothrock
Environmental Chief
56 CES/CEIE
13970 Gillespie Drive
Luke AFB Arizona 85309-1149

RECEIVED
NOV 04 2014
KD
ARIZONA STATE HISTORIC PRESERVATION OFFICE

Ms. Ann Howard
Arizona State Historic Preservation Office
Arizona State Parks
1300 West Washington Street
Phoenix Arizona 85007

Re: Section 106 Consultation Luke Air Force Base Fireworks Display -"No Historic Properties Affected"

Dear Ms. Howard

In September 2014 Luke Air Force Base (AFB) sent your office a letter advising you of our intent to prepare an Environmental Assessment for a fireworks display. We are initiating review under Section 106 for the proposed undertaking.

The undertaking consists of a fireworks display which serves as a finale for the Fourth of July celebrations called Freedom Fest. A pyrotechnics contractor for Luke AFB would set up all equipment required for the fireworks display at the proposed launch site located on private land adjacent to Luke AFB (attachment). On July 4th, the fireworks display would begin at sunset and last for approximately 20 minutes. The contractor would remain at the launch site throughout the night to sweep the area for duds and remove all associated equipment and debris. Locating the launch site on private property is needed to provide a safe location from which to launch fireworks where there are limited flammable hazards within proximity of the public viewing venue at Fowler Park on Luke AFB.

The launch site and fallout zone are wholly contained on private property. The property is an undeveloped agricultural field of approximately 153 acres and is actively farmed. The area is constantly disturbed due to the farming activities and has been used for agricultural purposes for at least the past 40 years. Currently, the fields are used to plant nurse crops in the summer months and potatoes in the winter months. No intrusive, ground disturbing activities will occur as part of the fireworks display. Since the land has been disturbed for the last 40 years, and no intrusive activities will be conducted for the fireworks display, Luke recommends a finding of "No Historic Properties Affected".

We request that you please provide any comments within 30 days to Mr. Jeff Rothrock at the above address. Should you have any questions or require additional information, please feel free to contact myself at (623) 856-3832 or at charles.rothrock@luke.af.mil.

Sincerely

JEFF ROTHROCK

Attachment
Location of Fireworks Display

No Historic Properties Affected

11-12-14

Arizona State Historic Preservation Office
Arizona State Parks Board

JERRY P. WEIERS
5850 W. Glendale Avenue
Glendale, AZ 85301

Phone (623) 930-2260
Fax (623) 937-2764

Mayor
City of Glendale

Mr. Jeff Rothrock
56 CES/CEIE
13970 Gillespie Drive
Luke AFB, AZ 85309-1149

Mr. Rothrock:

The City of Glendale has reviewed Luke Air Force Base's plans for a Fireworks Display and Cleanup for the Fourth of July celebration called Freedom Fest. The City of Glendale does not object to the proposed action.

We hope that the event will a success for the airmen and their families. If you have any questions, please feel free to contact Brent Stoddard, Intergovernmental Program Director at bstoddard@glendaleaz.com or 623-930-2078.

In your service,

Mayor Jerry P. Weiers

Flood Control District
of Maricopa County

www.fcd.maricopa.gov

William D. Wiley, P.E.
Chief Engineer and
General Manager
2801 West Durango Street
Phoenix, Arizona 85009
Phone: 602-506-1501
Fax: 602-506-4601

October 6, 2014

Jeff Rothrock
56 CES/CEIE
13970 Gillespie Drive
Luke AFB, AZ 85309-1149

Re: Fireworks Display and Cleanup at Luke Air Force Base, Arizona

Dear Mr. Rothrock:

We are pleased to inform you that we carefully reviewed your proposed Freedom First and Firework Display and have concluded that it will not adversely impact the Flood Control District of Maricopa County. Thank you for considering us in this Action.

We are looking forward to this year's event and send our gratitude for the services that are provided by you and your fellow service men and women.

Sincerely,

William D. Wiley P.E.
Chief Engineer and General Manager

From: Frank Schinzel - AQDX [mailto:FrankSchinzel@mail.maricopa.gov]
Sent: Monday, October 06, 2014 3:22 PM
To: ROTHROCK, CHARLES J GS-13 USAF AETC 56 CES/CEIE
Cc: Daren K. Frank - PLANDEVX
Subject: Fourth of July Fireworks

It was a pleasure talking with you today Jeff. As mentioned, you will not be required under our Rule 314 (http://www.maricopa.gov/aq/divisions/planning_analysis/rules/docs/314-1207.pdf), Open Outdoor Fires, to have a permit from our department for the actual use of the fireworks. However, the contractor will fall under our Rule 310.01 (http://www.maricopa.gov/aq/divisions/planning_analysis/rules/docs/310.01.pdf), Fugitive Dust from Non-Traditional Sources. There should be no dust or trackout from equipment/vehicle use before, during and after the event. If the contractor has to do any earthmoving activity (leveling the site, grading, etc) prior to use, that is more than a tenth of an acre, the contractor will be required to get a Rule 310, Fugitive Dust from Dust-Generating Operations, (http://www.maricopa.gov/aq/divisions/planning_analysis/rules/docs/310-1001.pdf) permit from our department.

If you or the contractor have any questions, please contact me.

Frank

Frank Schinzel
Government Liaison
Maricopa County Air Quality Department
1001 North Central Avenue, suite 125
Phoenix, Arizona 85004
Located at the Central Ave. & Roosevelt METRO stop
602.506.6940 *office* 602.525.1074 *cell*
CleanAirMakeMore.com

United States Department of the Interior

U.S. Fish and Wildlife Service
Arizona Ecological Services Office
2321 West Royal Palm Road, Suite 103
Phoenix, Arizona 85021-4951
Telephone: (602) 242-0210 Fax: (602) 242-2513

In reply refer to:
AESO/SE
22410-2015-SLI-0132

December 11, 2014

Mr. Jeff Rothrock
56 CES/CEIE
13970 Gillespie Drive
Luke Air Force Base, Arizona 85309-1149

Dear Mr. Rothrock:

Thank you for your correspondence of September 26, 2014, received in our office October 7, 2014, requesting review by the U.S. Fish and Wildlife Service of the proposed Fireworks Display and Cleanup at Luke Air Force Base, Arizona. This letter documents our recommendations regarding this project, in compliance with section 7 of the Endangered Species Act of 1973 as amended (16 U.S.C. 1531 et seq.). In your letter you outlined two alternative actions: 1) a pyrotechnics display, including cleanup, and 2) a laser light show at Fowler Park. Based on the information that you have provided, we believe that no endangered or threatened species or critical habitat will be affected by this project; nor is this project likely to jeopardize the continued existence of any proposed species or adversely modify any proposed critical habitat. No further review is required for this project at this time. Should project plans change or if additional information on the distribution of listed or proposed species becomes available, this determination may need to be reconsidered. We encourage you to coordinate review of this project with the Arizona Game and Fish Department.

Should you require further assistance or if you have any questions, please contact Jessica Gwinn (x249) or Mike Martinez (x224). Thank you for your continued efforts to conserve endangered species.

Sincerely,

Steven L. Spangle
Field Supervisor

cc (electronic): Tana Jones, Weston Solutions Inc. (tana.jones@westonsolutions.com)
Chief, Habitat Branch, Arizona Game and Fish Department, Phoenix, AZ (pep@azgfd.gov)
Regional Supervisor, Region VI, Arizona Game and Fish Department, Mesa, AZ (kwolffkrauter@azgfd.gov)

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Arizona Ecological Services Field Office
2321 WEST ROYAL PALM ROAD, SUITE 103
PHOENIX, AZ 85021
PHONE: (602)242-0210 FAX: (602)242-2513
URL: www.fws.gov/southwest/es/arizona/;
www.fws.gov/southwest/es/EndangeredSpecies/lists/

Consultation Tracking Number: 02EAAZ00-2015-SLI-0132 December 01, 2014
Project Name: Luke AFB Fireworks Display and Cleanup

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project.

To Whom It May Concern:

The Fish and Wildlife Service (Service) is providing this list under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*). The list you have generated identifies threatened, endangered, proposed, and candidate species, and designated and proposed critical habitat, that *may* occur within one or more delineated United States Geological Survey 7.5 minute quadrangles with which your project polygon intersects. Each quadrangle covers, at minimum, 49 square miles. Please refer to the species information links found at http://www.fws.gov/southwest/es/arizona/Docs_Species.htm or http://www.fws.gov/southwest/es/arizona/Documents/MiscDocs/AZSpeciesReference.pdf for a quick reference, to determine if suitable habitat for the species on your list occurs in your project area.

The purpose of the Act is to provide a means whereby threatened and endangered species and the habitats upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of Federal trust resources and to determine whether projects may affect federally listed species and/or designated critical habitat. A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If the Federal action agency determines that listed species or critical habitat *may be affected* by

a federally funded, permitted or authorized activity, the agency must consult with us pursuant to 50 CFR 402. Note that a "may affect" determination includes effects that may not be adverse and that may be beneficial, insignificant, or discountable. An effect exists even if only one individual or habitat segment may be affected. The effects analysis should include the entire action area, which often extends well outside the project boundary or "footprint" (e.g., downstream). If the Federal action agency determines that the action may jeopardize a *proposed* species or adversely modify *proposed* critical habitat, the agency must enter into a section 7 conference. The agency may choose to confer with us on an action that may affect proposed species or critical habitat.

Candidate species are those for which there is sufficient information to support a proposal for listing. Although candidate species have no legal protection under the Act, we recommend that they be considered in the planning process in the event they become proposed or listed prior to project completion. More information on the regulations (50 CFR 402) and procedures for section 7 consultation, including the role of permit or license applicants, can be found in our Endangered Species Consultation Handbook at: http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF.

