DRAFT

ENVIRONMENTAL ASSESSMENT FOR THE PROPOSED RELOCATION OF THE TAIWAN AIR FORCE

AIR EDUCATION AND TRAINING COMMAND
AIR FORCE CIVIL ENGINEER CENTER

JUNE 2018

DRAFT
FINDING OF NO SIGNIFICANT IMPACT FOR THE PROPOSED RELOCATION OF THE TAIWAN AIR FORCE

Pursuant to Council on Environmental Quality (CEQ) regulations for implementing the procedural provisions of the National Environmental Policy Act (NEPA), 23 U.S. Code (USC) §327; 40 Code of Federal Regulations (CFR) Parts 1500-1508; and the U.S. Air Force (USAF) Environmental Impact Analysis Process, 32 CFR Part 989, the USAF, as the Lead Agency, has prepared an Environmental Assessment (EA) to identify and evaluate potential impacts on the natural and human environment associated with the proposed relocation of the Taiwan Air Force (TAF) F-16 Formal Training Unit (FTU) from Luke Air Force Base (AFB).

Purpose of the Proposed Action (Section 1.2, *Purpose of the Action*)

The purpose of the Proposed Action is three-fold: 1) maintain the F-16 international pilot training programs that enhance both U.S. Foreign Policy and Department of Defense (DoD) strategic and operational objectives by continuing to support training of F-16 pilots by the 21st Fighter Squadron (21 FS) at a USAF installation other than Luke AFB; 2) provide facilities necessary to meet physical needs associated with the proposed beddown; and 3) maximize operations and maintenance facility efficiency while meeting current environmental, safety, and security standards (namely those set forth by the DoD in its United Facilities Criteria [UFC]: DoD Minimum Anti-terrorism Standards for Buildings).

Need for the Proposed Action (Section 1.3, *Need for the Action*)

The *need* for the Proposed Action is to relocate the TAF F-16 FTU in order to accommodate the programmed beddown of F-35s at Luke AFB under the USAF's 2012 Record of Decision (ROD). All F-16 FTUs currently operating at Luke AFB must either be relocated or retired.

The *need* for the proposed Entry Control Facility (ECF) and associated proposed relocation of the Aerovation Hangar is driven by the existing configuration of the entry road to Tucson ANGB, which leaves the installation susceptible to security risks and causes congestion. The proposed ECF is necessary to meet Antiterrorism/Force Protection (AT/FP) standards in accordance with DoD and

USAF regulations (UFC Series 4-000, *DoD Anti-Terrorism/Force Protection Standards & Security Engineering*; UFC 4-022-01, *Security Engineering, Entry Control Facility [ECF]/Access Control Point [ACP]*).

DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

Selection Criteria for Alternatives (Section 2.2, *Alternative Selection Standards*)

Potential alternative locations for the proposed relocation of the TAF F-16 FTU were evaluated based on the following standards:

Weather – Adverse weather conditions can impact training missions. Therefore, Air Education and Training Command (AETC) site survey teams evaluated potential locations for historic weather patterns and the potential impacts to flying missions.

Range – The TAF F-16 FTU requires several different ranges to conduct its stated mission. The AETC site survey team evaluated which ranges would be compatible for TAF training at each beddown location.

TAF Mission – The 21 FS mission to provide advanced air combat tactics training to TAF pilots would be best accomplished if the TAF remains in Arizona. This would enable the TAF F-16 FTU to continue using the Barry M. Goldwater Range (BMGR), Ruby Military Operations Area (MOA) and Tombstone MOA, as well as the Davis-Monthan AFB for missions involving live munitions.

Facility and Logistics Support – Potential beddown locations were evaluated based on existing facilities and their ability to accommodate the TAF F-16 FTU mission and associated personnel. Additionally, potential construction requirements and timelines were considered to ensure that the 2019 relocation timeline could be achieved.

Additionally, potential alternative locations for facilities construction and improvements were evaluated based on two overarching selection standards:

Standard 1: Planning Constraints – Planning constraints are man-made or natural elements that can create significant limitations to the operation or construction of buildings, roadways, utility systems, and other facilities. These

constraints, when considered collectively with the installation's capacity opportunities, inform the identification of potential areas for development, as well as those areas that can be redeveloped to support growth. This standard addresses compatibility with overall installation operations, land use compatibility, and natural and built resources, and largely dictates the location/placement of a proposed facility.

- *Operational* – Operational constraints are generally related to the operation of aircraft; storing fuel and other potentially hazardous materials; and similar operational requirements that can limit future development activity. Operational constraints include but are not limited to airfield noise contours, Explosives Safety Quantity-Distance (ESQD) arcs, airfield and airspace clearance criteria, and AT/FP requirements.

- *Natural and Cultural* – Natural constraints include biological resources (e.g., federally listed Pima pineapple cactus [*Coryphantha robustispina*]) and cultural resources (e.g., historic structures or archaeological resources). These resources provide positive aesthetic, social, cultural, and recreational attributes that substantially contribute to the overall quality of life on the installation.

- *Built* – Built constraints are related to the condition, functionality, or effectiveness of existing infrastructure systems, facilities, and other man-made improvements.

- *Land Use* – Land use compatibility constraints are associated with land use designations (e.g., industrial, administrative, recreation, open space, etc.) and ensuring that planning considerations account for compatibility between proposed and existing uses.

Standard 2: Sustainability Development Indicators – This standard refers to the ability to operate into the future without a decline in either the mission or the natural and man-made systems that support it, ensuring long-term sustainability of the installation. Sustainability is a holistic approach to asset management that seeks to minimize the negative impacts of the USAF's mission and operations on the environment. This standard also generally drives the scope of the facility/infrastructure development and/or

improvement and supports sustainability of the installation through consideration of: energy, water, wastewater, air quality, facilities space optimization, encroachment, and natural/cultural resources.

Alternatives Eliminated from Further Consideration (Section 2.3, *Screening of Alternatives*)

AETC requested that the TAF relocate its F-16 FTU off Luke AFB by 31 December 2019 due to the increase in F-35 training requirements at Luke AFB. AETC initially recommended the following four bases as suitable alternatives for the TAF F-16 FTU: Holloman AFB, New Mexico; Albuquerque Air National Guard Base (ANGB), New Mexico; Tucson ANGB, Arizona; and Davis-Monthan AFB, Arizona. After evaluating the alternatives screening criteria (i.e., weather, range, TAF mission, facility and logistics support, planning constraints, and sustainability development indicators), Tucson ANGB and Davis-Monthan AFB were carried forward for further consideration. Beddown at either of these locations would allow the TAF to continue to use their existing military training airspaces.

To assess their ability to host the TAF F-16 FTU unit, the Secretary of the Air Force Installations and Basing authorized Site Survey Control Number (SCN) 16-08 to evaluate Davis-Monthan AFB and Tucson ANGB for the proposed relocation. Based on results of the site surveys, Davis-Monthan AFB was determined not to be a reasonable alternative for relocation due to the higher order of magnitude for facility construction and costs ($28 million for Davis-Monthan AFB versus $3 million for Tucson ANGB), thus resulting in insufficient time to meet the 31 December 2019 deadline for relocation activities. As a result, Tucson ANGB was identified as the preferred new location for the TAF. The decision to proceed with TAF F-16 FTU beddown at Tucson ANGB was formally documented in a Memorandum for the Record (MFR) – signed by the Secretary of the Air Force – dated 2 October 2017.

Description of Alternative 1 (Section 2.4.1, *Alternative 1: TAF F-16 FTU Relocation to Tucson International Airport*)

Tucson ANGB is located at Tucson International Airport (TUS), approximately 10 miles southwest of downtown Tucson, in Pima County, Arizona. TUS is operated

by the Tucson Airport Authority (TAA). The 162d Wing (162 WG) at Tucson ANGB currently hosts multiple countries for international F-16 pilot training, including the Royal Netherlands Air Force (148th Fighter Squadron [148 FS]) and the Iraqi Air Force (125th Fighter Squadron Detachment 1 [125 FS Det 1]).

Under Alternative 1, the TAF's 12 Primary Authorized Aircraft (PAA) and two Backup Aircraft Inventory (BAI) would be relocated from Luke AFB to Tucson ANGB. Prior to the proposed relocation of the 14 aircraft and approximately 191 personnel associated with the TAF F-16 FTU, the 125 FS Det 1 – and their inventory of eight Iraqi F-16 aircraft and associated personnel – is scheduled to depart Tucson ANGB in June 2019. The TAF F-16 FTU would transition from Luke AFB to Tucson ANGB by 31 December 2019. As such, there would ultimately be a net increase of six F-16 aircraft at Tucson ANGB upon implementation of Alternative 1, bringing the total F-16 inventory at Tucson ANGB to 86 aircraft. The total proposed number of TAF F-16 operations flown at Tucson ANGB would be 6,459 operations per year. The departure of the Iraqi F-16 Foreign Military Sales (FMS) program would reduce annual operations at Tucson ANGB by approximately 2,658. Therefore, the projected total annual operations at Tucson ANGB following beddown of the TAF F-16s would be 31,723 and would remain below the operational tempo of 40,000 annual operations evaluated in the *Final Environmental Assessment for Proposed Aircraft Conversion and Construction Activities at the 162nd Fighter Wing* (2003) and the 43,208 operations considered in the *Environmental Impact Statement (EIS) for F-35A Training Basing* (2012).

In addition to the proposed beddown of the TAF F-16 FTU, implementation of Alternative 1 would include facilities construction and improvements necessary to support the proposed beddown in conjunction with existing operations at Tucson ANGB. Most of these proposed projects would be limited to interior renovations and small-scale additions to existing buildings. However, Alternative 1 also includes the construction of a new ECF to meet AT/FP standards. The proposed ECF would require acquisition (via lease and/or purchase) of property from the TAA, demolition of three existing facilities on the property, and the construction of a new check house, vehicle inspection area, truck inspection lane, and associated pavements. (It is also anticipated that the proposed

ECF would include a new recruiting facility within the Tucson ANGB fenceline.) Additionally, the Aerovation Hangar and associated infrastructure would be reconstructed/replaced in a new location on TAA property, adjacent to the Air Traffic Control (ATC) tower.

The proposed construction, demolition, and interior renovation projects at Tucson ANGB include the following:

1) Fiscal Year (FY) 2018 – Building 1 Renovation and Addition (XHEA172009)
2) FY 2018 – Building 40 Renovation and Addition (XHEA172010)
3) FY 2018 – Sunshade Reconfiguration
4) FY 2020 – Construct New Entry Control Facility (ECF) (XHEA109012)
5) FY 2020 – In-kind Hangar Replacement (XHEA179047)
6) FY 2019 – Building 49 Fire Suppression System Installation (XHEA122009)

No-Action Alternative (Section 2.4.2, *Alternative 2: No-Action Alternative*)

Under the No-Action Alternative, the proposed relocation of the TAF F-16 FTU to Tucson ANGB would not occur and associated construction, demolition, and interior renovation projects would not be implemented. All airfield, airspace, and range use, as well as munitions training, would reflect current existing conditions should the proposed action not occur. TAF training operations would remain at Luke AFB until a suitable alternative relocation site is identified. However, over the long-term under the No-Action Alternative, AETC's goal to remove all F-16s from Luke AFB (i.e., via either relocation or retirement) by 2023 would not be met. Because CEQ regulations stipulate that the No-Action Alternative be analyzed to assess any environmental consequences that may occur if the Proposed Action is not implemented, the No-Action Alternative has been carried forward for analysis in the EA. The No-Action Alternative provides a baseline against which the Proposed Action can be compared.

ENVIRONMENTAL CONSEQUENCES

The environmental analysis included in the EA focused on the following resource areas: airspace management, air quality, noise, land use, biological resources,

transportation and circulation, cultural resources, hazardous materials and wastes, and safety. USAF has found that implementation of the Proposed Action would not result in any significant impacts to these resource areas. Per NEPA, resource areas anticipated to experience either no impacts or negligible environmental impacts were not examined in detail in this EA. These environmental resources include: geology and soils, visual resources, water resources, socioeconomics, and environmental justice/protection of children. The rationale for excluding a detailed discussion of these resources is provided in Table 2-5 of this EA.

Airspace Management (Section 4.1, *Airspace Management*): Implementation of Alternative 1 would result in the beddown of 14 TAF F-16 A/B aircraft at Tucson ANGB. Prior to the arrival of the 21 FS, the 125 FS Det 1 would depart from Tucson ANGB. Thus, the proposed TAF F-16 FTU relocation would result in a net increase in F-16 operations at TUS of approximately 16 percent (i.e., 3 percent total aircraft operations). Given that proposed F-16 aircraft operations would only result in a 3 percent increase in the total aircraft operations at TUS and that no new F-16 operating parameters would result from the proposed TAF F-16 FTU beddown, impacts to the airfield would be less than significant. Relative to regional aircraft activity, net increases in flight activity would be minor. Existing scheduling/coordination processes and procedures currently used to manage existing military training airspace are well established by, and in coordination with, the Federal Aviation Administration (FAA) and would require no modification to support proposed training operations. Ongoing and proposed training activities would not impose any major restrictions on air commerce opportunities, significantly limit access, or require any modifications to ATC systems. Therefore, the proposed relocation of the TAF F-16 FTU would result in less than significant impacts to airspace management.