In addition to species listed under the Act, we advise you to consider species protected under the Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703-712) and the Bald and Golden Eagle Protection Act (BGEPA) (16 U.S.C. 668 *et seq.*). Both laws prohibit the take of covered species. The list of MBTA-protected birds is in 50 CFR 10.13 (for an alphabetical list see http://www.fws.gov/migratorybirds/RegulationsPolicies/mbta/MBTANDX.HTML). The Service's Division of Migratory Birds is the lead for consultations under these laws (Southwest Regional Office phone number: 505/248-7882). For more information regarding the MBTA, BGEPA, and permitting processes, please visit the following web site: http://www.fws.gov/migratorybirds/mbpermits.html. Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g. cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/southwest/es/arizona/CellTower.htm

Although bald eagles (*Haliaeetus leucocephalus*) are no longer listed under the Act, they are protected under both the BGEPA and the MBTA. If a bald eagle nest occurs in or near the proposed project area, our office should be contacted. An evaluation must be performed to determine whether the project is likely to disturb nesting bald eagles (see http://www.fws.gov/southeast/es/baldeagle/) and the Division of Migratory Birds consulted if necessary. The National Bald Eagle Management Guidelines provide recommendations to minimize potential project impacts to bald eagles (see http://www.fws.gov/midwest/eagle/pdf/NationalBaldEagleManagementGuidelines.pdf).

Activities that involve streams and/or wetlands are regulated by the U.S. Army Corps of Engineers (Corps). We recommend that you contact the Corps to determine their interest in proposed projects in these areas. For activities within a National Wildlife Refuge, we recommend that you contact refuge staff for specific information about refuge resources.

If your action is on Indian land or has implications for off-reservation tribal interests, we encourage you to contact the tribe(s) and the Bureau of Indian Affairs (BIA) to discuss potential tribal concerns, and to invite any affected tribe and the BIA to participate in the section 7

consultation. In keeping with our tribal trust responsibility, we will notify tribes that may be affected by proposed actions when section 7 consultation is initiated. For more information, please contact our tribal coordinator, John Nystedt, at (928) 556-2160 or John_Nystedt@fws.gov.

The State of Arizona protects some species not protected by Federal law. We recommend you contact the Arizona Game and Fish Department (AGFD) for animals and Arizona Department of Agriculture for plants to determine if species protected by or of concern to the State may occur in your action area. The AGFD has an Environmental Review On-Line Tool that can be accessed at http://www.azgfd.gov/hgis/. We also recommend that you coordinate with the AGFD regarding your project.

For additional communications regarding this project, please refer to the consultation Tracking Number in the header of this letter. We appreciate your concern for threatened and endangered species. If we may be of further assistance, please contact Brenda Smith at 928/556-2157 for projects in Northern Arizona, our general Phoenix number (602/242-0210) for central Arizona, or Jean Calhoun at 520/670-6150 (x223) for projects in southern Arizona.

Sincerely,

/s/

Steven L. Spangle

Field Supervisor

Attachment

United States Department of Interior
Fish and Wildlife Service

Project name: Luke AFB Fireworks Display and Cleanup

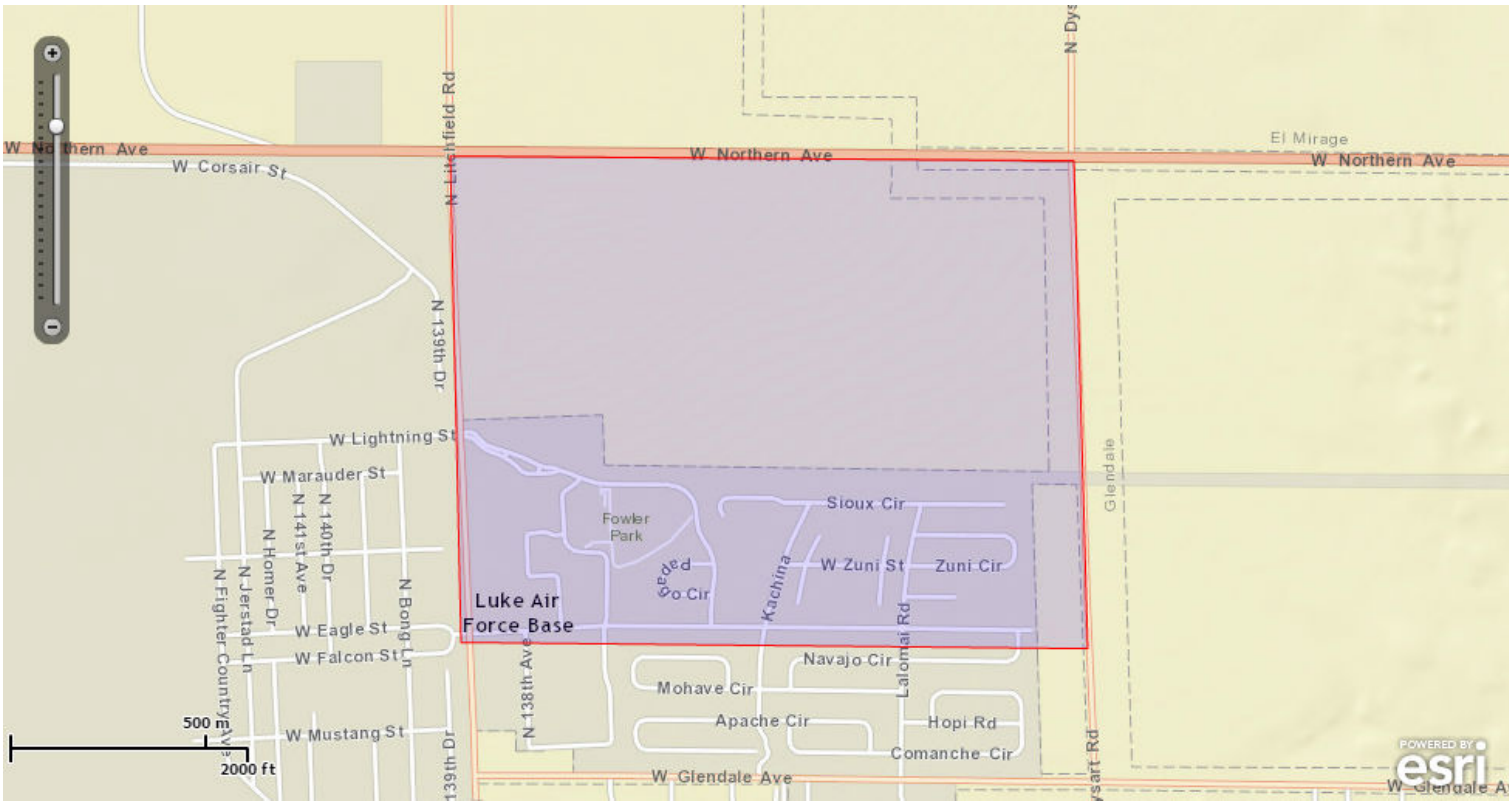
Official Species List

Provided by:

Arizona Ecological Services Field Office
2321 WEST ROYAL PALM ROAD, SUITE 103
PHOENIX, AZ 85021
(602) 242-0210
http://www.fws.gov/southwest/es/arizona/
http://www.fws.gov/southwest/es/EndangeredSpecies/lists/

Consultation Tracking Number: 02EAAZ00-2015-SLI-0132
Project Type: ** Other **
Project Description: Proposed action consists of annual Fourth of July fireworks on the agricultural field south of Northern Avenue and west of Dysart Road.

Project Location Map:



Project Coordinates: MULTIPOLYGON (((-112.3588623 33.5511467, -112.3415674 33.551043, -112.3411812 33.5397743, -112.3585662 33.5399138, -112.3588623 33.5511467)))

Project Counties: Maricopa, AZ

Endangered Species Act Species List

There are a total of 7 threatened, endangered, or candidate species on your species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Critical habitats listed under the **Has Critical Habitat** column may or may not lie within your project area. See the **Critical habitats within your project area** section further below for critical habitat that lies within your project. Please contact the designated FWS office if you have questions.

Birds	**Status**	**Has Critical Habitat**	**Condition(s)**
California Least tern *(Sterna antillarum browni)*	Endangered		
Southwestern Willow flycatcher *(Empidonax traillii extimus)* Population: Entire	Endangered	Final designated	
Sprague's Pipit *(Anthus spragueii)*	Candidate		
Yellow-Billed Cuckoo *(Coccyzus americanus)* Population: Western U.S. DPS	Threatened	Proposed	
Fishes			
Roundtail chub *(Gila robusta)* Population: Lower Colorado River Basin DPS	Candidate		
Mammals			
Lesser Long-Nosed bat *(Leptonycteris curasoae yerbabuenae)* Population: Entire	Endangered		
Reptiles			

Sonoran desert tortoise *(Gopherus morafkai)*	Candidate		

Critical habitats that lie within your project area

There are no critical habitats within your project area.

THE STATE OF ARIZONA
GAME AND FISH DEPARTMENT
5000 W. CAREFREE HIGHWAY
PHOENIX, AZ 85086-5000
(602) 942-3000 • WWW.AZGFD.GOV

January 30, 2015

Ms. Tana Jones
Weston Solutions, Inc.
960 West Elliot Road
Tempe, AZ 85284

Re: Review of Luke Air Force Base Proposed Fireworks Display Launch Site

Dear Ms. Jones,

The Arizona Game and Fish Department (Department) has received your letter, dated January 8, 2015, regarding the proposed fireworks display launch site and cleanup immediately north of Luke Air Force Base in Maricopa County, AZ. According to the report you generated on December 15, 2014 from the Department's Heritage Data Management System's On-line Review Tool, western burrowing owl (*Athene cunicularia hypugaea*), a special status species that is regulated under the Migratory Bird Treaty Act (MBTA), have been reported within a two-mile radius of the proposed site.

If suitable habitat for this species is present within your project area, the Department recommends conducting an occupancy survey for western burrowing owl to determine if this species occurs within your project footprint. Guidelines for conducting this survey are found in *Burrowing Owl Project Clearance Guidance for Landowners* which can be accessed on-line through the Department's website. Please note that the survey should be conducted by a surveyor that is certified by the Department. If an active burrowing owl burrow is detected, please contact the Department and the U.S. Fish and Wildlife Service for direction, in accordance with the *Burrowing Owl Project Clearance Guidance for Landowners*. http://www.azgfd.gov/pdfs/w_c/owl/BurrowingOwlClearanceProtocol.pdf.

If you have any questions regarding this letter, please contact me at (623) 236-7513.

Sincerely,

Audrey K. Owens
Project Evaluation Program Specialist, Habitat Branch
Arizona Game and Fish Department

cc: Laura Canaca, Project Evaluation Program Supervisor
Kelly Wolff-Krauter, Habitat Program Manager, Region VI

AGFD# M15-01081809

Project Evaluation Request
Arizona Game and Fish Department

Notice: In order to obtain a review of your project, we require all of the information requested on this form to be provided. This review is free of charge. However, due to staff and budgetary constraints, we ask you to submit this form early in the process, as estimated turnaround time is 30 days (if you need this review in less than 30 days, please include a needed by date and we will try to accommodate your request). This request is a preliminary review and further project review should include draft documents and a letter formally requesting further environmental review.

Project Evaluation Objectives:
Habitat Evaluation incorporates fish and wildlife resource needs or features in land and water development projects and land and water management planning efforts in Arizona.

Habitat Protection ensures habitat protection through environmental compliance and regulation, and to monitor the implementation and effectiveness of mitigation commitments for various land and water development projects and management planning activities in Arizona.

Instructions: The Following materials are required to process the request
- **Completed form**
- **Map(s) delineating the project area (preferably a USGS quadrangle map)**
- **Relevant attachments (other supportive documents, photographs, etc.)**

Send to:
Arizona Game and Fish Department
Project Evaluation Program, WMHB
5000 W. Carefree Highway
Phoenix, Arizona 85086
Fax 623-236-7366

Applicant Requesting Project Evaluation

Date of Request: 1/8/15			
Name: Tana Jones	Organization: Weston Solutions, Inc. (contractor) on behalf of Luke AFB		
Street Address	City	State	Zip Code
E-Mail Address: tana.jones@westonsolutions.com	Telephone Number: 720-232-4399	Fax Number	

Individual/Organization/Agency Proposing Project (if different from above)

Name: Jeff Rothrock	Organization: Luke AFB, 56 CES/CEIE, Environmental Chief		
Street Address: 13970 Gillespie Drive	City: Luke AFB	State: AZ	Zip Code: 85209-1149
E-Mail Address: charles.rothrock@us.af.mil	Telephone Number: 623-856-3832	Fax Number	

Location of Proposed Project *Remember to attach a topographic and/or plat map delineating the project area*

County(ies): Maricopa

Township(s): 2N	Range(s): 1W	Section(s): 3

Proposed Project Information

Project Number or Site Name: Proposed Fireworks Display Launch Site

What is the proposed date you intend to begin work on the project?

Annually - July 4

Proposed Project Information (continued)

Please briefly describe the project and project activities.

Fireworks Display and Cleanup. This display serves as a finale for the Fourth of July celebrations called Freedom Fest which are held by the installation. The purpose of the action is to continue to provide a finale to the Freedom Fest which draws over 2,000 spectators comprised of Airmen and their families.

Briefly describe current land uses and habitat types in the project area.

The launch site for the proposed fireworks display is located off-base immediately adjacent to the north of Luke AFB in unincorporated Maricopa County in an agricultural field, north of a base housing area, south of Northern Parkway, and west of North Dysart Road. The agricultural field encompasses approximately 153 acres of land which is bound on the south by Luke AFB base housing and to the west by Mountain States Wholesale Nursery. Land to the north and east of the proposed launch site consist of agricultural and industrial uses. The area has been used for agricultural purposes for at least the past 40 years. Currently, the fields are used to plant cover crops in the summer months and potatoes in the winter months. There are no plans for future development or any uses other than agriculture on the property.

List any water bodies such as rivers, intermittent streams, lakes, or wetlands within or near the project area. Xeric washes should also be described, along with any anticipated impacts as a result of the project.

Dysart drain runs to the south of the project area, there are no anticipated impacts. All trash, debris, and unexploded fireworks will be picked up and disposed of following the fireworks display including within the drain and the irrigation ditches within the project area.

List any reports that have been prepared to describe the habitat that will be affected by the proposed project (e.g. habitat reconnaissance surveys, wetland delineation, etc.)

Draft Environmental Assessment

List any other resources or reviews that relate to the proposed project (correspondence, other phases of the project, other alternatives, etc.)

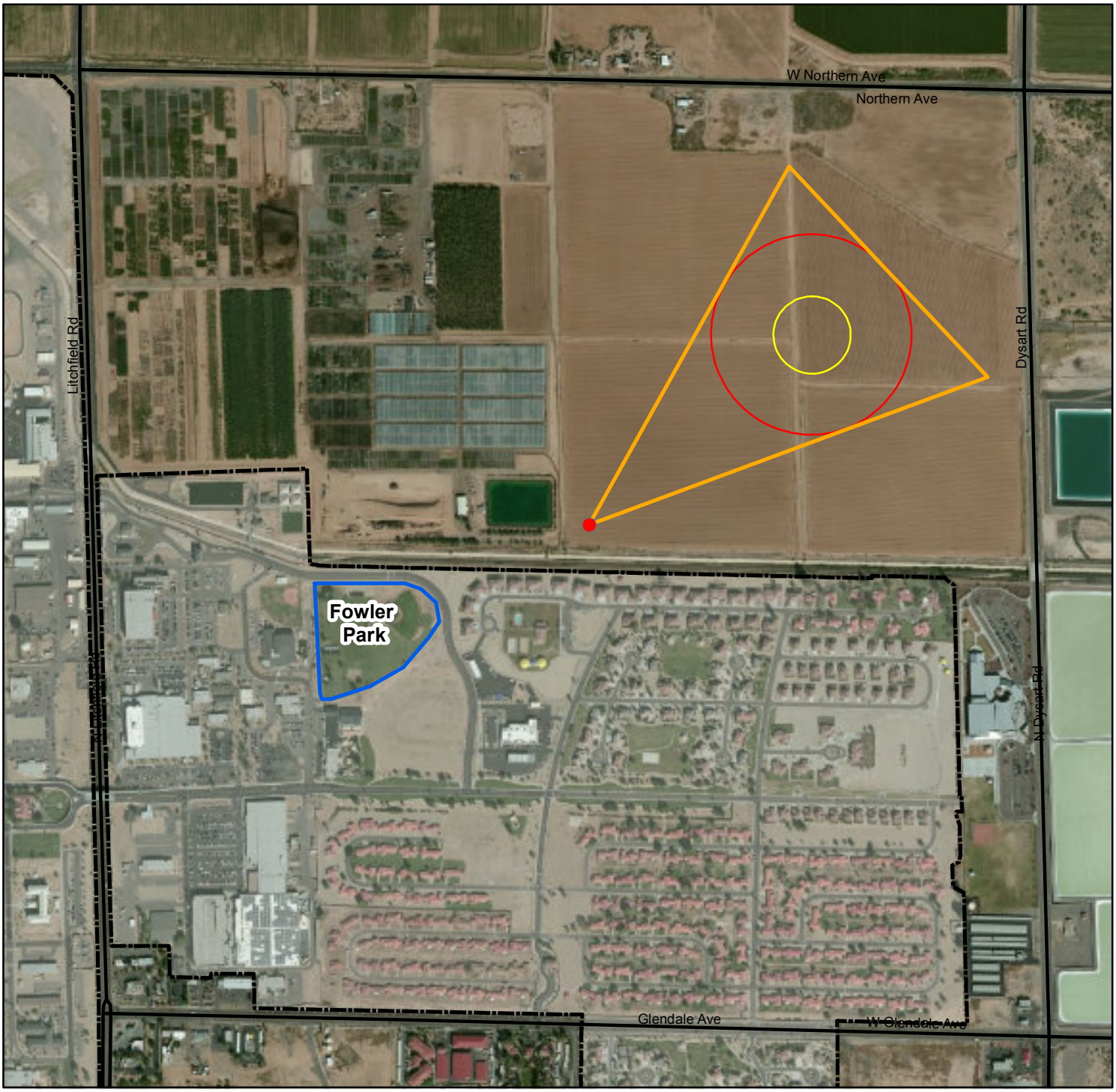
Correspondence from USFWS stating: "...we believe that no endangered or threatened species or critical habitat will be affected by this project; nor is this project likely to jeopardize the continued existence of any proposed species or adversely modify any proposed critical habitat. No further review is required for this project at this time."

List any permits, licenses, or regulatory approvals you have or plan on applying for, or have already received as part of this project.

None required

Return as hard copy to:
AZ Game & Fish Dept.
Project Evaluation Program-Habitat Branch
5000 W. Carefree Hwy., Phoenix, AZ 85086

Return as soft copy:
via email to pep@azgfd.gov
or fax to 623-236-7366
or upload a file at http://www.azgfd.gov/hgis



Legend

- Local Road
- Alternative Action
- Proposed Action
- Display Site
- Fallout Zone
- Firing Point
- Luke Air Force Base

Aerial Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community
Date: 11/2010
Coordinates: UTM NAD83 12N

Figure 1
Location of Proposed and Alternative Actions
Environmental Assessment, Fireworks Display
Luke Air Force Base, Maricopa County, AZ

0 800 1,600
Approximate scale in feet

N

Arizona Environmental Online Review Tool Report

Arizona Game and Fish Department Mission
To conserve Arizona's diverse wildlife resources and manage for safe, compatible outdoor recreation opportunities for current and future generations.