Air Quality (Section 4.2, *Air Quality*): Fugitive dust would be generated during facility construction activities – including site preparation, clearing, and grading – associated with the proposed relocation of the TAF F-16 FTU. Although any substantial increase in fugitive dust emissions is inherently adverse, increased fugitive dust emissions associated with the proposed construction activities would be short-term and temporary, resulting in less than significant impacts to air quality. Combustion emissions would be associated with construction-related

equipment, workers' vehicles, and transport of construction materials. Emissions associated with construction equipment (e.g., grader, backhoe, dozer, etc.), construction worker commutes and the transportation of materials would be minimal given the temporary nature of the construction activities. Further, annual operational emissions – including F-16 operations – would be below the *de minimis* thresholds for criteria pollutants; therefore, operational air quality impacts would be less than significant.

Noise (Section 4.3, *Noise*): The proposed relocation of the TAF F-16 FTU would result in minor, temporary construction-related impacts on the noise environment in the vicinity of proposed construction, demolition, and interior renovation project sites. However, noise generation would be typical of standard construction activities, would last only the duration of construction, and would be restricted to normal working hours. The noise environment in the immediate vicinity of the airport is dominated by noise from civilian and military aircraft operations. As such, noise produced by construction and demolition activities would not significantly impact noise-sensitive receptors in the vicinity of the airfield. The proposed relocation of the TAF's 14 F-16 aircraft to Tucson ANGB would result in a 16-percent increase in total F-16 operations at TUS. Under Alternative 1, the 65 Day-Night Average A-weighted Sound Level (DNL) noise contour would extend approximately 4.41 miles to the southeast beyond the end of Runway 29R and approximately 4.83 miles to the southeast beyond the end of Runway 29L, primarily over vacant and undeveloped land, with some commercial/industrial uses located in Pima County. Northwest of the airport, the 65 DNL noise contour would extend approximately 2.11 miles beyond the end of Runway 11L and 1.76 miles beyond the end of Runway 11R, affecting residential and commercial land uses within Tucson; however, the increase in noise exposure would be less than 1.5 dB at or above 65 DNL and less than 3-db within the 60 to 65 DNL noise zone. A 3-dB change is necessary for noise increases to be noticeable to humans; therefore, impacts to the noise environment surrounding the airfield would be less than significant.

Land Use (Section 4.4, *Land Use*): Under Alternative 1, Building 1 would be renovated, reconfigured, and expanded to support two FMS programs including the 21 FS and the 148 FS (currently located in Building 40). Similarly, Building 40 would be renovated, reconfigured, and expanded to support wing headquarters

and communications functions that would be relocated from Building 1. Implementation of these projects would accomplish the goals of the 162 WG's Installation Development Plan (IDP) to collocate all operational functions and flight simulator activities around Building 44 and all squadron operations functions to the east side of the installation. In addition, the 162 WG would acquire (via lease and/or purchase) the 18-acre TAA property to support construction of the proposed ECF, which was identified as a priority project in the 162 WG's IDP. The proposed ECF would provide sufficient queuing capacity and vehicle denial capabilities as well as ensure compliance with other existing AT/FP requirements. Additionally, the proposed construction of a 1,500-square-foot (sf) recruiting facility associated with the proposed ECF would also result in beneficial impacts related to AT/FP as it would relocate this function within the installation's fenceline. All proposed construction, demolition, and interior renovation activities are consistent with the 162 WG's IDP and are consistent with ANG planning policies and guidelines. Therefore, impacts to land use associated with Alternative 1 would be beneficial.

Biological Resources (Section 4.5, *Biological Resources*): Proposed construction activities would largely occur within previously disturbed or developed areas of Tucson ANGB and TUS. These areas are characterized by loud industrial-type noise and intensive human use characteristic of an airfield. Consequently, construction-related noise would have less than significant impacts on wildlife potentially occurring on the installation. Construction activities would not result in the removal of federally listed or special status plant species (e.g., Pima pineapple cactus [*Coryphantha robustispina*]), or sensitive vegetation or habitat types that could support special status wildlife species. Any indirect impacts to adjacent habitats (e.g., increased construction-related noise) would be short-term and temporary. Therefore, impacts to biological resources at Tucson ANGB and TUS would be less than significant. Further, no impacts to biological resources would occur within or beneath the affected airspaces as the total F-16 operations would remain below the number of operations that were previously assessed for these airspaces. Additionally, increases to noise levels within airspace utilized for 162 WG training would increase by no more than 0.64 dB relative to existing conditions.

Transportation and Circulation (Section 4.6, *Transportation and Circulation*): Implementation of the proposed construction would require delivery of materials to and removal of demolition-related debris from the project sites at Tucson ANGB and TUS. However, construction traffic would make up only a small portion of the total existing traffic volume in the region and at the installation, and many of the vehicles would be driven to and kept on site for the duration of construction, resulting in very few actual increased trips. Increases in traffic volumes associated with the proposed construction activities would be short-term and temporary. Further, construction of the proposed ECF would be completed prior to closing and fencing off the existing ECF. Therefore, installation access would not be interrupted during construction.

Operational impacts of the proposed ECF would be beneficial. The new ECF would provide adequate queuing capacity and vehicle denial capabilities in accordance with AT/FP standards. Associated traffic improvements would allow efficient access to and from the installation. Additionally, improvements would include a realignment of privately owned vehicle (POV) parking and vehicle access surrounding Building 1 and Building 40, to accommodate fire and emergency vehicles and ensure compliance with AT/FP standoff distances. Consequently, the proposed ECF would have beneficial impacts on traffic and circulation on the installation.

Cultural Resources (Section 4.7, *Cultural Resources*): Proposed construction activities would not impact any buildings or other built resources that are eligible for listing on the National Register of Historic Places (NRHP). Six buildings at Tucson ANGB and TUS would be demolished or renovated; however, each of these buildings have been evaluated for NHRP eligibility and do not meet the criteria for listing on the NRHP. The Arizona State Historic Preservation Office (SHPO) has concurred with the determination of no historic properties affected in a letter dated 18 May 2018. No known archaeological sites are located on the installation or the affected areas of TUS. Thus, none of the proposed construction projects would affect any known archaeological resources. According to the Bureau of Indian Affairs, no lands on or in the immediate vicinity of the installation are held in trust by the U.S. for tribal governments. Although most of the proposed projects are sited in previously disturbed areas at the installation, the potential remains, however slight, for buried, unknown archaeological resources

to be uncovered during ground-disturbing activities (i.e., construction and expansion of facilities, and demolition). If such resources were uncovered during construction by the 162 WG, activities would be suspended until a qualified archaeologist could determine the significance of the resource(s). Therefore, implementation of the proposed construction activities would not significantly impact cultural resources. No impacts to cultural resources would occur beneath the affected airspaces as the total F-16 operations would remain below the number of operations that were previously assessed for these airspaces. Additionally, increases to noise levels within airspace utilized for 162 WG training would increase by no more than 0.64 dB relative to existing conditions.

Hazardous Materials and Wastes (*Section 4.8, Hazardous Materials and Wastes*): The use and storage of minor amounts of hazardous materials related to the proposed construction activities would increase temporarily during the construction and demolition activities. However, any hazardous materials used or hazardous wastes generated as a result of implementation of construction related to the proposed relocation of the TAF would be accumulated and removed in accordance with procedures included in the installation's Hazardous Waste Management Plan (HWMP). Prior to demolition, all facilities constructed prior to 1978 would be examined for asbestos-containing material (ACM) and all potential ACM in the buildings proposed for demolition would be handled and disposed of according to the installation's HWMP as well as in compliance with all applicable Federal, state, and local regulations.

Demolition of the three facilities on TAA property and construction of the proposed ECF would occur within the boundaries of the TUS Area Superfund Site, which is characterized by contaminated groundwater. Implementation of the proposed facilities construction projects would not require excavation that would affect or expose contaminated groundwater. Nevertheless, to reduce overall worker exposure potential, a Site-Specific Health and Safety Plan would be implemented. The Health and Safety Plan would be designed to evaluate each of the chemicals present in the work area and the potential exposure scenarios/paths.

Safety (Section 4.9, *Safety*): The proposed relocation of the TAF F-16 FTU would result in a net increase to existing aircraft operations performed at TUS; however, proposed F-16 operations would adhere to all established flight safety guidelines and protocol and would remain below the number of operations previously

assessed in the *Final Environmental Assessment for Proposed Aircraft Conversion and Construction Activities at the 162nd Fighter Wing* (2003). Therefore, with regard to aircraft mishaps and bird-aircraft strikes, no impact to aircraft safety would result from proposed TAF F-16 FTU relocation. Implementation of the proposed relocation of the TAF would also not result in any changes to munitions storage or ESQD arcs at Tucson ANGB. Further, proposed construction activities would address existing AT/FP-related issues at Tucson ANGB by constructing a new ECF and POV parking at Tucson ANGB. Therefore, the Proposed Action would result in moderate beneficial impacts associated with AT/FP.

Cumulative Effects (Section 5, *Cumulative Impacts*): Overall, the proposed relocation of the TAF F-16 FTU and associated construction would result in minor, less than significant impacts that would be well below the context and intensity thresholds described for each resource area. As such, the proposed relocation of the TAF F-16 FTU and associated construction would not contribute to cumulatively significant impacts when considered with other past, present, and reasonably foreseeable future actions.

MITIGATION AND MONITORING

The proposed relocation of the TAF F-16 FTU and associated construction would not result in significant impacts to any of the resource areas considered in this EA. As such, no mitigation measures would be required to reduce impacts to less than significant levels. Nevertheless, Best Management Practices (BMPs) are described for air quality, noise, cultural resources, and hazardous materials. Although not required to reduce potential impacts to less than significant levels, these BMPs would be implemented in order to further reduce short-term construction-related impacts associated with construction activities in support of the proposed TAF relocation.

SCOPING AND PUBLIC REVIEW

NEPA, 40 CFR Parts 1500-1508, and 32 CFR Part 989 requires public review of the EA before approval of the FONSI and implementation of the Proposed Action. Scoping letters were distributed to relevant Federal, state, and local agencies on 27 April 2018 notifying them of the Proposed Action and requesting input on the scope of the EA. A Notice of Availability (NOA) for public review of the Draft EA

was published in the Arizona Daily Star and the Arizona Republic and the Draft EA was made available for public review at the Joel D. Valdez Main Library, located at 101 North Stone Avenue, Tucson, AZ 85701 as well as Valencia Library, located at 202 West Valencia Road, Tucson, AZ 85706. Through the intergovernmental review process, USAF notified relevant Federal, state, and local agencies and allowed them sufficient time to make known their environmental concerns specific to the Proposed Action. The total review period for public and agency comments was 30 days following the release of the Draft EA. All public, agency, and Native American comments received on the Draft EA will be incorporated into the Final EA.

FINDING OF NO SIGNIFICANT IMPACT

Based on my review of the facts and analyses contained in the attached EA, conducted under the provisions of NEPA, CEQ regulations, and 32 CFR Part 989, I conclude that the Proposed Action (Alternative 1) would not have a significant environmental impact, either by itself or cumulatively with other known projects. Accordingly, an Environmental Impact Statement is not required. The signing of this Finding of No Significant Impact completes the environmental impact analysis process.

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CYNTHIA OLIVIA, GS-15 Date
Chief Resource Integration Division

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ACRONYMS AND ABBREVIATIONS

°F	degrees Fahrenheit
125 FS Det 1	125th Fighter Squadron Detachment 1
148 FS	148th Fighter Squadron
162 WG	162d Wing
21 FS	21st Fighter Squadron
AAC	Arizona Administrative Code
AAF	Army Airfield
ACHP	Advisory Council on Historic Preservation
ACM	asbestos-containing material
ACP	Access Control Point
ADEQ	Arizona Department of Environmental Quality
AEDT	Aviation Environmental Design Tool
AETC	Air Education and Training Command
AFB	Air Force Base
AFCEC/CZN	Air Force Civil Engineer Center, National Environmental Policy Act Division
AFI	Air Force Instruction
AFM	Air Force Manual
AFPD	Air Force Policy Directive
AGE	aerospace ground equipment
AGFD	Arizona Game and Fish Department
AGL	above ground level
AIRFA	American Indian Religious Freedom Act
ALP	Airport Layout Plan
ANG	Air National Guard
ANGB	Air National Guard Base
AR	air refueling route
ARTCC	Air Route Traffic Control Center
AST	aboveground storage tank
AT/FP	Anti-Terrorism/Force Protection
ATC	Air Traffic Control
ATCAA	Air Traffic Control Assigned Airspace
AZDA	Arizona Department of Agriculture
AZPDES	Arizona Pollutant Discharge Elimination System
BAI	Backup Aircraft Inventory
BASH	Bird/Wildlife Aircraft Strike Hazard
BGEPA	Bald and Golden Eagle Protection Act
BMGR	Barry M. Goldwater Range
BMP	Best Management Practice
BOS	Base Operations Support
CAA	Clean Air Act
CAAA	Clean Air Act Amendments

ACRONYMS AND ABBREVIATIONS
(continued)

CAD/PAD	Cartridge Actuated Device / Propellant Actuated Device
CAP	centralized accumulation point
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFA	controlled firing area
CFR	Code of Federal Regulations
CH_4	methane
CO	carbon monoxide
CO_2	carbon dioxide
CRS	Cultural Resources Survey
CUZ	Compatible Use Zone
CWA	Clean Water Act
CZ	clear zone
dB	decibels
dBA	A-weighted decibel
DNL	day-night sound level
DoD	Department of Defense
DoDI	Department of Defense Instruction
DOT	U.S. Department of Transportation
DSCA	Defense Security Cooperation Agency
EA	Environmental Assessment
EBS	Environmental Baseline Survey
ECF	Entry Control Facility
EIAP	Environmental Impact Analysis Process
EIS	Environmental Impact Statement
EISA	Energy Independence and Security Act
EO	Executive Order
ERP	Environmental Restoration Program
ESA	Endangered Species Act
ESQD	Explosives Safety Quantity Distance
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulations
FEMA	Federal Emergency Management Agency
FICON	Federal Interagency Committee on Noise
FIS	Fighter Interceptor Squadron
FL	Flight Level
FMS	Foreign Military Sales
FONSI	Finding of No Significant Impact
FTU	Formal Training Unit
FY	Fiscal Year

ACRONYMS AND ABBREVIATIONS
(continued)

GHG	greenhouse gas
GWETRS	Groundwater Extraction, Treatment, and Recharge Systems
HAP	Hazardous Air Pollutant
HEF	High Expansion Foam
HIRL	High Intensity Runway Lights
HUD	U.S. Department of Housing and Urban Development
HVAC	heating, ventilation, and air conditioning
HWMP	Hazardous Waste Management Plan
Hz	hertz
I-	Interstate
ICRMP	Integrated Cultural Resources Management Plan
IDP	Installation Development Plan
IDP	Installation Development Plan
IFR	Instrument Flight Rules
IMT	International Military Training
INM	Integrated Noise Model
INRMP	Integrated Natural Resources Management Plan
IPCC	Intergovernmental Panel on Climate Change
IR	instrument route
JP-4	Jet Propellent 4
JP-8	Jet Propellent 8
LBP	lead-based paint
L_{dnmr}	day-night average sound level
LEED	Leadership in Energy and Environmental Design
LOA	Letter of Agreement
LOX	Liquid Oxygen
MALSR	Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights
MBTA	Migratory Bird Treaty Act
MCAS	Marine Corps Air Station
MCCA	Military Construction Cooperative Agreement
MFR	Memorandum for the Record
MND	Taiwan Ministry of National Defense
MOA	military operations area
MSA	munitions storage area
MSL	mean sea level
MTR	Military Training Route
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NAGPRA	Nation American Graves Protection and Repatriation Act

ACRONYMS AND ABBREVIATIONS
(continued)

NAVAIDS	navigational aids
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NFA	No Further Action
NGB	National Guard Bureau
NHPA	National Historic Preservation Act
NM	nautical miles
NMFS	National Marine Fisheries Service
NO_2	nitrogen dioxide
NOA	Notice of Availability
NO_x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NRHP	National Register of Historic Places
O_3	ozone
OFZ	Obstacle Free Zone
PAA	Primary Aircraft Authorization
PAPI	Precision Approach Path Indicator
Pb	lead
PCA	Positive Control Area
PCB	polychlorinated biphenyl
PCC	Pima County Code
PF IV	Peace Fenghuang Program
PM	particulate matter
PM_{10}	particulate matter equal to or less than 10 microns in diameter
$PM_{2.5}$	particulate matter equal to or less than 2.5 microns in diameter
POL	petroleum, oils, and lubricants
POV	privately owned vehicle
PPC	Pima pineapple cactus
PPE	personal protective equipment
QA/COR	Quality Assurance/Contracting Officer Representative
R-	Restricted Area
RCRA	Resource Conservation and Recovery Act
REIL	Runway End Identifier Lights
ROD	Record of Decision
ROFA	Runway Object Free Area
RPZ	Runway Protection Zone
RSA	Runway Safety Area

ACRONYMS AND ABBREVIATIONS
(continued)

RSZ	Runway Safety Zone
SAP	satellite accumulation point
SCN	Site Survey Control Number
SEL	Sound Exposure Level
sf	square feet
SF_6	sulfur hexafluoride
SFO	Simulated Flame Out
SHPA	Arizona State Historic Preservation Act
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SO_2	sulfur dioxide
SQG	Small Quantity Generator
SRL	Soil Remediation Level
SUA	Special Use Airspace
TAA	Tucson Airport Authority
TAF	Taiwan Air Force
TFG	Tactical Fighter Group
THPO	Tribal Historic Preservation Office
tpy	tons per year
TRACON	Terminal Radar Approach Control
TUS	Tucson International Airport
UFC	Unified Facilities Criteria
USACE	U.S. Army Corps Engineers
USAF	U.S. Air Force
USC	U.S. Code
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGBC	U.S. Green Building Council
UST	underground storage tank
UTD/SIM	Unit Training Device/Simulator
VFR	Visual Flight Rules
VOC	volatile organic compounds
VR	visual route

SECTION 1
PURPOSE OF AND NEED FOR ACTION

1.1 INTRODUCTION

In August 2012, the U.S. Air Force (USAF) published a Record of Decision (ROD) to establish six F-35A training squadrons at Luke Air Force Base (AFB), operating a total of 144 F-35A aircraft (USAF 2012). This F-35A beddown at Luke AFB will be accomplished through a combination of new construction and repurposing existing facilities currently in use by a number of other units. The ROD allows 26 F-16s to remain at Luke AFB; however, due to F-35A training requirements, Air Education and Training Command (AETC) developed a mandate to remove all F-16s from Luke AFB (i.e., via either relocation or retirement) by 2023.

The Foreign Military Sales (FMS) initiative comprises the U.S. Government's program for transferring defense articles, services, and training to international partners and organizations. The Defense Security Cooperation Agency (DSCA) administers the FMS program for the Department of Defense (DoD). Under FMS, the U.S. Government uses DoD's acquisition system to procure defense articles and services on behalf of its partners. The President designates countries and international organizations eligible to participate in FMS, and the Department of State approves individual programs on a case-by-case basis. Currently, 179 countries and international organizations participate in FMS. Major FMS programs nurture long-term relationships with the U.S. military, including access to joint training and doctrine as well as increased opportunities for interoperability with U.S. forces (DSCA 2018).

Under the FMS program, the Taiwan Peace Fenghuang (PF IV) Program was initiated in 1996 for F-16 initial pilot training at Luke AFB, following Taiwan Air Force's (TAF's) purchase of F-16s from the U.S. The F-16 training evolved into advance tactics that mirror the USAF F-16 mission strategy and techniques. PF IV includes advanced combat tactics training as well as deployments for more realistic training. The F-16 advanced pilot training at Luke AFB is managed by the dedicated 21st Fighter Squadron (21 FS).

The 21 FS was inactivated, redesignated, and moved several times prior to being activated at Luke AFB and assigned to the 56th Operations Group in 1996. In 1996, Taiwan purchased 150 F-16 Block 20 aircraft; the first 14 production aircraft were beddown at Luke AFB, initiating the PF IV Training Program under the 21 FS. The initial mission of the 21 FS was to provide necessary F-16 basic pilot training; however, this has evolved into a mission intended to provide advanced air combat tactics training to TAF pilots. This training is beneficial to Taiwan and the U.S. Government and continuing this partnership is a strategic advantage to both countries. Training in the 21 FS is a combination of classroom time and flying. The average daily staff associated with the 21 FS is approximately 12 full-time civilian personnel, 9 active-duty USAF personnel, and approximately 12 to 18 TAF student pilots per year. The 21 FS was founded in 1944 and assigned to Seymour-Johnson Field, North Carolina.

In efforts to remove all F-16s from Luke AFB (i.e., via either relocation or retirement) by 2023, AETC requested that TAF relocate its F-16 Formal Training Unit (FTU) off Luke AFB. The TAF agreed to AETC's request to relocate off of Luke AFB, with a target date of 31 December 2019.

In accordance with the National Environmental Policy Act (NEPA) of 1969 (42 U.S. Code [USC] §§4321 et seq.) and the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (Title 40 Code of Federal Regulations [CFR] Parts 1500–1508), AETC and the Air Force Civil Engineer Center, NEPA Division (AFCEC/CZN) have prepared this Environmental Assessment (EA) to consider the potential consequences to the human and natural environment that may result from the proposed relocation of the TAF F-16 FTU. The Federal Aviation Administration (FAA) is a Cooperating Agency for this EA. As such, FAA Order 1050.1F and FAA Order 5050.4B are also implemented as part of this EA (see section 1.6, *Cooperating Agency and Intergovernmental Coordination / Consultations*).

1.2 PURPOSE OF THE ACTION

The *purpose* of the Proposed Action is three-fold: 1) maintain the F-16 international pilot training programs that enhance both U.S. Foreign Policy and DoD strategic and operational objectives by continuing to support training of F-16 pilots by the

21 FS at a USAF installation other than Luke AFB; 2) provide facilities necessary to meet physical needs associated with the proposed beddown; and 3) maximize operations and maintenance facility efficiency while meeting current environmental, safety, and security standards (namely those set forth by the DoD in its *United Facilities Criteria [UFC]: DoD Minimum Anti-terrorism Standards for Buildings*).

1.3 NEED FOR THE ACTION

The *need* for the Proposed Action is to relocate the TAF F-16 FTU in order to accommodate the programmed beddown of F-35s at Luke AFB under the USAF's 2012 ROD. Although the ROD allows 26 F-16s to remain at Luke, AETC has developed a mandate to remove all F-16s from Luke AFB (i.e., via either relocation or retirement) by 2023.

The *need* for the proposed Entry Control Facility (ECF) and associated proposed relocation of the Aerovation Hangar is driven by the existing configuration of the entry road to Tucson ANGB, which leaves the installation susceptible to security risks and causes congestion. The proposed ECF is necessary to meet Antiterrorism / Force Protection (AT/FP) standards in accordance with DoD and USAF regulations (UFC Series 4-000, *DoD Anti-Terrorism/Force Protection Standards & Security Engineering*; UFC 4-022-01, *Security Engineering, Entry Control Facility [ECF]/Access Control Point [ACP]*).

1.4 DECISIONS TO BE MADE

This EA evaluates the potential environmental consequences of implementing the Proposed Action as described in Section 2.1, *Proposed Action*. Based on the analyses conducted in support of this EA, USAF will make one of three decisions regarding the Proposed Action:

1. Choose the alternative action that best meets the purpose of and need for this project and sign a Finding of No Significant Impact (FONSI), allowing implementation of the selected alternative;

2. Initiate preparation of an Environmental Impact Statement (EIS) if it is determined that significant impacts would occur as a result of implementation of the action alternatives; or

3. Select the No-Action Alternative, whereby the Proposed Action would not be implemented.

As required by NEPA and its implementing regulations established by CEQ, preparation of an environmental document must precede final decisions regarding a Federal action and be available to inform decision-makers of the potential environmental impacts.

1.5 APPLICABLE LAWS AND ENVIRONMENTAL REGULATIONS

1.5.1 National Environmental Policy Act

NEPA requires that Federal agencies consider potential environmental consequences of proposed Federal actions. The law's intent is to protect, restore, or enhance the environment through well-informed Federal decisions. The CEQ was established under NEPA for the purpose of implementing and overseeing Federal policies as they relate to this process. In 1978, the CEQ issued *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act* (40 CFR Parts 1500-1508 [CEQ 1978]). These regulations specify that an EA be prepared to:

- Briefly provide sufficient analysis and evidence for determining whether to prepare an EIS or a FONSI;
- Aid in an agency's compliance with NEPA when no EIS is necessary; and
- Facilitate preparation of an EIS when one is necessary.

Further, to comply with other relevant environmental requirements (e.g., the Safe Drinking Water Act, Endangered Species Act [ESA], and National Historic Preservation Act [NHPA]) in addition to NEPA, and to assess potential environmental impacts, the Environmental Impact Analysis Process (EIAP) and decision-making process for the Proposed Action involves a thorough examination of all pertinent environmental issues.

1.5.2 Environmental Impact Analysis Process

The EIAP is the process by which the USAF facilitates compliance with environmental regulations (32 CFR Part 989). The primary legislation affecting the USAF's environmental review and decision-making process is NEPA. This act and other facets of the EIAP are described below.

1.5.3 Endangered Species Act

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

1.5.4 Cultural Resources Regulatory Requirements

The NHPA (54 USC §§30010 et seq.) established the National Register of Historic Places (NRHP) and the Advisory Council on Historic Preservation (ACHP) which outlined procedures for the management of cultural resources on Federal property. Cultural resources can include archaeological remains, architectural structures, and traditional cultural properties such as ancestral settlements, historic trails, and places where significant historic events occurred. The NHPA requires Federal agencies to consider potential impacts to cultural resources that are listed, nominated to, or eligible for listing on the NRHP; designated a National Historic Landmark; or valued by modern Native Americans for maintaining their traditional culture. Section 106 of NHPA requires Federal agencies to consult with the appropriate State Historic Preservation Office (SHPO) if their undertaking might affect such resources. *Protection of Historic and Cultural Properties* (36 CFR Part 800) provides an explicit set of procedures for Federal agencies to meet their obligations under the NHPA, which includes inventorying of resources and consultation with SHPO.