Project Name:

Luke AFB Fireworks Display and Cleanup Environmental Assessment

Project Description:

Under the Proposed Action, a pyrotechnics contractor (contractor) for Luke AFB would set up all equipment required for the fireworks display at the proposed launch site located on private land adjacent to Luke AFB. On July 4th, the fireworks display would begin at sunset and last for approximately 20 minutes. The contractor would remain at the launch site throughout the night to sweep the area for duds and remove all associated equipment and debris. Under the alternative action, Luke AFB would conduct a laser light show at Fowler Park at the conclusion of the Freedom Fest celebration. The laser light show would consist of projected multi-colored laser beams shot into the sky above the Park.

Project Type:

Education/Information

Contact Person:

Tana Jones

Organization:

Weston Solutions, Inc. (contractor for Luke AFB)

On Behalf Of:

DOD

Project ID:

HGIS-00217

Please review the entire report for project type and/or species recommendations for the location information entered. Please retain a copy for future reference.

Disclaimer:

1. This Environmental Review is based on the project study area that was entered. The report must be updated if the project study area, location, or the type of project changes.
2. This is a preliminary environmental screening tool. It is not a substitute for the potential knowledge gained by having a biologist conduct a field survey of the project area. This review is also not intended to replace environmental consultation (including federal consultation under the Endangered Species Act), land use permitting, or the Departments review of site-specific projects.
3. The Departments Heritage Data Management System (HDMS) data is not intended to include potential distribution of special status species. Arizona is large and diverse with plants, animals, and environmental conditions that are ever changing. Consequently, many areas may contain species that biologists do not know about or species previously noted in a particular area may no longer occur there. HDMS data contains information about species occurrences that have actually been reported to the Department. Not all of Arizona has been surveyed for special status species, and surveys that have been conducted have varied greatly in scope and intensity. Such surveys may reveal previously undocumented population of species of special concern.
4. HabiMap Arizona data, specifically Species of Greatest Conservation Need (SGCN) under our State Wildlife Action Plan (SWAP) and Species of Economic and Recreational Importance (SERI), represent potential species distribution models for the State of Arizona which are subject to ongoing change, modification and refinement. The status of a wildlife resource can change quickly, and the availability of new data will necessitate a refined assessment.

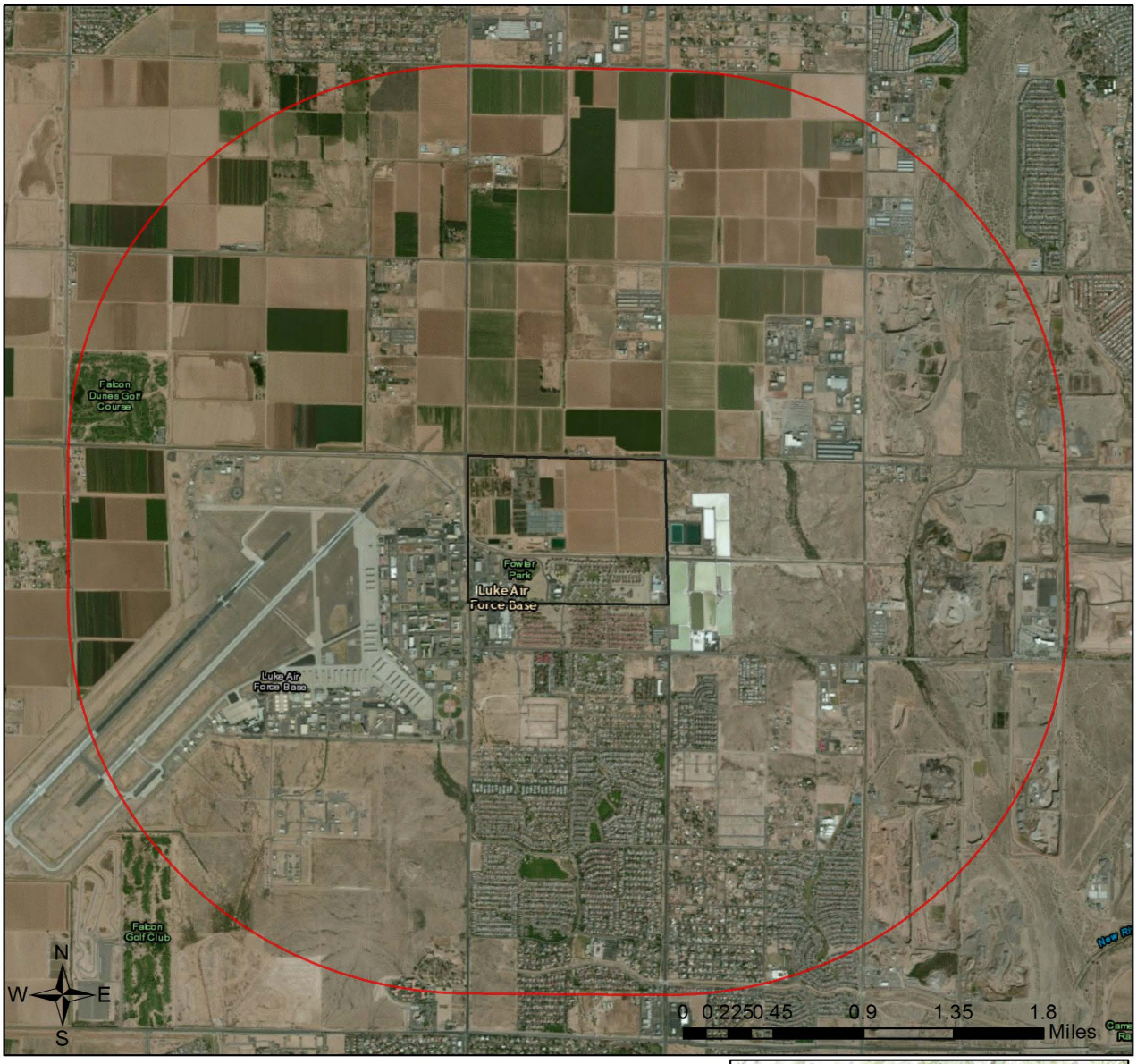
Locations Accuracy Disclaimer:
Project locations are assumed to be both precise and accurate for the purposes of environmental review. The creator/owner of the Project Review Report is solely responsible for the project location and thus the correctness of the Project Review Report content.

Recommendations Disclaimer:

1. The Department is interested in the conservation of all fish and wildlife resources, including those species listed in this report and those that may have not been documented within the project vicinity as well as other game and nongame wildlife.
2. Recommendations have been made by the Department, under authority of Arizona Revised Statutes Title 5 (Amusements and Sports), 17 (Game and Fish), and 28 (Transportation).
3. Potential impacts to fish and wildlife resources may be minimized or avoided by the recommendations generated from information submitted for your proposed project. These recommendations are preliminary in scope, designed to provide early considerations on all species of wildlife.
4. Making this information directly available does not substitute for the Department's review of project proposals, and should not decrease our opportunity to review and evaluate additional project information and/or new project proposals.
5. Further coordination with the Department requires the submittal of this Environmental Review Report with a cover letter and project plans or documentation that includes project narrative, acreage to be impacted, how construction or project activity(s) are to be accomplished, and project locality information (including site map). Once AGFD had received the information, please allow 30 days for completion of project reviews. Send requests to:
   Project Evaluation Program, Habitat Branch
   Arizona Game and Fish Department
   5000 West Carefree Highway
   Phoenix, Arizona 85086-5000
   Phone Number: (623) 236-7600
   Fax Number: (623) 236-7366
   Or
   PEP@azgfd.gov
6. Coordination may also be necessary under the National Environmental Policy Act (NEPA) and/or Endangered Species Act (ESA). Site specific recommendations may be proposed during further NEPA/ESA analysis or through coordination with affected agencies