Executive Order (EO) 13007, *Indian Sacred Sites*, directs Federal land management agencies to accommodate access to, and ceremonial use of, Native American sacred sites including any specific, discrete, narrowly delineated location on Federal land provided that the Native American tribe or appropriately authoritative representative of a Native American religion has informed the agency of the existence of such a site.

The American Indian Religious Freedom Act (AIRFA) (42 USC §1996) established Federal policy to protect and preserve the rights of Native Americans to believe, express, and exercise their traditional religions, including providing access to sacred sites. The Native American Graves Protection and Repatriation Act (NAGPRA) (25 USC §§3001–3013) requires consultation with Native American tribes prior to excavation or removal of human remains and certain objects of cultural importance.

In addition, DoD Instruction (DoDI) 4710.02, *DoD Interactions with Federally-Recognized Tribes*, assigns responsibilities and provides procedures for DoD interactions with federally recognized tribes in accordance with EO 13175, *Consultation and Coordination with Indian Tribal Governments*. This DoDI requires that all DoD components shall consult with Native American tribes whenever proposing an action that may have the potential to significantly affect protected tribal resources, tribal rights, or tribal lands. The tribal consultation process is distinct from NEPA consultation or the interagency coordination process, and it requires separate notification of all relevant tribes.

1.5.5 Intergovernmental Review of Federal Programs

EO 12372, *Intergovernmental Review of Federal Programs*, structures the U.S. Government's system of consultation with other Federal, state, and local governments on its decisions involving grants, other forms of financial assistance, and direct development. As detailed in 40 CFR §1501.4(b), CEQ regulations require intragovernmental and intergovernmental notifications prior to making any detailed statement of environmental impacts. Through the coordination and consultation under EO 12372, the USAF notifies relevant Federal, state, and local agencies and allows them sufficient time to make known their environmental concerns specific to a proposed Federal action. Comments and concerns submitted

by these agencies are subsequently incorporated into the analysis of potential environmental impacts conducted as part of this EA.

1.6 COOPERATING AGENCY AND INTERGOVERNMENTAL COORDINATION/ CONSULTATIONS

1.6.1 Lead and Cooperating Agencies

The USAF is the Lead Agency for this EA pursuant to 40 CFR §1501.5, *Lead Agencies*.

In accordance with the guidelines generally prescribed in CEQ regulations (40 CFR §1501.6, *Cooperating Agencies*), in December 2017 the USAF requested that the FAA formally participate as a cooperating agency by:

- Making FAA staff available for interdisciplinary reviews;
- Participating in the NEPA process, including agency coordination meetings;
- Commenting on the draft documents, meet scheduled timelines, help resolve any significant issues between FAA requirements and USAF, and other NEPA-related procedural actions;
- Identifying issues related to the FAA's jurisdiction by law or special expertise; and
- Adopting, as appropriate, the Final EA as required to fulfill the independent FAA-related NEPA obligations and to reduce duplication of efforts with other Federal, state, tribal, and local procedures.

In January 2018, the FAA / Office of Airports for the Western-Pacific Region accepted this request and became a formal Cooperating Agency in the preparation of this EA.

The FAA has established several policies for implementing NEPA including:

- FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures (2015)*; and

- FAA Order 5050.4B, *Implementing Instructions for Airport Actions*.

FAA Order 1050.1F provides the FAA with policies and procedures to ensure agency compliance with NEPA and implementing regulations issued by the CEQ (40 CFR Parts 1500-1508). Exhibit 4-1 in FAA Order 1050.1F identifies 14 impact categories that should be considered during the NEPA process (FAA 2015). This EA considers each of the resources as prescribed by FAA Order 1050.1F as outlined in Table 1-1 (see also Table 2-5 in Section 2.5, *Scope of Environmental Services*).

Table 1-1. FAA Order 1050.1F, Environmental Impact Categories

Resource Area	
Air Quality	Socioeconomics
Biological Resources (including fish, wildlife, and plants)	Environmental Justice
Climate	Children's Environmental Health and Safety Risks
Coastal Resources	Light Emissions
Department of Transportation Act: Section 4(f)	Visual Resources / Visual Character
Farmlands	Wetlands
Hazardous Materials, Solid Waste, and Pollution Prevention	Floodplains
Historical, Architectural, Archeological, and Cultural Resources	Surface Waters
Land Use	Groundwater
Natural Resources and Energy Supply	Wild and Scenic Rivers
Noise and Noise-Compatible Land Use	

Source: FAA 2015.

USAF has obtained technical input from the FAA during the preparation of this EA. Further, the USAF is working cooperatively with FAA to ensure that adoption of the findings of this EA will enable continued airfield and airspace management that serves future military aviation training and civilian aviation needs.

1.6.1.1 FAA Purpose and Need for the Proposed Action

FAA's statutory mission is to ensure the safe and efficient use of navigable airspace in the U.S. pursuant to 49 USC §47101(a)(1). The FAA must ensure that the

implementation of the Proposed Action would not derogate the safety of aircraft and airport operations at TUS.

The *purpose* of the Proposed Action related to Tucson Airport Authority's (TAA's) request to modify the existing Airport Layout Plan (ALP) is to maintain TAA tenant operational capabilities and to meet the need of TUS users. FAA approval of the ALP modification pursuant to 49 USC §47107(a)(16) would ensure the proposed ECF at Tucson ANGB and associated in-kind replacement of the Aerovation Hangar at TUS would not result airspace obstruction to the airport and/or obstruction to Runway Safety Area and Object Free Area.

As a result of the Proposed Action, the FAA has developed an additional Federal action for the unconditional approval of the ALP depicting the proposed ECF and proposed in-kind replacement of the Aerovation Hangar pursuant to 49 USC §47101(a)(1) and 49 USC §47107(a)(16).

1.6.2 Interagency and Intergovernmental Coordination and Consultations

Federal, state, and local agencies with jurisdiction that could be affected by the Proposed Action were notified during the development of this EA. Appendix A contains the list of agencies that received scoping materials as well as all associated correspondence. Additionally, consultation with the Arizona SHPO under Section 106 of the NHPA regarding NRHP eligibility was initiated 27 April 2018 (see Appendix C).

1.6.3 Government-to-Government Consultations

The relevant federally recognized tribes in Arizona were each notified on 27 April 2018 of the Proposed Action and offered the opportunity for government-to-government consultation. A list of Native American tribal governments consulted during this analysis along with copies of all correspondence are included in Appendix B.

1.7 PUBLIC AND AGENCY ENVIRONMENTAL ASSESSMENT REVIEW

A Notice of Availability (NOA) for the Draft EA and FONSI was published in the *Arizona Daily Star* and *Arizona Republic*, announcing the availability of the EA for review. The NOA invited the public to review and comment on the Draft EA. Additionally, electronic copies of the Draft EA were also delivered to the Federal, state, and local agencies listed in Appendix A. All public and agency comments on the Draft EA received during the 30-day review period will be provided in Appendix A of the Final EA.

Copies of the Draft EA and FONSI were made available for review at the following locations:

Joel D. Valdez Main Library 101 North Stone Avenue, Tucson, AZ 85701	Valencia Library 202 West Valencia Road, Tucson, AZ 85706

SECTION 2
DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

This section describes the Proposed Action and the alternatives that the U.S. Air Force (USAF) is considering to fulfill the purpose of and need for the Proposed Action (refer to Section 1.2, *Purpose of the Action* and Section 1.3, *Need for the Action*). The National Environmental Policy Act (NEPA) process evaluates potential environmental consequences associated with the Proposed Action and its alternatives. In addition, Council on Environmental Quality (CEQ) regulations specify that an Environmental Assessment (EA) must include a No-Action Alternative against which potential impacts can be compared. While the No-Action Alternative would not satisfy the purpose of or need for the Proposed Action, it is analyzed in detail in accordance with CEQ regulations.

2.1 PROPOSED ACTION

The Proposed Action includes the relocation of the Taiwan Air Force (TAF) F-16 Formal Training Unit (FTU) from Luke Air Force Base (AFB) in order to allow the 21st Fighter Squadron (21 FS) to continue high-quality F-16 pilot training critical to the overall USAF mission while supporting the Air Education and Training Command (AETC) decision to beddown F-35s at Luke AFB and move or retire all existing F-16 FTUs at Luke AFB. In addition to the TAF F-16 FTU beddown and associated facilities construction activities necessary to support associated operations and maintenance activities, the Proposed Action also includes the construction of a new Entry Control Facility (ECF) to meet Anti-Terrorism/Force Protection (AT/FP) standards.

2.2 ALTERNATIVE SELECTION STANDARDS

This section outlines the alternative selection standards that were used by the USAF to develop and analyze the range of reasonable alternatives to the Proposed Action. Alternatives selection standards were used to help determine feasibility of alternatives, potential project siting locations, and the extent to which project alternatives would fulfill the purpose and need for the Proposed Action

Potential alternative locations for the beddown of the TAF F-16 FTU were evaluated based on the following standards:

Weather – Adverse weather conditions can impact training missions. Therefore, AETC site survey teams evaluated potential locations for historic weather patterns and the potential impacts to flying missions.

Range – The TAF F-16 FTU requires several different ranges to conduct its stated mission. The AETC site survey team evaluated which ranges would be compatible for TAF training at each beddown location.

TAF Mission – The 21 FS mission to provide advanced air combat tactics training to TAF pilots would be best accomplished if the TAF remains in Arizona. This would enable the TAF F-16 FTU to continue using the Barry M. Goldwater Range (BMGR), Ruby Military Operations Area (MOA) and Tombstone MOA, as well as the Davis-Monthan AFB for missions involving live munitions.

Facility and Logistics Support – Potential beddown locations were evaluted based upon existing facilities and their ability to accommodate the TAF F-16 FTU mission and associated personnel. Additionally, potential construction requirements and timelines were considered to ensure that the 2019 relocation timeline could be achieved.

Additionally, potential alternative locations for facilities construction and improvements were evaluated based on two overarching selection standards:

Standard 1: Planning Constraints – Planning constraints are man-made or natural elements that can create significant limitations to the operation or construction of buildings, roadways, utility systems, and other facilities. These constraints, when considered collectively with the installation's capacity opportunities, inform the identification of potential areas for development, as well as those areas that can be redeveloped to support growth. This standard addresses compatibility with overall installation operations, land use compatibility, and natural and built resources, and largely dictates the location/placement of a proposed facility.

- *Operational* – Operational constraints are generally related to the operation of aircraft; storing fuel and other potentially hazardous materials; and similar operational requirements that can limit future development activity. Operational constraints include but are not limited to airfield noise contours, Explosives Safety Quantity-Distance (ESQD) arcs, airfield and airspace clearance criteria, and AT/FP requirements.

- *Natural and Cultural* – Natural constraints include biological resources (e.g., federally listed Pima pineapple cactus [PPC]) and cultural resources (e.g., historic structures or archaeological resources). These resources provide positive aesthetic, social, cultural, and recreational attributes that substantially contribute to the overall quality of life on the installation.

- *Built* – Built constraints are related to the condition, functionality, or effectiveness of existing infrastructure systems, facilities, and other man-made improvements.

- *Land Use* – Land use compatibility constraints are associated with land use designations (e.g., industrial, administrative, recreation, open space, etc.) and ensuring that planning considerations account for compatibility between proposed and existing uses.

Standard 2: Sustainability Development Indicators – This standard refers to the ability to operate into the future without a decline in either the mission or the natural and man-made systems that support it, ensuring long-term sustainability of the installation. Sustainability is a holistic approach to asset management that seeks to minimize the negative impacts of the USAF's mission and operations on the environment. This standard also generally drives the scope of the facility/infrastructure development and/or improvement and supports sustainability of the installation through consideration of: energy, water, wastewater, air quality, facilities space optimization, encroachment, and natural/cultural resources.

2.3 SCREENING OF ALTERNATIVES

The process described below was used to identify alternatives for the TAF F-16 FTU relocation basing locations. The process applied operational and other criteria to identify suitable basing alternatives.

AETC requested TAF to relocate its F-16 FTU off Luke AFB by 31 December 2019 due to the increase in F-35 training requirements a Luke AFB. AETC initially recommended the following four bases as suitable alternatives for the TAF F-16 FTU: Holloman AFB, New Mexico; Albuquerque Air National Guard Base (ANGB), New Mexico; Tucson ANGB, Arizona; and Davis-Monthan AFB, Arizona. After evaluating factors listed in Section 2.2, *Alternative Selection Standards* (i.e., weather, range, TAF mission, facility and logistics support, planning constraints, and sustainability development indicators), Tucson ANGB and Davis-Monthan AFB were carried forward for further alternative analysis. Beddown at either of these locations would allow the TAF to continue to use their existing military training airspaces.