Luke AFB Fireworks Display and Cleanup Environmental Assessment

Aerial Image Basemap With Locator Map



Project Boundary

Buffered Project Boundary

Project Size (acres): 474.51

Lat/Long (DD): 33.5457 / -112.3500

County(s): Maricopa

AGFD Region(s): Mesa

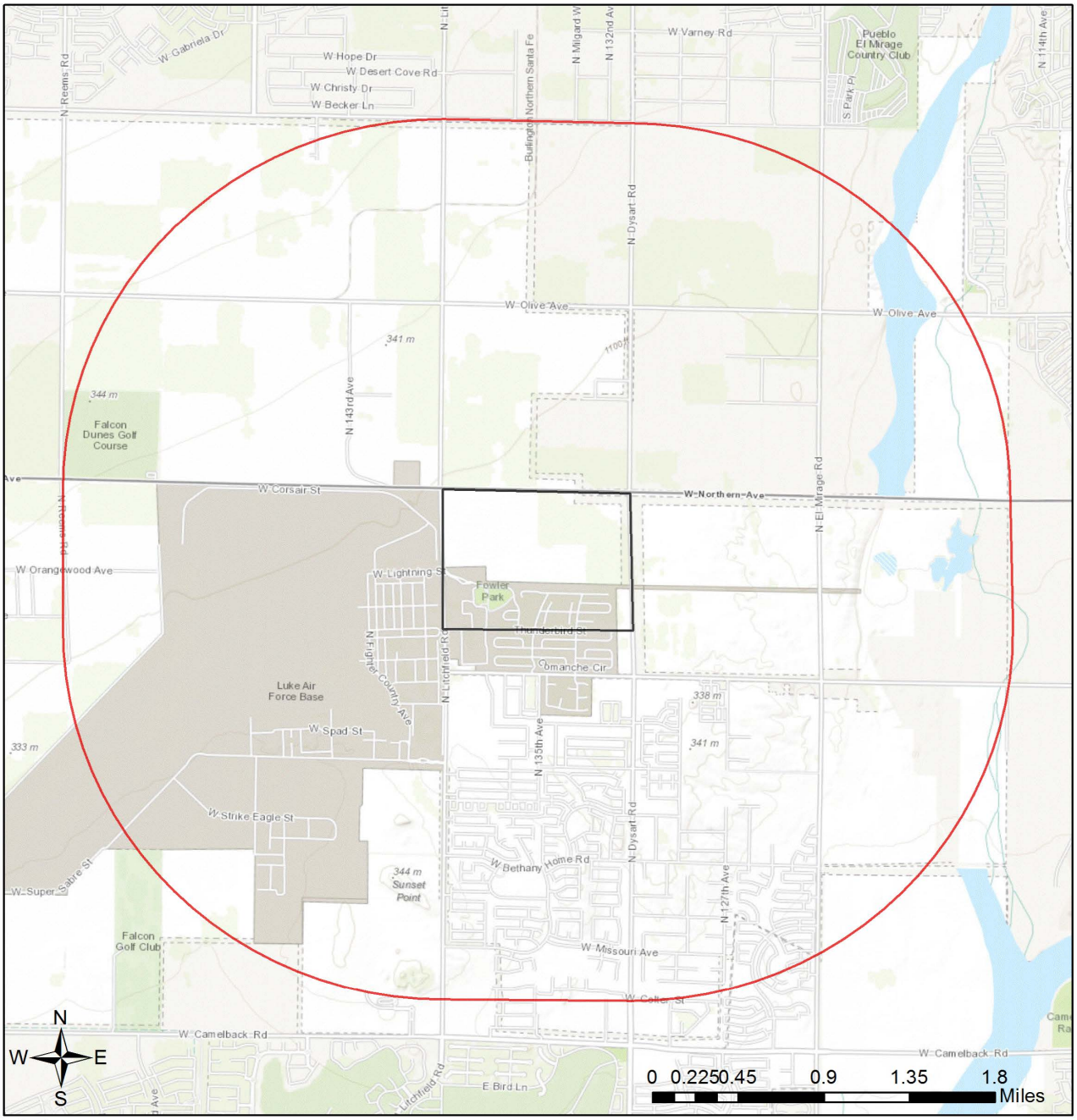
Township/Range(s): T2N, R1W

USGS Quad(s): EL MIRAGE

Service Layer Credits: Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong),

Luke AFB Fireworks Display and Cleanup Environmental Assessment

Web Map As Submitted By User



- Project Boundary
- Buffered Project Boundary
- Critical Habitat
- Important Bird Areas
- Special Areas
- Wildlife Corridors

Project Size (acres): 474.51

Lat/Long (DD): 33.5457 / -112.3500

County(s): Maricopa

AGFD Region(s): Mesa

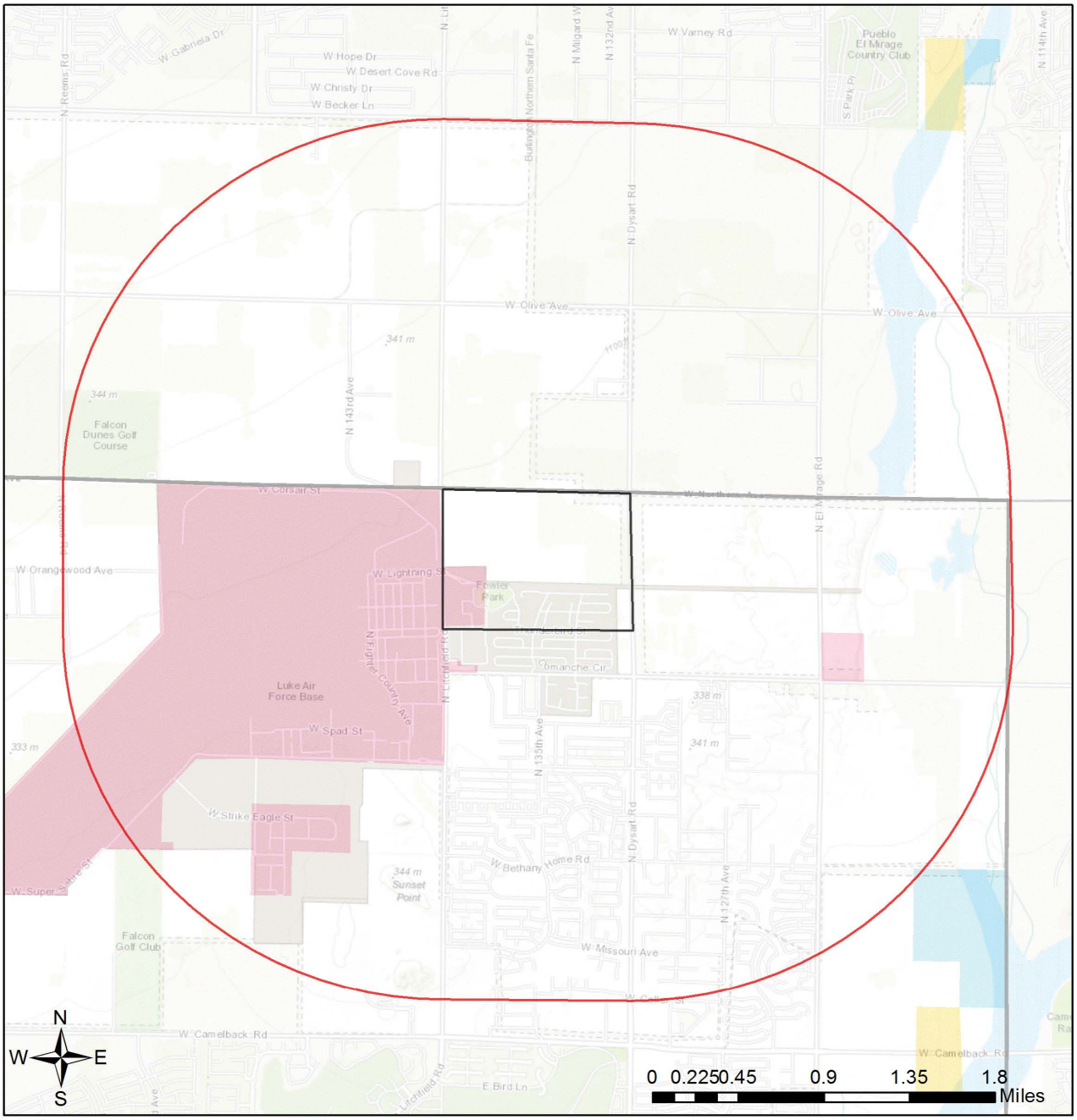
Township/Range(s): T2N, R1W

USGS Quad(s): EL MIRAGE

Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community
Arizona Game and Fish Department - GIS Program

Luke AFB Fireworks Display and Cleanup Environmental Assessment

Topo Basemap With Township/Ranges and Land Ownership



Project Boundary	Mixed/Other
Buffered Project Boundary	National Park/Mon.
Township/Ranges	Private
AZ Game and Fish Dept.	State and Regional Parks
BLM	State Trust
BOR	US Forest Service
Indian Res.	Wildlife Area/Refuge
Military	

Project Size (acres): 474.51

Lat/Long (DD): 33.5457 / -112.3500

County(s): Maricopa

AGFD Region(s): Mesa

Township/Range(s): T2N, R1W

USGS Quad(s): EL MIRAGE

Sources: Esri, HERE, DeLorme, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

Special Status Species and Special Areas Documented within 2 Miles of Project Vicinity

Scientific Name	Common Name	FWS	USFS	BLM	State	SGCN
Athene cunicularia hypugaea	Western Burrowing Owl	SC	S	S		1B

Note: Status code definitions can be found at http://www.azgfd.gov/w_c/edits/hdms_status_definitions.shtml*.*

Species of Greatest Conservation Need
Predicted within Project Vicinity based on Predicted Range Models

Scientific Name	Common Name	FWS	USFS	BLM	State	SGCN
Aix sponsa	Wood Duck					1B
Ammospermophilus harrisii	Harris' Antelope Squirrel					1B
Anaxyrus microscaphus	Arizona Toad	SC				1B
Aquila chrysaetos	Golden Eagle	BGA		S		1B
Athene cunicularia hypugaea	Western Burrowing Owl	SC	S	S		1B
Botaurus lentiginosus	American Bittern				WSC	1B
Buteo regalis	Ferruginous Hawk	SC		S	WSC	1B
Chilomeniscus stramineus	Variable Sandsnake					1B
Chionactis occipitalis klauberi	Tucson Shovel-nosed Snake	C*				1A
Coccyzus americanus	Yellow-billed Cuckoo (Western DPS)	LT	S		WSC	1A
Colaptes chrysoides	Gilded Flicker			S		1B
Coluber bilineatus	Sonoran Whipsnake					1B
Corynorhinus townsendii pallescens	Pale Townsend's Big-eared Bat	SC	S	S		1B
Crotalus tigris	Tiger Rattlesnake					1B
Euderma maculatum	Spotted Bat	SC	S	S	WSC	1B
Eumops perotis californicus	Greater Western Bonneted Bat	SC		S		1B
Gopherus morafkai	Sonoran Desert Tortoise	C*	S		WSC	1A
Haliaeetus leucocephalus	Bald Eagle	SC, BGA	S	S	WSC	1A
Heloderma suspectum	Gila Monster					1A
Incilius alvarius	Sonoran Desert Toad					1B
Kinosternon sonoriense sonoriense	Desert Mud Turtle			S		1B
Lasiurus blossevillii	Western Red Bat		S		WSC	1B
Lasiurus xanthinus	Western Yellow Bat		S		WSC	1B
Leopardus pardalis	Ocelot	LE			WSC	1A
Lithobates yavapaiensis	Lowland Leopard Frog	SC	S	S	WSC	1A
Macrotus californicus	California Leaf-nosed Bat	SC		S	WSC	1B
Melanerpes uropygialis	Gila Woodpecker					1B
Melospiza lincolnii	Lincoln's Sparrow					1B
Melozone aberti	Abert's Towhee		S			1B
Micruroides euryxanthus	Sonoran Coralsnake					1B
Myotis occultus	Arizona Myotis	SC		S		1B
Myotis velifer	Cave Myotis	SC		S		1B

Species of Greatest Conservation Need
Predicted within Project Vicinity based on Predicted Range Models

Scientific Name	Common Name	FWS	USFS	BLM	State	SGCN
Myotis yumanensis	Yuma Myotis	SC				1B
Nyctinomops femorosaccus	Pocketed Free-tailed Bat					1B
Panthera onca	Jaguar	LE			WSC	1A
Passerculus sandwichensis	Savannah Sparrow					1B
Perognathus longimembris	Little Pocket Mouse					1B
Phrynosoma solare	Regal Horned Lizard					1B
Phyllorhynchus browni	Saddled Leaf-nosed Snake					1B
Rallus longirostris yumanensis	Yuma Clapper Rail	LE			WSC	1A
Setophaga petechia	Yellow Warbler					1B
Tadarida brasiliensis	Brazilian Free-tailed Bat					1B
Troglodytes pacificus	Pacific Wren					1B
Vireo bellii arizonae	Arizona Bell's Vireo					1B
Vulpes macrotis	Kit Fox					1B

Species of Economic and Recreation Importance Predicted within Project Vicinity

Scientific Name	Common Name	FWS	USFS	BLM	State	SGCN
Callipepla gambelii	Gambel's Quail					
Zenaida asiatica	White-winged Dove					

Project Type: Education/Information

Project Type Recommendations:

Based on the project type entered (information/education), no impacts to land or water resources are anticipated and therefore no project type recommendations or mitigation measures are provided. If you entered this project type by mistake, please contact the PEP program to change the project type for you.

Project Location and/or Species Recommendations:

HDMS records indicate that Western Burrowing Owls have been documented within the vicinity of your project area. Please review the western burrowing owl resource page at: http://www.azgfd.gov/w_c/BurrowingOwlResources.shtml.

U.S. Department of Homeland Security
FEMA Region IX
1111 Broadway, Suite 1200
Oakland, CA. 94607-4052

FEMA

November 5, 2014

Jeff Rothrock, Environmental Chief
56 CES/CEIE
13970 Gillespie Drive
Luke AFB, Arizona 85309-1149

Dear Mr. Rothrock:

This is in response to your request for comments regarding the Department of the Air Force, Fireworks Display and Cleanup at Luke Air Force Base, Arizona.

Please review the current effective countywide Flood Insurance Rate Maps (FIRMs) for the County of Maricopa (Community Number 040037), Maps revised October 16, 2013. Please note that the County of Maricopa, Arizona is a participant in the National Flood Insurance Program (NFIP). The minimum, basic NFIP floodplain management building requirements are described in Vol. 44 Code of Federal Regulations (44 CFR), Sections 59 through 65.

A summary of these NFIP floodplain management building requirements are as follows:

- All buildings constructed within a riverine floodplain, (i.e., Flood Zones A, AO, AH, AE, and A1 through A30 as delineated on the FIRM), must be elevated so that the lowest floor is at or above the Base Flood Elevation level in accordance with the effective Flood Insurance Rate Map.

- If the area of construction is located within a Regulatory Floodway as delineated on the FIRM, any ***development*** must not increase base flood elevation levels. **The term *development* means any man-made change to improved or unimproved real estate, including but not limited to buildings, other structures, mining, dredging, filling, grading, paving, excavation or drilling operations, and storage of equipment or materials.** A hydrologic and hydraulic analysis must be performed *prior* to the start of development, and must demonstrate that the development would not cause any rise in base flood levels. No rise is permitted within regulatory floodways.

- Upon completion of any development that changes existing Special Flood Hazard Areas, the NFIP directs all participating communities to submit the appropriate hydrologic and hydraulic data to FEMA for a FIRM revision. In accordance with 44 CFR, Section 65.3, as soon as practicable, but not later than six months after such data becomes available, a community shall notify FEMA of the changes by submitting technical data for a flood map revision. To obtain copies of FEMA's Flood Map Revision Application Packages, please refer to the FEMA website at http://www.fema.gov/business/nfip/forms.shtm.

Please Note:

Many NFIP participating communities have adopted floodplain management building requirements which are more restrictive than the minimum federal standards described in 44 CFR. Please contact the local community's floodplain manager for more information on local floodplain management building requirements. The Maricopa County floodplain manager can be reached by calling Timothy Phillips, P.E., Chief, Engineer &General Manager, at (602) 506-1501.

If you have any questions or concerns, please do not hesitate to call Patricia Rippe, Senior NFIP Planner of the Mitigation staff at (510) 627-7015.

Sincerely,

Gregor Blackburn, CFM, Branch Chief
Floodplain Management and Insurance Branch

cc:
Timothy Phillips, P.E., Chief Engineer & General Manager, Maricopa County
Brian Cosson, NFIP State Coordinator, Arizona Department of Water Resources
Patricia Rippe, Senior NFIP Planner, DHS/FEMA RIX
Alessandro Amaglio, Environmental Officer, DHS/FEMA Region IX

GILA RIVER INDIAN COMMUNITY

POST OFFICE BOX 2140, SACATON, AZ 85147

TRIBAL HISTORIC PRESERVATION OFFICE

(520) 562-7162
Fax: (520) 562-5083

November 14, 2014

Jeff Rothrock, Environmental Chief
Environmental Science Management
13970 Gillespie Drive
Luke AFB, Arizona 85309-1149

RE: Section 106 Consultation Luke Air Force Base (LAFB) Fireworks Display, LAFB, Maricopa County, Arizona, No Historic Properties Affected

Dear Chief Rothrock,

The Gila River Indian Community Tribal Historic Preservation Office (GRIC-THPO) has received your consultation letter dated November 14, 2014. The letter describes an undertaking of the LAFB to prepare an Environmental Assessment (EA) for the July 4th fireworks display/show. Setup by a pyrotechnics contractor will occur on private land adjacent to the LAFB. The area has been heavily disturbed. No ground disturbing activities are expected to occur for this undertaking. The LAFB has made a finding of no historic properties affected for this undertaking.

The GRIC-THPO concurs with a finding of no historic properties affected. The proposed project area is within the ancestral lands of the Four Southern Tribes (Gila River Indian Community; Salt River Pima-Maricopa Indian Community; Ak-Chin Indian Community and the Tohono O'Odham Nation). The GRIC-THPO defers to the Salt River Pima-Maricopa Indian Community as lead in the consultation process.

Thank you for consulting with the GRIC-THPO. If you have any questions please do not hesitate to contact me or Archaeological Compliance Specialist Larry Benallie, Jr. at 520-562-7162.

Respectfully,

Barnaby V. Lewis
Tribal Historic Preservation Officer
Gila River Indian Community

DEPARTMENT OF THE AIR FORCE
AIR EDUCATION AND TRAINING COMMAND

4 Nov 14

Jeff Rothrock
Environmental Chief
56 CES/CEIE
13970 Gillespie Drive
Luke AFB Arizona 85309-1149

Chairman Herman Honanie
Hopi Tribe
Post Office Box 123
Kykotsmovi, Arizona 86039

Re: Section 106 Consultation Luke Air Force Base Fireworks Display -"No Historic Properties Affected"

Dear Chairman Honanie

Luke Air Force Base (AFB) is in the process of preparing an Environmental Assessment for our July 4th fireworks display. We are initiating review under Section 106 for the proposed undertaking.

The undertaking consists of a fireworks display which serves as a finale for the Fourth of July celebrations called Freedom Fest. A pyrotechnics contractor for Luke AFB would set up all equipment required for the fireworks display at the proposed launch site located on private land adjacent to Luke AFB (attachment). On July 4th, the fireworks display would begin at sunset and last for approximately 20 minutes. The contractor would remain at the launch site throughout the night to sweep the area for duds and remove all associated equipment and debris. Locating the launch site on private property is needed to provide a safe location from which to launch fireworks where there are limited flammable hazards within proximity of the public viewing venue at Fowler Park on Luke AFB.

The launch site and fallout zone are wholly contained on private property. The property is an undeveloped agricultural field of approximately 153 acres and is actively farmed. The area is constantly disturbed due to the farming activities and has been used for agricultural purposes for at least the past 40 years. Currently, the fields are used to plant nurse crops in the summer months and potatoes in the winter months. No intrusive, ground disturbing activities will occur as part of the fireworks display. Since the land has been disturbed for the last 40 years, and no intrusive activities will be conducted for the fireworks display, Luke recommends a finding of "No Historic Properties Affected".

We request that you please provide any comments within 30 days to Mr. Jeff Rothrock at the above address. Should you have any questions or require additional information, please feel free to contact myself at (623) 856-3832 or at charles.rothrock@luke.af.mil.

Sincerely

JEFF ROTHROCK

cc: Leigh Kuwanwisiwma, Director Hopi Cultural Preservation Office

Attachment
Location of Fireworks Display

CONCUR

for

16-10-14

THE COCOPAH INDIAN TRIBE
Cultural Resource Department
14515 S. Veterans' Drive
Somerton, Arizona 85350-2689
Telephone (928) 627-4849
Cell (928)503-2291
Fax (928) 627-3173

CCR-015-14-003

November 18, 2014

Jeff Rothrock
Environmental Chief
56 CES/CEIE
13970 Gillespie Drive
Luke AFB, AZ 85309-1149

RE: Section 106 Consultation Luke Air Force Base Fireworks Display – "No Historic Properties Affected"

Dear Mr. Rothrock:

The Cultural Resources Department of the Cocopah Indian Tribe appreciates your consultation efforts on this project. We are pleased that you contacted our department on this issue for the purpose of solicitation of our input and to address our concerns on this matter. We concur with your determination of "No Historic Properties Affected".