Table 2-1. Evaluation of Alternative Base Locations

Selection Criterion	Holloman AFB	Albuquerque ANGB	Tucson ANGB	Davis-Monthan AFB
Weather	Yes	Yes	Yes	Yes
Range	No	No	Yes	Yes
TAF Mission	Yes	Yes	Yes	Yes
Facility and Logistics Support	No	No	Yes	No
Planning Contstraints	Yes	Yes	Yes	Yes
Sustainability Development Indicators	Yes	Yes	Yes	Yes

To assess their ability to host the TAF F-16 FTU unit, the Secretary of the Air Force Installations and Basing authorized Site Survey Control Number (SCN) 16-08 to evaluate Davis-Monthan AFB and Tucson ANGB for this relocation. Based on results of the site surveys, Davis-Monthan AFB was determined not to be a reasonable alternative for relocation due to the higher order of magnitude for facility construction and costs ($28 million for Davis-Monthan AFB vesus $3 million for Tucson ANGB), thus resulting in insufficient time to meet the 31

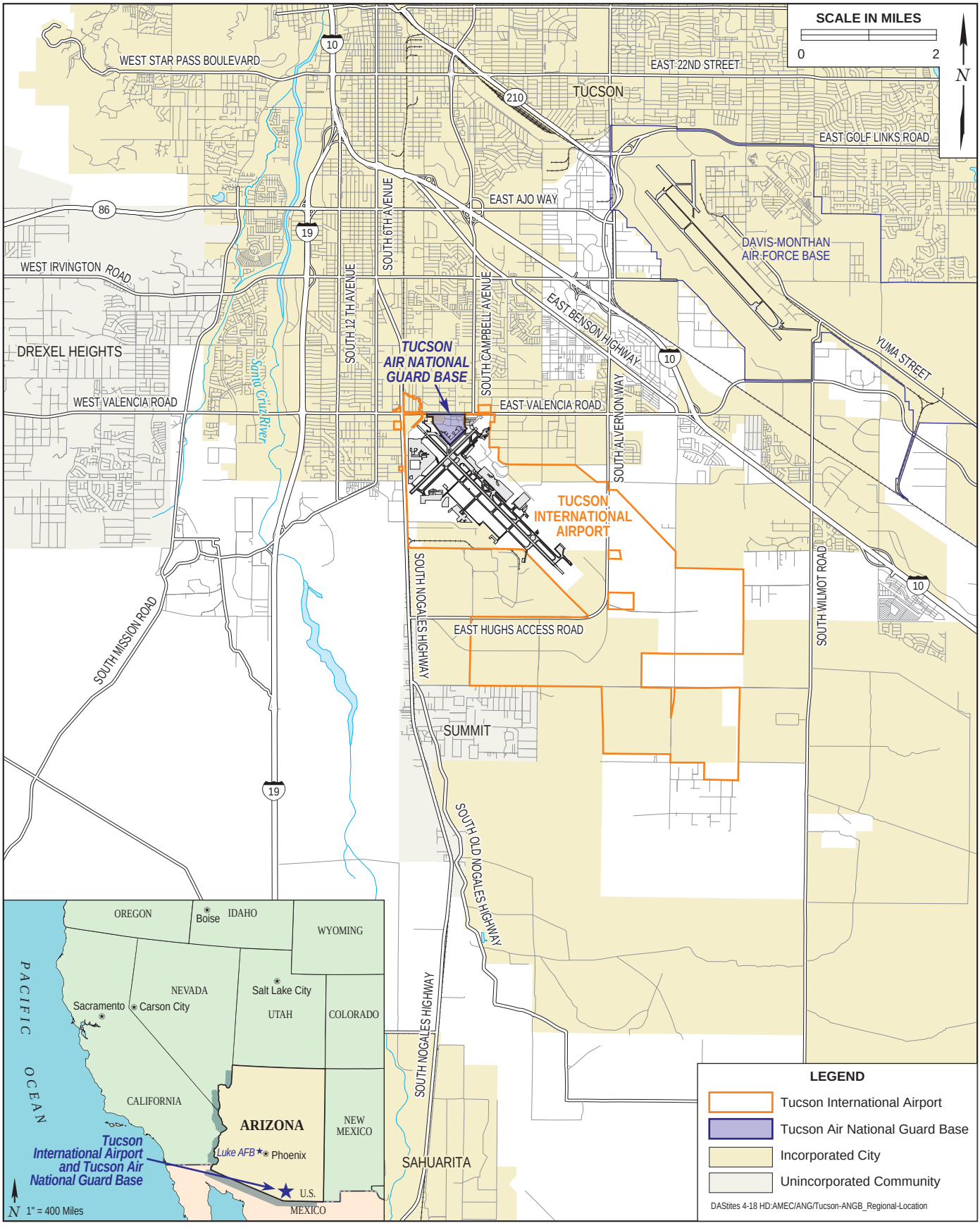
December 2019 deadline for relocation activities. As a result, Tucson ANGB was identified as the perferred new location for the TAF. The decision to proceed with TAF basing at Tucson ANGB was formally documented in a Memorandum for the Record (MFR) – signed by the Secretary of the Air Force – dated 2 October 2017.

2.4 DESCRIPTION OF THE ALTERNATIVES

2.4.1 Alternative 1: TAF F-16 FTU Relocation to Tucson International Airport

Tucson ANGB is located at Tucson International Airport (TUS), approximately 10 miles southwest from the center of Tucson, in Pima County, Arizona (see Figure 2-1). TUS is operated by the Tucson Airport Authority (TAA) under a long-term lease with the City of Tucson. Tucson ANGB is fee-owned by the USAF - either through quit claim deed, warranty deed, or through a taking by the U.S. Attorney for the District - and is licensed/permitted to the Arizona ANG. The installation currently occupies approximately 94 acres of property along the northwestern boundary of TUS (see Figures 2-1 and 2-2). The existing ECF (i.e., the main gate) is located on East Valencia Road, approximately 1.5 miles east of U.S. Interstate 19 (I-19), and approximately 2.7 miles southwest of I-10. Tucson ANGB shares use of the runway, security, and fire control with TUS.

The 162 WG at Tucson ANGB currently hosts multiple countries for international F-16 pilot training, including the Royal Netherlands Air Force (148th Fighter Squadron [148 FS]) and the Iraqi Air Force (125th Fighter Squadron Detachment 1 [125 FS Det 1]). The 162 WG is the "face of the USAF to the world," providing the best-trained coalition war-fighting partners for the USAF. The 162 WG has trained F-16 pilots from 23 different countries, while developing strategic partnerships and building strong international relationships based on performance and trust (Arizona ANG 2011a). At Tucson ANGB, the 162 WG manages a fleet of approximately 80 F-16 C/D/E/F Fighting Falcons. Tucson ANGB currently maintains an inventory of 41 buildings with a total area of 607,225 square feet (sf) within its 94-acre installation boundary (see Table 2-2). The average daily staff associated with the 162 WG is approximately 1,000 full-time personnel and approximately 900 Drill Status Guardsmen who provide forces in support of wartime operations.

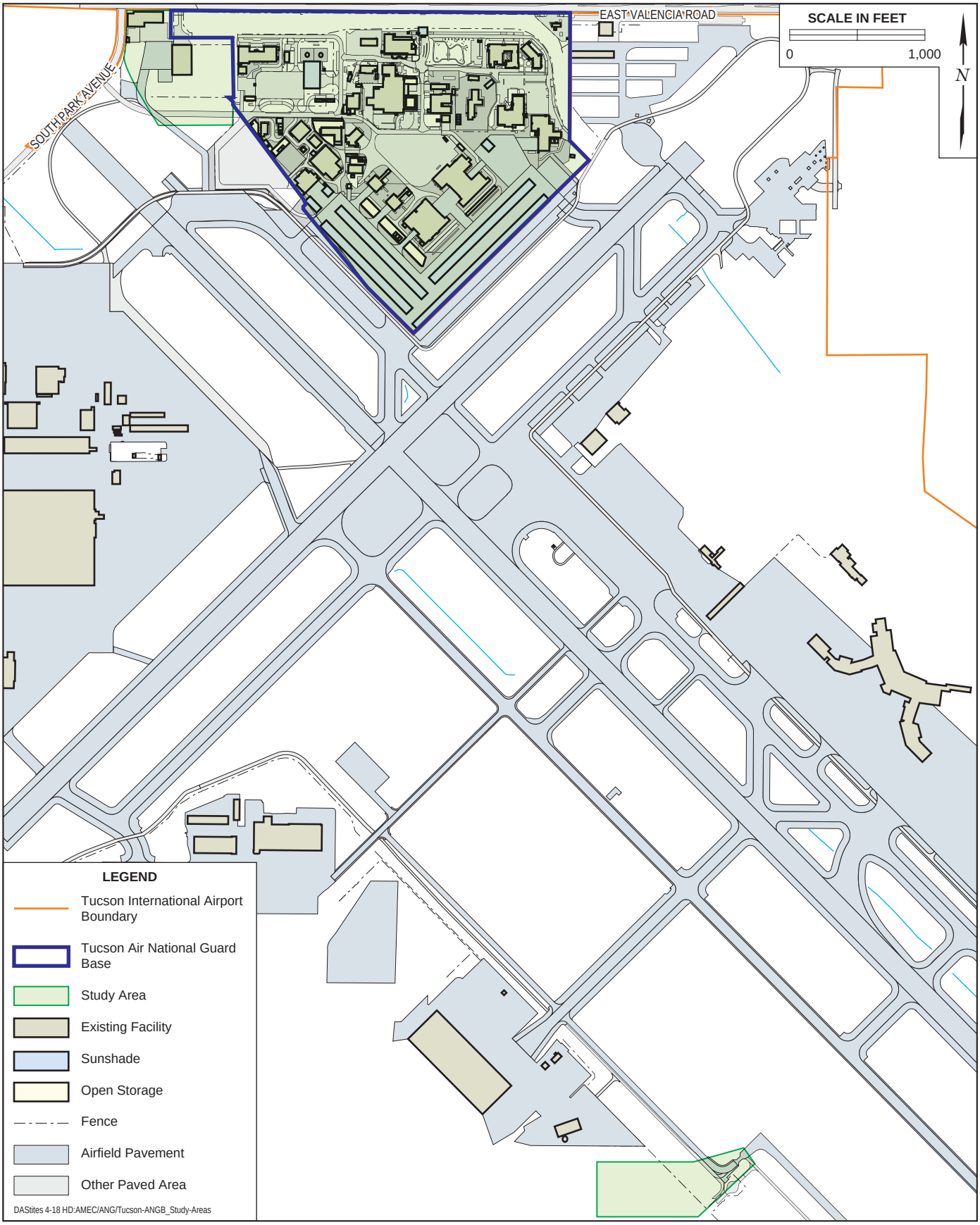


EA

Regional Location Tucson International Airport and Tucson Air National Guard Base

FIGURE 2-1

No warranty is made by the State/Territory/National Guard Bureau as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. This map is a "living document," in that it is intended to change as new data become available and are incorporated into the Enterprise GIS database.



EA

Study Areas at Tucson International Airport

FIGURE 2-2

No warranty is made by the State/Territory/National Guard Bureau as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. This map is a "living document," in that it is intended to change as new data become available and are incorporated into the Enterprise GIS database.

Table 2-2. Existing Facilities at Tucson ANGB

Building Number[1]	Current Use	Building Area (sf)	Date Constructed
1	Reserve Forces Operational Training	30,358	1966
3	Warehouse Supply and Equipment	18,688	1991
4	Reserve Comp. Medical Training	12,368	2005
5	Dining Hall (DH) Airman (Detachment)	24,103	1958
6	Warehouse Supply and Equipment Base	6,000	1986
8	Munitions Loading Crew Training (TNG)	3,000	2001
9	Warehouse Supply and Equipment Base	93,380	1958
10	Hangar, Maintenance	68,605	1994
11	Exchange Service (SVC) Outlet	608	1961
12	Hangar, Maintenance	65,508	1991
15	Reserve Forces Operational Training	6,138	1966
16	Traffic Check House	133	1995
19	Building Water Support	200	1958
20	Reserve Forces Operational Training	1,536	1989
21	Base Engineer (BE) Administration	11,604	1960
22	Grounds Maintenance	720	1981
23	BE Storage Shed	1,200	1992
24	Petroleum, Oils, and Lubricants (POL) Operations	112	1999
25	POL Operations	2,736	1999
26	Vehicle Fuel System	2,870	2000
27	Munitions Support	5,065	1958
28	Disaster Preparedness	4,533	1987
29	Munition Storage	800	1961
30	Jet Engine Maintenance	4,753	2000
31	Hazardous Storage	772	1992
32	Aerospace Ground Equipment (AGE) Shop	10,000	1989
33	Weapons and Release System	20,391	1960
34	Jet Engine Maintenance	31,598	1989
35	Fuel Cell Maintenance	17,595	1989
36	Storage Liquid Oxygen (LOX)	1,017	1999
37	Storage LOX	234	1999
38	Storage LOX	1,017	1999
39	POL Operations	256	1999

Table 2-2. Existing Facilities at Tucson ANGB (Continued)

Building Number[1]	Current Use	Building Area (sf)	Date Constructed
40	Squadron Operations	28,110	1959
41	Munitions	12,831	1958
42	Flight Simulator Training	3,037	2005
44	Squadron Operations	66,123	1983
49	Munitions Load Crew Training	31,737	1987
50	Fire Crash/Rescue and Security Forces	12,619	1993
105	Sanitary Sewage Pump	100	1994
108	POL Operations	3,055	1999
112	Hush House 1	10,005	1989
113	Hush House 2	10,006	1990
126	Runway Supervisory Unit Building	1,440	1987
127	Corrosion Control Storage	150	2002

Source: Arizona ANG 2011a.
sf – square feet

2.4.1.1 Proposed Aircraft Beddown and Operations

To accommodate the F-35A beddown at Luke AFB, the USAF is proposing to permanently relocate the TAF – including 14 F-16 aircraft – from Luke AFB to Tucson ANGB. The TAF F-16 FTU would to be fully operational at Tucson ANGB by early 2020 and would facilitate the continuation of the TAF advanced pilot training program that has been ongoing at Luke AFB since 1996.