If you have any questions or need additional information please feel free to contact the cultural resource department. We will be happy to assist you with any future concerns or questions.

Sincerely,

H. Jill McCormick, M.A.

Cultural Resource Manager

11/17/14 VG

SAN CARLOS APACHE TRIBE
Historic Preservation & Archaeology Department
P.O. Box 0
San Carlos Arizona 85550
Tel. (928) 475-5797

Tribal Consultation Response Letter

Date: 11/12/2014
Contact Name: Jeff Rothrock, Environmental Chief Attn: Charles.rothrock@luke.af.mil
Company: 56 CES/CEIE
Address: 13970 Gillespie Drive, Luke AFB, Arizona 85309-1149
Project Name/#:

Dear Sir or Madam: Section 106 Consultation – Fireworks Display (NHPA)

Under Section 106 and 110 of the National Historic Preservation Act, we are replying to the above referenced project. Please see the appropriate marked circle, including the signatures of Vernelda Grant, Tribal Historic Preservation Officer (THPO), and the concurrence of the Chairman of the San Carlos Apache Tribe:

- ⊗ **NO INTEREST/NO FURTHER CONSULTATION** VG (sign & date) 11/12/14
  I have determined that there is not a likelihood of eligible properties of religious and cultural significance to the San Carlos Apache Tribe in the proposed project area.
- ⊗ **CONCURRENCE WITH REPORT FINDINGS & THANK YOU** VG (sign & date) 11/12/14
- ○ **REQUEST ADDITIONAL INFORMATION** _____ (sign & date)
  I require additional information in order to provide a finding of effect for this proposed undertaking, i.e. Project description ___ Map ___ Photos ___ Other _____
- ⊗ **NO EFFECT** VG (sign & date) 11/12/14
  I have determined that there are no properties of religious and cultural significance to the San Carlos Apache Tribe that are listed on the National Register within the area of potential effect or that the proposed project will have no effect on any such properties that may be present.
- ○ **NO ADVERSE EFFECT** _____ (sign & date)
  Properties of cultural and religious significance within the area of effect have been identified that are eligible for listing in the National Register for which there would be no adverse effect as a result of the proposed project.
- ○ **ADVERSE EFFECT** _____ (sign & date)
  I have identified properties of cultural and religious significance within the area of potential effect that are eligible for listing in the National Register. I believe the proposed project would cause an adverse effect on these properties. Please contact the THPO for further discussion.

STIPULATION: We were taught traditionally not to disturb the natural world in a significant way, and that to do so may cause harm to oneself or one's family. Apache resources can be best protected by managing the land to be as natural as it was in pre-1870s settlement times. Please contact the THPO, if there is a change in any portion of all previously discussed projects. Thank you for contacting the San Carlos Apache Tribe, your effort is greatly appreciated.

CONCURRENCE: Hubert Moses / Acting Chair 11/14/14
Terry Rambler, Tribal Chairman — Date

Received from Tribal Admin 04-21-15 AD

Scanned 04-21-15 (initial & date) AK

Emailed 04-21-15 (initial & date)

SAN CARLOS APACHE TRIBE
Historic Preservation & Archaeology Department
P.O. Box 0
San Carlos Arizona 85550
Tel. (928) 475-5797

Tribal Consultation Response Letter

Date: 03/26/15
Contact Name: Attn: charles.rothrock@luke.af.mil
Company: Jeff Bothrock, Environmental Chief
Address: Dept. of the Air Force - Air Education & Training Command
Project Name/#: 56 CEC/CEIE, 13970 Gillespie Drive, Luke AFB, AZ 85309-1149

Dear Sir or Madam: Section 106 - Luke Air Force Base Fireworks Display

Under Section 106 and 110 of the National Historic Preservation Act, we are replying to the above referenced project. Please see the appropriate marked circle, including the signatures of Vernelda Grant, Tribal Historic Preservation Officer (THPO), and the concurrence of the Chairman of the San Carlos Apache Tribe:

- ⊗ **NO INTEREST/NO FURTHER CONSULTATION** VGrant 03/26/15 (sign & date)
  I have determined that there is not a likelihood of eligible properties of religious and cultural significance to the San Carlos Apache Tribe in the proposed project area.
- ⊗ **CONCURRENCE WITH REPORT FINDINGS & THANK YOU** VGrant 03/26/15 (sign & date)
- ⊗ **REQUEST ADDITIONAL INFORMATION** VGrant 03/26/15 (sign & date)
  I require additional information in order to provide a finding of effect for this proposed undertaking, i.e. Project description ___ Map ___ Photos X Other Although it passed the consultation deadline please accept this reply. Thank You!
- ○ **NO EFFECT** _____ (sign & date)
  I have determined that there are no properties of religious and cultural significance to the San Carlos Apache Tribe that are listed on the National Register within the area of potential effect or that the proposed project will have no effect on any such properties that may be present.
- ○ **NO ADVERSE EFFECT** _____ (sign & date)
  Properties of cultural and religious significance within the area of effect have been identified that are eligible for listing in the National Register for which there would be no adverse effect as a result of the proposed project.
- ○ **ADVERSE EFFECT** _____ (sign & date)
  I have identified properties of cultural and religious significance within the area of potential effect that are eligible for listing in the National Register. I believe the proposed project would cause an adverse effect on these properties. Please contact the THPO for further discussion.

STIPULATION: We were taught traditionally not to disturb the natural world in a significant way, and that to do so may cause harm to oneself or one's family. Apache resources can be best protected by managing the land to be as natural as it was in pre-1870s settlement times. Please contact the THPO, if there is a change in any portion of all previously discussed projects. Thank you for contacting the San Carlos Apache Tribe, your effort is greatly appreciated.

CONCURRENCE: _____ 4/8/15
Terry Rambler, Tribal Chairman — Date

cc: SCAHPA files (V. Grant, 2013, updated)

DEPARTMENT OF THE AIR FORCE
AIR EDUCATION AND TRAINING COMMAND

SCAT-AICCH (6)
RECEIVED NOV 19 2014

11/12/14

To Vern Grant 4 Nov 14

FYI

TR, Chairman

Jeff Rothrock
Environmental Chief
56 CES/CEIE
13970 Gillespie Drive
Luke AFB Arizona 85309-1149

Chairman Terry Rambler
San Carlos Apache Tribe
Post Office Box O
San Carlos, Arizona 85550

Re: Section 106 Consultation Luke Air Force Base Fireworks Display -"No Historic Properties Affected"

Dear Chairman Rambler

Luke Air Force Base (AFB) is in the process of preparing an Environmental Assessment for our July 4th fireworks display. We are initiating review under Section 106 for the proposed undertaking.

The undertaking consists of a fireworks display which serves as a finale for the Fourth of July celebrations called Freedom Fest. A pyrotechnics contractor for Luke AFB would set up all equipment required for the fireworks display at the proposed launch site located on private land adjacent to Luke AFB (attachment). On July 4th, the fireworks display would begin at sunset and last for approximately 20 minutes. The contractor would remain at the launch site throughout the night to sweep the area for duds and remove all associated equipment and debris. Locating the launch site on private property is needed to provide a safe location from which to launch fireworks where there are limited flammable hazards within proximity of the public viewing venue at Fowler Park on Luke AFB.

The launch site and fallout zone are wholly contained on private property. The property is an undeveloped agricultural field of approximately 153 acres and is actively farmed. The area is constantly disturbed due to the farming activities and has been used for agricultural purposes for at least the past 40 years. Currently, the fields are used to plant nurse crops in the summer months and potatoes in the winter months. No intrusive, ground disturbing activities will occur as part of the fireworks display. Since the land has been disturbed for the last 40 years, and no intrusive activities will be conducted for the fireworks display, Luke recommends a finding of "No Historic Properties Affected".

RECEIVED
SAN CARLOS APACHE TRIBE
NOV 5 2014
OFFICE OF
CHAIRMAN

DEPARTMENT OF THE AIR FORCE
AIR EDUCATION AND TRAINING COMMAND

4 Nov 14

Jeff Rothrock
Environmental Chief
56 CES/CEIE
13970 Gillespie Drive
Luke AFB Arizona 85309-1149

Chairman Terry Rambler
San Carlos Apache Tribe
Post Office Box O
San Carlos, Arizona 85550

Re: Section 106 Consultation Luke Air Force Base Fireworks Display -"No Historic Properties Affected"

Dear Chairman Rambler

Luke Air Force Base (AFB) is in the process of preparing an Environmental Assessment for our July 4th fireworks display. We are initiating review under Section 106 for the proposed undertaking.

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Fireworks EA
Consultation Responses

- Chris Coder – Yavapai-Apache Nation
  - left voice mail, no comments

(no document text this page)

APPENDIX B – Public Announcement and Press Releases

(no document text this page)

AFFIDAVIT OF PUBLICATION

THE ARIZONA REPUBLIC

STATE OF ARIZONA
COUNTY OF MARICOPA } SS.

rian Billings, being first duly sworn, upon oath deposes nd says: That he is a legal advertising representative of the rizona Business Gazette, a newspaper of general irculation in the county of Maricopa, State of Arizona, ublished in Phoenix, Arizona, by Phoenix Newspapers nc., which also publishes The Arizona Republic, and that ne copy hereto attached is a true copy of the advertisement ublished in the said paper on the dates as indicated.