2.4.1.2 F-16 Aircraft and Airfield Operations

Under Alternative 1, the TAF's 12 Primary Authorized Aircraft (PAA) and two Backup Aircraft Inventory (BAI) would be relocated from Luke AFB to Tucson ANGB. Prior to the proposed relocation of the 14 aircraft and personnel associated with the TAF F-16 FTU, the 125 FS Det 1 – and their inventory of eight Iraqi F-16 aircraft – is scheduled to depart Tucson ANGB in June 2019. The TAF would transition from Luke AFB to Tucson ANGB by 31 December 2019. As such, there would be a net increase of six F-16 aircraft at Tucson ANGB upon implementation of Alternative 1, bringing the total F-16 inventory at Tucson ANGB to 86 aircraft.

Aircraft operations are defined as individual flying activities of a single aircraft (e.g., takeoffs, landings, practice approaches, touch-and-go landings, etc.). The 162 WG currently has a Letter of Agreement (LOA) dated 5 September 2014 with TAA restricting Arizona ANG operations to no more than 40,000 operations per year with no more than 10 percent of the maximum allowable aircraft operations per year utilizing afterburners (TAA and Arizona ANG 2014). The total proposed number of TAF F-16 operations flown at Tucson ANGB would be 6,459 operations per year. The departure of the 125 FS Det 1 F-16 FMS program would reduce annual operations at Tucson ANGB by approximately 2,658. Therefore, the projected total annual operations at Tucson ANGB following beddown of the TAF F-16s would be 31,723 and would remain below the operational tempo of 40,000 annual operations considered in the *Final Environmental Assessment for the Proposed Aircraft Conversion and Construction Activities at the 162d Fighter Wing (2003)* and the 43,208 considered in the *Environmental Impact Statement (EIS) for F-35A Training Basing (2012)* (see Table 2-3).

Table 2-3. Proposed F-16 Operations at Tucson ANGB

Current Local Operations	Departing Iraqi Air Force Operations	Proposed TAF Operations	Projected Total Operations at Tucson ANGB (2019)	2003 EA Thresholds	2012 EIS Thresholds
27,414	-2,658	+6,459	**31,723**	40,000	43,208

Source: Arizona ANG 2003; USAF 2012.
Notes: Projected total operations at Tucson ANGB (2019) include 508 operations completed by transient F-16 aircraft at Tucson ANGB.

Under Alternative 1, the F-16s at Tucson ANGB – including those associated with the TAF F-16 FTU – would use afterburners during approximately 47 percent of all departures. This is largely due to a new targeting pod on the F-16 aircraft, which offers better air-to-surface and air-to-air targeting capability but also makes the aircraft heavier, requiring additional afterburner takeoffs. The 47 percent afterburner use proposed under Alternative 1 exceeds the 10 percent maximum afterburner use agreed upon in the 2014 LOA between TAA and the Arizona ANG. Therefore, a new LOA resolving this issue would need to be negotiated prior to beddown of the TAF F-16 FTU.

2.4.1.3 Airspace Operations

Special Use Airspace (SUA) in the vicinity of TUS consists of Military Operations Areas (MOAs), Air Traffic Control Assigned Airspaces (ATCAAs), Military Training Routes (MTRs), and Restricted Areas. The TAF currently uses the Barry M. Goldwater Range (BMGR) MOA for air-to-ground training including surface attack tactics, close air support, and night surface attack training. Additionally, the TAF uses the Sells MOA/ATCAA in combination with Restricted Area 2301E (R-2301E) and Tombstone MOA/ATCAA for basic piloting skills and air-to-air combat training. Other MOAs/ATCAAs that are used for training include Jackal MOA/ATCAA, Outlaw MOA/ATCAA, Ruby MOA/ATCAA, and Rustler MOA/ATCAA, R-2304 and R-2305, and the following MTRs: Air Refueling Route 613 (AR-613), AR-639A, AR-647, Visual Route 259 (VR-259), VR-260, VR-267, VR-268, and VR-269. Under Alternative 1, the TAF would continue to utilize established SUA and there would be no changes to the shape or configuration of these airspace areas, or to the types of training operations conducted therein, or the utilization of the airspace by altitude.

TAF aircraft operations would continue to involve the use of chaff and flares, and practice munitions, similar to other existing F-16 units located at Tucson ANGB. The FAA prohibits the carrying of live munitions at municipal airports and the current training syllabus of the 21 FS requires only inert munitions, with the exception of firing live guns. Therefore, TAF pilots in TAF aircraft would not carry live armament, consistent with operations conducted by other existing F-16 units located at Tucson ANGB. The 162 WG rarely uses live munitions, and when required, these missions would be conducted at Davis-Monthan AFB. The Cartridge Actuated Device / Propellant Actuated Device (CAD/PAD) spares-storage, and build-up would be accomplished at Davis-Monthan AFB.

2.4.1.4 Personnel Relocation

Relocation of the TAF from Luke AFB to Tucson ANGB would also include a minor increase in personnel levels. Initial projections regarding staffing requirements indicate the need for the following positions to be established at Tucson ANGB:

- 9 Officers (1 Squadron commander and 8 instructor pilots);
- 17 Civilians (12 operations support and 5 Quality Assurance/Contracting Officer Representative [QA/COR] positions);
- 1 Maintenance/Logistics officer would be staffed by the TAF;
- Approximately 60 contract field team backshop maintainers and 87 contracted flightline maintainers; and
- Up to 17 additional positions for TAF base operation support would be provided by the TAF to the 162 WG.

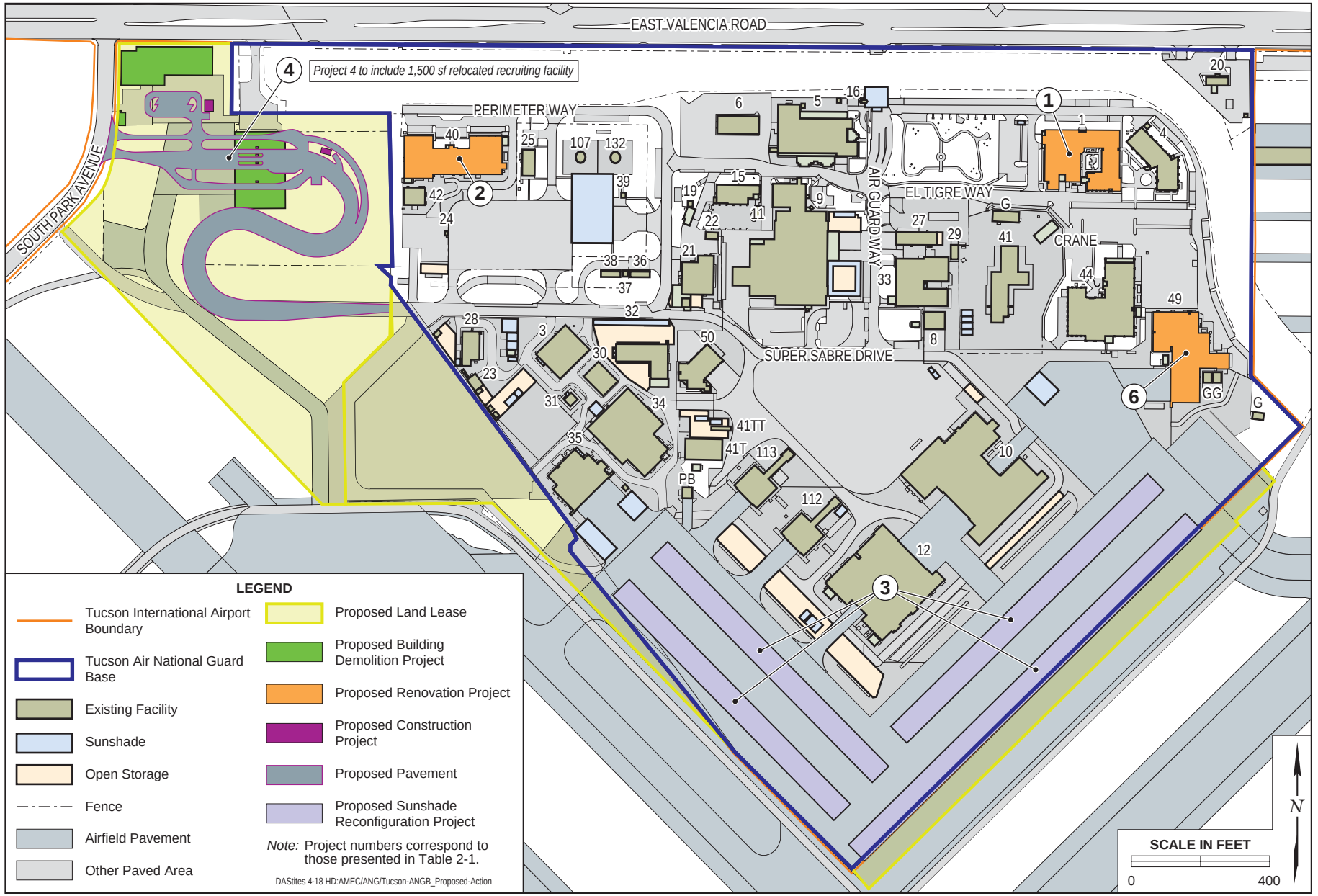
2.4.1.5 Proposed Facility Construction

In addition to the proposed TAF beddown, implementation of Alternative 1 would include facilities construction and improvements necessary to support the proposed beddown in conjunction with existing operations at Tucson ANGB. Most of these proposed projects would be limited largely to interior renovations and small-scale additions to existing buildings. However, Alternative 1 also includes the construction of a proposed ECF to meet AT/FP standards. The proposed ECF requires acquisition (via lease and/or purchase) of property from the TAA, demolition of three existing facilities on the property, and the construction of a new check house, vehicle inspection area, truck inspection lane, and associated pavements. (It is also anticipated that the proposed ECF would include a new recruiting facility.) Additionally, the Aerovation Hangar and associated infrastructure currently located on the proposed acquisition property would be reconstructed/replaced in a new location elsewhere on TAA property.

Table 2-4. Proposed Construction, Demolition, and Interior Renovation Projects

Key[1]	Project Number	Project Title	Fiscal Year[2]	Area/ Size	Key Components
1	XHEA172009	Building 1 Renovation and Addition	2018	30,358 sf	– Reconfiguration and renovation of Building 1 to support the 21 FS and 148 FS programs – 2,000 sf of addition to provide administrative space
2	XHEA172010	Building 40 Renovation and Addition	2018	28,110 sf	– Relocation of the wing headquarters from Building 1 to Building 40 – Reconfiguration and renovation of Building 40 to support wing headquarters functions previously located in Building 1
3	N/A	Sunshade Reconfiguration	2018	0 sf	– Reconfiguration of existing sunshades to increase parking for F-16 aircraft from 65 spots to 86 (e.g., reducing the number of suspension poles and allowing two F-16s per space)
4	XHEA109012	Construct New Entry Control Facility	2020	4,000 sf	– Purchase or long-term lease of 18-acre parcel from the TAA – Construction of new ECF consisting of approximately 400 sf check house, 2,000 sf vehicle inspection area, and 1,600 sf truck inspection lane, circulation improvements (approximately 150,000 sf) and lighting – Construction of a new recruiting facility
5	XHEA179047	In-kind Hangar Replacement	2020	35,000 sf	– In-kind replacement of existing Aerovation Hangar and associated infrastructure currently located on proposed ECF property – Construction of an approximately 35,000 sf metal hangar with an approximately 53,000 sf asphalt aircraft apron and 22,000 sf vehicle parking lot on TAA property
6	XHEA122009	Building 49 Fire Suppression System Installation	2019	0 sf	– Installation of fire suppression and fire detection systems in existing hangar bay (Building 49) to support use of space for F-16 phase maintenance

Notes:
[1] Key refers to locations depicted on Figure 2-3.
[2] Fiscal Years (FYs) provided are estimates based on foreseeable project design and construction timelines.
sf – square feet



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Proposed Action at Tucson Air National Guard Base

FIGURE 2-3

1) ***FY 2018 – Building 1 Renovation and Addition (XHEA172009).*** Building 1 was originally constructed in 1966 and currently provides a total of 30,358 sf that serves as the existing 162 WG headquarters. As part of Alternative 1, Building 1 would be renovated and reconfigured to support two FMS programs, including the 21 FS as well as the 148 FS, which is currently located in Building 40. The TAF will be upgrading to F-16Vs, and existing simulators at Tucson ANGB do not meet simulator requirements for F-16Vs. Consequently, Building 1 would support one new F-16V Unit Training Device/Simulator (UTD/SIM) for TAF use. Additionally, the renovation would provide additional administrative space to house contractor support needed for the 162 WG flying training program. The renovation would also include the addition of approximately 2,000 sf of administrative space, which would be sited in the existing courtyard in the central area of Building 1.

Operations asscociated with the TAF would be located in Building 1. Additionally, in order to accomplish the goals of the 162 WG's Installation Development Plan (IDP) (Arizona ANG 2011a), the 148 FS would be relocated from Building 40 to Building 1 following completion of these renovations. The purpose of this relocation is to develop an operational campus at Tucson ANGB – located between Building 1 and Building 44 – that includes all operational functions and flight simulator activities. During construction activities, occupants of Building 1 would be relocated into temporary buildings. Nearby vehicular access and privately owned vehicle (POV) parking would be realigned and designated as restricted access to accommodate fire and emergency vehicles.

2) ***FY 2018 – Building 40 Renovation and Addition (XHEA172010).*** Building 40 was originally constructed in 1959; the facility currently provides 28,110 sf and functions as the International Squadron Operations Building, occupied by the 148 FS. Under Alternative 1, Building 40 would be renovated and reconfigured to support wing headquarters and communications functions that would be relocated from Building 1; following completion of these renovations, the 148 FS would be relocated to Building 1. Proposed interior work includes space reconfiguration and relocation of some existing interior walls, partitions, windows, and doors, as well as new wall, floor, and ceiling finishes. To meet current code and energy reduction measures, modifications to electrical, communications, fire suppression and heating, ventilation, and air conditioning (HVAC) systems would be required. Exterior work would include repair of existing parking areas, and installation of force protection measures to meet AT/FP requirements. Additionally, this project includes proposed construction of an approximately 3,000-sf addition onto the existing facility for an auditorium/multi-purpose training room with capacity for up to 250 students.

3) ***FY 2018 – Sunshade Parking Reconfiguration.*** Covered parking for F-16 aircraft is required at Tucson ANGB to reduce sun-related damage to aircraft and to provide F-16 maintainers with safe working conditions during extreme summer heat. The 162 WG currently parks F-16 aircraft in the 65 sunshade spaces, with the remaining aircraft parked in existing hangar space. However, this current configuration requires maintainers to continuously tow parked

aircraft between the hangars and the sunshades in order to free up space for the required maintenance activities. With the addition of the TAF aircraft, this existing condition would no longer be viable as there would not be enough existing hangar space to accommodate the net increase of six aircraft (i.e., an increase from 80 to 86 aircraft with the scheduled 125 FS Det 1 departure and the proposed TAF beddown). Under Alternative 1, the sunshade footprint would remain the same; however, the supports would be redesigned to provide parking space for two aircraft under each sunshade, rather than one aircraft as currently configured. This would provide the space required to park up to 86 aircraft under sunshades, but within the footprint of the existing sunshade structures.

4) ***FY 2018 – New Entry Control Facility (ECF) (XHEA109012).*** The Federal Aviation Administration (FAA) is the agency responsible for approving changes to Airport Layout Plans (ALPs). In addition to the beddown and associated facilities construction activities necessary to support associated operations and maintenance activities, Alternative 1 also includes the construction of a proposed ECF to meet AT/FP standards. To facilitate the construction of the proposed ECF, the Arizona ANG would need to acquire (via lease and/or purchase) an 18-acre property from the TAA and demolish the three existing facilities on the property, which would require the TAA to amend the ALP at TUS.

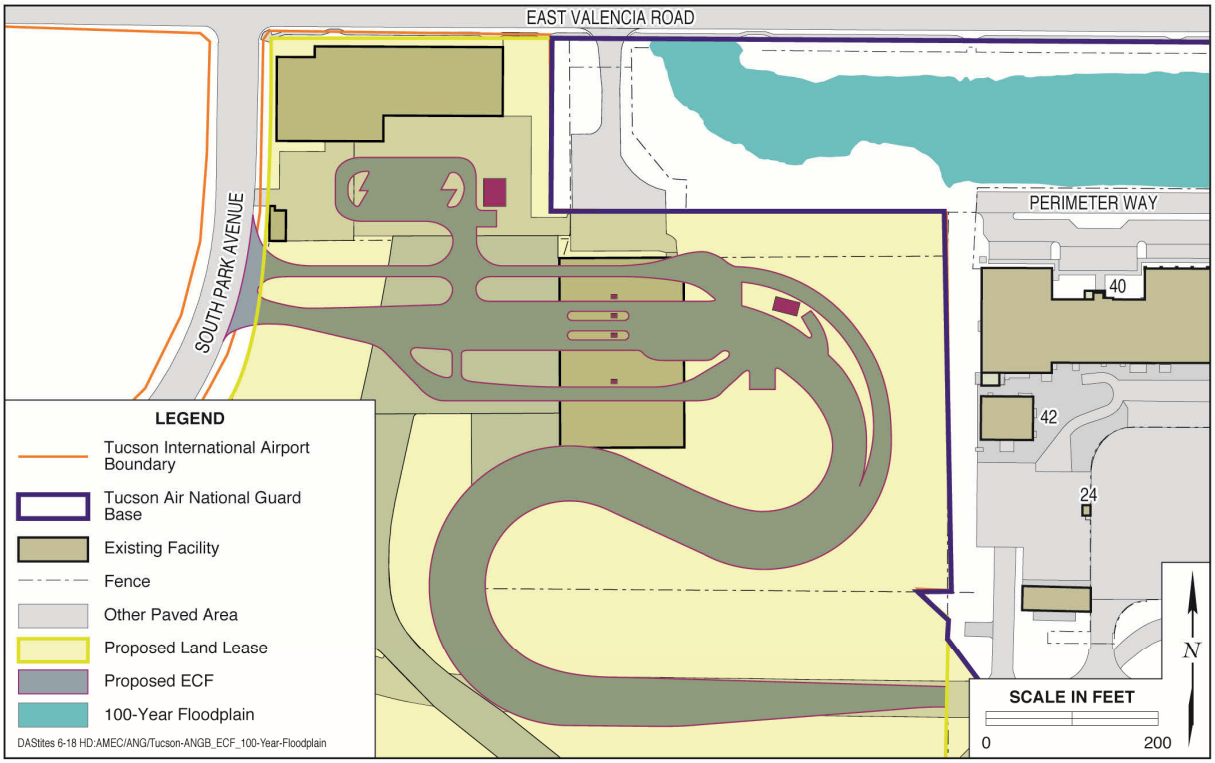
Several different locations were evaluated for the construction of the proposed ECF. The ECF location requires adequate space to provide S-turns to slow vehicle speeds as they enter the base, and must accommodate sufficient vehicle queuing and vehicle denial capabilities. The existing boundaries of Tucson ANGB, and existing development would not permit reconfiguration of the ECF within the existing fenceline, as it would require demolition and relocation of existing mission-critical facilities (including the Petroleum, Oils and Lubricants [POL] facility). Therefore, the construction of the proposed ECF requires the acquisition of property (via lease and/or purchase) currently owned by the TAA. Given the location of existing development along East Valencia Road, the proposed acquisition property could only be located on either the eastern or western end of Tucson ANGB. All other locations along East Valencia Road are developed

and would require construction of a new intersection as well as a bridge over an existing manmade wash (i.e., drainage canal), which would likely trigger additional permitting requirements (e.g., a permit from the U.S. Army Corps of Engineers [USACE] in accordance with Section 404 of the Clean Water Act [CWA]). The only alternative parcel that could be acquired contains the Million Air hangar and associated facilities. These facilities were recently developed and are heavily used. As such, they are not available for relocation and/or in-kind replacement. Ultimately – based primarily on the Planning Constraints selection standard described above – the proposed site of the ECF was determined to be the only feasible alternative.

Under Alternative 1, a new ECF would be constructed on the west side of the installation at the intersection of East Valencia Road and South Park Avenue. Pavements would be located to the west and to the south of the manmade wash and all construction activities would avoid work in the wash. This project was identified as a priority project in the 162 WG's IDP to address non-compliance with AT/FP requirements associated with the existing ECF located off of East Valencia Road. In order to construct a ECF that provides sufficient queuing capacity and vehicle denial capabilities – and consistent with existing AT/FP requirements – the 162 WG is proposing to acquire (via lease and/or purchase) an 18-acre parcel from the TAA, which currently supports a 35,000-sf metal hangar (Aerovation Hangar) and two additional vacant buildings, comprising open-air bays and a support facility.

Construction of the proposed ECF would include construction of a check house, vehicle inspection areas, truck inspection, circulation improvements, and lighting, with a total paved area of approximately 150,000 sf. Additionally, the proposed ECF would include a new recruiting facility. (The existing recruiting facility is located outside the installation's boundaries and construction of a new facility would relocate this function within the fenceline.) The conceptual design for the proposed ECF includes an entrance off of South Park Avenue. Improvements to lane configuration and signal timing at the intersection of East Valencia Road and South Park Avenue would be accomplished by the City of Tucson and funded through

a Military Construction Cooperative Agreement (MCCA). Improvements would include extending the left turn lanes on both the westbound and eastbound approach, as well as adding a right turn lane on the eastbound approach. A left turn lane would be added to the northbound approach extending to the proposed ECF intersection. The signal would be changed to utilize protected/permitted left turn phasing for all approaches. Following completion of the proposed ECF, the existing ECF would be abandoned in place and fenced to prevent access across the existing bridge. In the future, this entrance may be used for secondary access to the installation.



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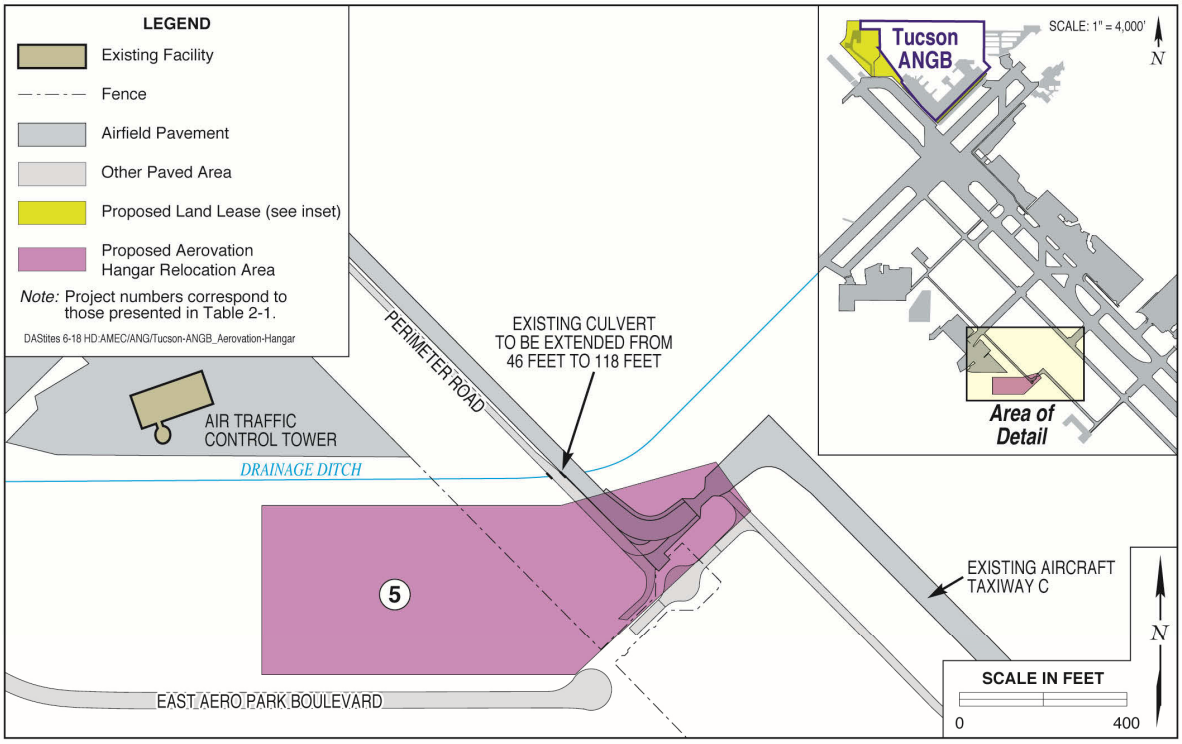
Proposed ECF and 100-Year Floodplain

FIGURE 2-4

5) FY 2020 – In-Kind Hangar Replacement (XHEA179047). Under Alternative 1, the Aerovation Hangar and the two unoccupied facilities on the 18-acre acquistion parcel would be demolished. The Aerovation Hangar is primarily used for aircraft maintenance, and includes office and shop space, a break room and restrooms on the north and south sides. The 162 WG would relocate the existing 35,000-sf Aerovation Hangar to an undeveloped 9-acre parcel on TAA property, located adjacent to the new Air Traffic Control (ATC) tower. This location was selected to provide access from the replacement hangar to the airfield via the existing aircraft Taxiway C located immediately east of the hangar area (see Figure 2-5). In addition to the in-kind replacement of the Aerovation Hangar and associated infrastructure, construction would include development of an up to 53,000-sf asphalt aircraft apron and a 22,000-sf vehicle parking area. The footprint of the in-kind replacement hangar and associated pavements would entirely avoid the existing drainage ditch to the north of the site. However, the proposed construction of the replacement hangar would include the extension of the existing 48-foot culvert to 118 feet per the requirements FAA Advisory Circular 150/5300-13a, *Airport Design*. The extension of this culvert would affect approximately 6,600 square feet (0.15 acres) of Waters of the U.S. Consequently, all appropriate permits – including CWA Section 404 Nationwide Permit No. 14 issued by the USACE and CWA Section 402 Arizona Pollutant Discharge Elimination System (AZPDES) permit issued by the Arizona Department of Environmental Quality (ADEQ) – would be required and obtained prior to construction and culvert extension.