The Arizona Republic

ebruary 8, 2015

PUBLIC NOTICE
LUKE AIR FORCE BASE
Invites
PUBLIC COMMENT

ON THE DRAFT ENVIRONMENTAL ASSESSMENT AND DRAFT PROPOSED FINDING OF NO SIGNIFICANT IMPACT FOR FIREWORKS DISPLAY AND CLEANUP FOR THE LUKE AIR FORCE BASE, ARIZONA, FOURTH OF JULY CELEBRATIONS

The 56th Fighter Wing, Luke Air Force Base (AFB), Arizona, invites public comment on the draft Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) on the 56 Fighter Wing's proposal to conduct fireworks displays as a finale for the Fourth of July celebrations called Freedom Fest which are held by the installation. The EA, prepared in accordance with the National Environmental Policy Act and Air Force Instructions, evaluates potential impacts of the proposed and alternative actions, including the No Action Alternative, on the environment. The EA evaluated: land use, air quality, biological resources, earth resources, water resources, hazardous materials and wastes, infrastructure and utilities, and safety. Based on the EA, the Air Force has prepared a proposed Finding of No Significant Impact.

An electronic copy of the EA is available for your review at: http://www.luke.af.mil/. Hard copies of the EA and proposed FONSI are maintained at Northwest Regional Library, 16089 N. Bullard Avenue, Surprise; Litchfield Park Branch Library, 101 W. Wigwam Blvd., Litchfield Park; Glendale Public Library, 5959 W. Brown Street, Glendale; and Luke AFB Library, 4724 N. Homer Drive, Luke AFB.

Comments may be submitted through 10 March 2015 and should be provided to Jeff Rothrock, Environmental Chief, 56 CES/CEIE, 13970 Gillespie Drive, Luke AFB, Arizona 85309, and charles.rothrock@us.af.mil; (623-856-3832).

PRIVACY ADVISORY
Your comments on this Draft EA are requested. Any submitted letters or other written comments may be published in the Final EA. As required by law, comments will be addressed in the Final EA and made available to the public. Any personal information provided will be used only to identify your desire to make a statement during the public comment period or to fulfill requests for copies of the Final EA or associated documents. Private addresses will be compiled to develop a mailing list of those requesting copies of the Final EA. However, only the names of the individuals making comments and specific comments will be disclosed. Personal home addresses and phone numbers will not be published in the Final EA.

Sworn to before me this
23RD day of
February A.D. 2015

MANUEL VARGAS
Notary Public - State of Arizona
MARICOPA COUNTY
My Commission Expires
November 30, 2015

Notary Public

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PUBLIC NOTICE

LUKE AIR FORCE BASE

Invites
PUBLIC COMMENT

ON THE DRAFT ENVIRONMENTAL ASSESSMENT AND DRAFT PROPOSED FINDING OF NO SIGNIFICANT IMPACT FOR FIREWORKS DISPLAY AND CLEANUP FOR THE LUKE AIR FORCE BASE, ARIZONA, FOURTH OF JULY CELEBRATIONS

The 56th Fighter Wing, Luke Air Force Base (AFB), Arizona, invites public comment on the draft Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) on the 56 Fighter Wing's proposal to conduct fireworks displays as a finale for the Fourth of July celebrations called Freedom Fest which are held by the installation. The EA, prepared in accordance with the National Environmental Policy Act and Air Force Instructions, evaluates potential impacts of the proposed and alternative actions, including the No Action Alternative, on the environment. The EA evaluated: land use, air quality, biological resources, earth resources, water resources, hazardous materials and wastes, infrastructure and utilities, and safety. Based on the EA, the Air Force has prepared a proposed Finding of No Significant Impact.

An electronic copy of the EA is available for your review at: http://www.luke.af.mil/. Hard copies of the EA and proposed FONSI are maintained at Northwest Regional Library, 16089 N. Bullard Avenue, Surprise; Litchfield Park Branch Library, 101 W. Wigwam Blvd., Litchfield Park; Glendale Public Library, 5959 W. Brown Street, Glendale; and Luke AFB Library, 4724 N. Homer Drive, Luke AFB.

Comments may be submitted through 10 March 2015 and should be provided to Jeff Rothrock, Environmental Chief, 56 CES/CEIE, 13970 Gillespie Drive, Luke AFB, Arizona 85309, and charles.rothrock@us.af.mil; (623-856-3832).

PRIVACY ADVISORY

Your comments on this Draft EA are requested. Any submitted letters or other written comments may be published in the Final EA. As required by law, comments will be addressed in the Final EA and made available to the public. Any personal information provided will be used only to identify your desire to make a statement during the public comment period or to fulfill requests for copies of the Final EA or associated documents. Private addresses will be compiled to develop a mailing list of those requesting copies of the Final EA. However, only the names of the individuals making comments and specific comments will be disclosed. Personal home addresses and phone numbers will not be published in the Final EA.

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APPENDIX C – Air Emissions Calculations

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Proposed and Alternative Actions - Luke AFB Fireworks Display
Luke AFB, Pheonix, Arizona
Appendix C - Air Emission Calculations

Contents:

Tables

Emission Calculations:

On-Road Diesel Vehicle Emissions

Pollutant emissions = {Total vehicle miles traveled per year (miles/yr) * Pollutant EF (g/mile)}/453.59 g/lb

Where,
EF = emission factor
453.59 g/lb = conversion factor from grams to pounds

Unpaved Roads: Fugitive Dust Emissions:

$EF_{PM10/2.5\ (lb/vmt)} = k * (s/12)^{0.9} * (W/3)^{0.45}$ Eq. 1a, AP-42 13.2.2

k = Particle Size Multiplier
s = Surface Material Silt Content (%)
W = Mean Vehicle Weight (tons)

Table C-1

Summary of Emissions[a]
Luke AFB Fireworks Display
Luke AFB, Pheonix, Arizona

Action	Annual Emissions (ton/yr)						
	VOC	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	CO_2
Proposed Action	4.60E-04	4.60E-04	1.89E-03	2.11E-03	2.27E-04	2.20E-06	0.23
Alternative Action	4.60E-04	4.60E-04	1.89E-03	2.11E-03	2.27E-04	2.20E-06	0.23
No Action Alternative	0.0	0.0	0.0	0.0	0.0	0.0	0.0

CO = carbon monoxide

CO_2 = carbon dioxide

NO_x = oxides of nitrogen

$PM_{2.5}$ = particulate matter equal or less than 2.5 micrometers in diameter

PM_{10} = particulate matter equal or less than 10 micrometers in diameter

SO_2 = sulfur dioxide

ton/yr = US (short)tons per year

VOC = volatile organic compounds

Notes:

a To be conservative, it has been assumed that the Alernative Action emissions from vehicles is equal to the Proposed Action. Emissions shown do not include those from the detonation of fireworks.

Table C-2
Summary of On-Road Diesel Vehicle Combustion Emissions
Luke AFB Fireworks Display
Luke AFB, Pheonix, Arizona

Action	Annual Emissions (ton/yr)						
	CO	NO_X	PM_{10}	$PM_{2.5}$	SO_2	VOC	CO_2
Proposed Action	4.60E-04	1.89E-03	1.99E-05	1.83E-05	2.20E-06	1.02E-04	0.23
Alternative Action	4.60E-04	1.89E-03	1.99E-05	1.83E-05	2.20E-06	1.02E-04	0.23
No Action Alternative	0.0	0.0	0.0	0.0	0.0	0.0	0.0

CO = carbon monoxide

CO_2 = carbon dioxide

g/mile = grams per mile

mph = miles per hour

$PM_{2.5}$ = particulate matter equal or less than 2.5 micrometers in diameter

PM_{10} = particulate matter equal or less than 10 micrometers in diameter

NO_x = oxides of nitrogen

SO_2 = sulfur dioxide

ton/yr = US (short)tons per year

VMT = vehicle miles traveled

VOC = volatile organic compounds

Notes

a Annual emissions = EMFAC2011 EF (g/mile) * Annual VMT

EMFAC2011 Vehicle Type Category[a]	LHD1-DSL[b]	
Roadway Type	Paved[c]	
Annual Average VOC Emission Factor :	0.231	g/mile
Annual Average NO_x Emission Factor :	4.288	g/mile
Annual Average CO Emission Factor :	1.044	g/mile
Annual Average CO_2 Emission Factor :	523.7	g/mile
Annual Average SO_2 Emission Factor :	0.0050	g/mile
Annual Average PM_{10} Emission Factor :	0.0451	g/mile
Annual Average $PM_{2.5}$ Emission Factor :	0.0415	g/mile

	LDDT[d]	
Total Annual VMT (Same for all Alternatives)	400	miles/yr

Notes:

a Emission Factor Source: California Air Resources Board (CARB), EMFAC2011 on-road emission factor model.

b LHD1-DSL = Light heavy duty diesel powered trucks (8,500 - 10,000 pounds.)

c Aggregate Speed and aggregated model years for 2015.

e VMT based upon 2 vehicles, 4 trips, and 50 miles each way.

Table C-3
Fugitive Dust Emissions from Unpaved Roads
Luke AFB Fireworks Display
Luke AFB, Pheonix, Arizona

Unpaved Road: Fugitive Dust[a]

Proposed Action	s (silt content)	W (mean weight)	k_{PM10} (particle size multiplier)	$k_{PM2.5}$ (particle size multiplier)	Vehicle Miles Traveled[b] (miles/yr)	Emission Rates[c]	
						PM_{10} (ton/yr)	$PM_{2.5}$ (ton/yr)
Fugitive Dust	8.5	4.0	1.5	0.15	3.3	**2.09E-03**	**2.09E-04**

Notes:

a Source:US EPA AP-42, Section: 13.2.2, Eq. 1a.

b Assumed 4 vehicles will make 4 trips each, traveling approximately 1,110 feet each way on unpaved roads.

c Assumed Proposed = Alternative. No emission for the No Action Alternative