EA | **Proposed Aerovation Hangar Replacement Location** | FIGURE 2-5

6) ***FY 2019 – Building 49 Fire Suppression System Installation (XHEA122009).*** Weapons load training is currently accomplished in Building 49 using de-fueled aircraft in the hangar bay. Current operations have been assessed as Fire Safety Deficiency 1 and Risk Assessment Code 3 requiring portable fire extinguishers to be present and hangars doors to remain open during maintenance operations. With the proposed relocation of the 21 FS, Building 49 would be repurposed to support TAF F-16 FTU phase maintenance activities. Due to the increased risk to aircraft and personnel a fire detection and fire suppression system would be required. This project would include interior renovations including the installation of a High Expansion Foam (HEF) wet-pipe sprinkler system in the hangar bay area and the administrative space within Building 49.

2.4.2 Alternative 2: No-Action Alternative

Under the No-Action Alternative, the proposed relocation of TAF F-16 FTU to Tucson ANGB would not occur and associated construction, demolition, and

interior renovation projects would not be implemented. All airfield, airspace, and range use, as well as munitions training, would reflect current existing conditions should the proposed action not occur. The TAF F-16 FTU would continue to operate at Luke AFB until an suitable alternative relocation site is identified. Consequently, the AETC's goal to remove all F-16s from Luke AFB (i.e., via either relocation or retirement) by 2023 would not be met. Because CEQ regulations stipulate that the No-Action Alternative be analyzed to assess any environmental consequences that may occur if the Proposed Action is not implemented, the No-Action Alternative has been carried forward for analysis in the EA. The No-Action Alternative provides a baseline against which the Proposed Action can be compared.

2.5 SCOPE OF ENVIRONMENTAL ANALYSIS

This EA evaluates potential environmental impacts to the following resources that could have the potential to be affected by implementation of the Proposed Action:

- Airspace Management;
- Air Quality;
- Noise;
- Land Use;
- Biological Resources;
- Transportation and Circulation;
- Cultural Resources;
- Hazardous Material and Wastes; and
- Safety.

Per NEPA, those resource areas that are anticipated to experience either no environmental impacts or negligible environmental impacts under implementation of the Proposed Action are not examined in detail in this EA. These environmental resources include:

- Geology and Soils;

- Visual Resources;
- Water Resources;
- Socioeconomics; and
- Environmental Justice / Protection of Children.

As described in Section 1.6.1, *Lead and Cooperating Agencies*, per FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures (2015)*, the following 14 impact categories should be considered during the NEPA process (FAA 2015). The location of these analysis or the rationale for excluding a detailed discussion of a specific resource, are provided below in Table 2-5.

Table 2-5. FAA Order 1050.1F, Environmental Impact Categories

Resource	Location in the EA
Air Quality	Sections 3.2 and 4.2, *Air Quality*
Biological Resources (including fish, wildlife, and plants)	Sections 3.5 and 4.5, *Biological Resources*
Climate	Pursuant to Executive Order (EO) 13783, *Promoting Energy Independence and Economic Growth*, the CEQ has withdrawn its Final Guidance for Federal agencies on how to consider greenhouse gas (GHG) emissions and the effects of climate change in NEPA reviews. Nevertheless, FAA Order 1050.1F requires an assessment of GHG emissions as they relate to climate. GHGs include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride (SF_6). These GHGs are often assessed collectively in terms of carbon dioxide equivalent (CO_2e), which measures the amount of global warming that a GHG may cause, using the functionally equivalent amount or concentration of CO_2 as the reference. Per FAA Order 1050.1F, Exhibit 4-1, the FAA has not established a significance threshold for GHG emissions or impacts to climate. Nevertheless, research has shown there is a direct correlation between fuel combustion, GHG emissions, and climate change (Intergovernmental Panel on Climate Change [IPCC] 2014). Temporary, short-term GHG emissions would occur due to construction activities at Tucson ANGB. Under implementation of Alternative 1, the renovations to Buildings 1 and 40 and the reconfiguration of the aircraft sunshades during Fiscal Year (FY) 2018 would result in the emissions of 199.3 tons of CO_2e. Installation of a fire suppression system in Building 49 would occur in FY 2019 and would result in the emission of 117.5 tons of CO_2e. In 2020, construction of the proposed ECF and in-kind hangar replacement would result in the emission of 740.4 tons of CO_2e. With the implementation of Alternative 1, there would be no net increase in F-16 operations; existing operations and associated GHG emissions would simply be relocated to Tucson ANGB from Luke AFB. Therefore, while there would be an increase in GHG emissions at Tucson ANGB, there would be a corresponding decrease in GHG emissions at Luke AFB. Considering that GHG emissions have regional and global effects rather than local effects, the relocation of the TAF F-16 FTU would not result in a net increase in long-term, operational GHG emissions or otherwise have impacts on regional climate.

Table 2-5. FAA Order 1050.1F, Environmental Impact Categories (Continued)

Resource	Location in the EA
Coastal Resources	There are no coastal resources in the State of Arizona. Therefore, this resource area is not being carried forward for detailed analysis in the EA.
Department of Transportation Act: Section 4(f)	The Department of Defense reauthorization in 1997 provided that "[n]o military flight operations (including a military training flight), or designation of airspace for such an operation, may be treated as a transportation program or project for purposes of Section 303(c) of Title 49, (Public Law [PL] 105-85). With regard to proposed construction activities, resources that are protected by Section 4(f) of the Department of Transportation Act include publicly or privately owned that includes a historic site of national, state, or local significance. Substantial impairment occurs when the activities, features, or attributes of the resource that contribute to its significance or enjoyment are substantially diminished. Under Alternative 1, construction of the proposed ECF would require demolition of the existing Aerovation Hangar as well as the other two vacant facilities on the proposed 18-acre acquisition property. To support preparation of this document, Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler) conducted an Architectural Resources Survey of these buildings and determined that all three existing facilities are not ineligible for listing on the National Register of Historic Places (NRHP). The Arizona SHPO concurred with this determination in a letter dated 18 May 2018. Therefore, the FAA-required Section 4(f) analysis is not being carried forward for detailed analysis in the EA.
Farmlands	The implementation of Alternative 1 would not occur in the vicinity of farmland, nor would it have the potential to adversely affect any agricultural operations. All construction and interior renovation activities would occur at Tucson ANGB and TUS. Therefore, this resource area is not being carried forward for detailed analysis in the EA.
Hazardous Materials, Solid Waste, and Pollution Prevention	Sections 3.8 and 4.8, *Hazardous Materials and Wastes*
Historical, Architectural, Archeological, and Cultural Resources	Sections 3.7 and 4.7, *Cultural Resources*
Land Use	Sections 3.4 and 4.4, *Land Use.* Noise-related land use compatibility impacts associated with proposed F-16 aircraft operations are discussed in Sections 3.3 and 4.3, *Noise.*

Table 2-5. FAA Order 1050.1F, Environmental Impact Categories (Continued)

Resource	Location in the EA
Natural Resources and Energy Supply	FAA Order 1050.1F indicates that a significant impact would occur if an action would have the potential to exceed available or future supplies of these resources. Under Alternative 1, construction, demolition, and interior renovation would require the use of electricity and natural resources. However, operation of the proposed facilities would not consume a substantial quantity of these resources or result in demand exceeding available or future supplies of these resources. Additionally, flight operations associated with the TAF F-16 FTU would be relocated from Luke AFB to Tucson ANGB; however, the total number of operations would remain the same. Therefore, this resource area is not being carried forward for detailed analysis in the EA.
Noise and Noise-Compatible Land Use	Sections 3.3 and 4.3, *Noise*
Socioeconomics	Implementation of Alternative 1 could result in minor, short-term socioeconomic benefits related to temporary construction-related employment and expenditures; however, over the long-term there would be no measurable effect on local socioeconomics. The personnel and associated dependents that would be relocated to the Tucson area would not have a substantial effect on the capacity of existing housing, schools, and emergency services within the Tucson area, which has a population of over 530,000. Further, no measurable changes to the community tax base or long term economic activity would occur. Implementation of Alternative 1 would not disrupt or divide established communities or reduce levels of service of roads serving TUS and surrounding communities. As such, this resource area is not being carried forward for detailed analysis in the EA.
Environmental Justice	The areas north of TUS include low-income, minority populations (USEPA 2017). However, all construction, demolition, and interior renovation activities associated with Alternative 1 would take place within the boundaries of the Tucson ANGB or TUS. The changes to the noise contours associated with the TAF F-16 FTU operations would extend the 65 Day-Night Average A-weighted Sound Level (DNL) noise contour over primarily vacant and undeveloped land to the southeast, and some commercial and residential land uses to the northwest of the airport. However, the new areas beneath the 65 DNL noise contour would not experience an increase at or above the FAA's significance threshold of 1.5 dB and thus, would be negligibly affected by the changes to the noise contours (see Section 4.3, *Noise*). As such, no significant noise impacts or any other impacts to the resource areas considered in this EA would occur in areas outside of the airfield, and potential environmental justice populations (i.e., minority, low-income, or otherwise) would not be disproportionately affected. Therefore, this resource area is not being carried forward for detailed analysis in the EA.

Table 2-5. FAA Order 1050.1F, Environmental Impact Categories (Continued)

Resource	Location in the EA
Children's Environmental Health and Safety Risks	Implementation of Alternative 1 would not result in increased exposure of children to environmental health risks or safety risks such as those associated with the generation, use, or storage of hazardous materials. Standard construction site safety precautions (e.g., fencing and other security measures) would reduce potential risks to minimal levels and any potential impacts to children would be negligible and short-term. Therefore, this resource area is not being carried forward for detailed analysis in the EA.
Light Emissions	TUS is an international airport with high levels of aircraft activity. The area is characterized by a mixture of industrial and administrative facilities, hangars, the airfield, and landscaped vegetation. The implementation of Alternative 1 would not create annoyance or interfere with normal activities from light emissions, nor would it affect the visual character of the area due to light emissions. The implementation of Alternative 1 would result in activities which are similar to existing operations and would not result in significant changes to existing light emissions at TUS or at Tucson ANGB. Therefore, this resource area is not being carried forward for detailed analysis in the EA.
Visual Resources / Visual Character	Tucson ANGB is characterized by a mixture of industrial and administrative facilities, hangars, the airfield, and landscaped vegetation. The visual environment of Tucson ANGB and TUS does not constitute a unique or sensitive viewshed, and the proposed facilities, as well as modifications of existing facilities would be visually consistent with existing structures at the installation and in the vicinity of project sites. Under Alternative 1, there would be no adverse impact on visual resources or character at Tucson ANGB or in the region. Therefore, this resource area is not being carried forward for detailed analysis in the EA.
Wetlands	No jurisdictional wetlands have been identified on Tucson ANGB or TUS. Therefore, implementation of the Proposed Action would not result in the potential for impacts to wetlands and this resource area is not being carried forward for detailed analysis in the EA.
Floodplains	According to the Federal Emergency Management Agency (FEMA) Flood Map Service Center, the manmade wash located north of Tucson ANGB is a regulatory floodway identified as a 100-year floodplain. However, the entirety of Tucson ANGB is located in Zone X, Area of Minimal Flood Hazard. Further, the proposed ECF and the proposed in-kind Aerovation Hangar would also be located within Zone X and would avoid the 100-year floodplain. Therefore, this resource area is not being carried forward for detailed analysis in the EA.

Table 2-5. FAA Order 1050.1F, Environmental Impact Categories (Continued)

Resource	Location in the EA
Surface Waters	Construction of the proposed ECF would occur in the immediate vicinity of a man-made wash, which parallels East Valencia Road along the northern property line of Tucson ANGB (refer to Figure 2-4). Additionally, construction of the in-kind hangar replacement would occur within the vicinity of a drainage ditch located immediately to the north (refer to Figure 2-5). Both of these drainages are considered Waters of the U.S. The construction of the proposed ECF would entirely avoid the man-made wash and with implementation of standard best management practices (BMPs) described in *Arizona Department of Transportation Maintenance and Facilities Best Management Practices Manual (2010)* there would be no off-site impacts to the man-made wash. The footprint of the in-kind replacement hangar and associated pavements would entirely avoid the existing drainage ditch to the north of the site. However, the proposed construction would include the extension of the existing 48-foot culvert to 118 feet per the requirements FAA Advisory Circular 150/5300-13a, *Airport Design*. The extension of this culvert would affect approximately 6,600 square feet (0.15 acres) of Waters of the U.S. Consequently, all appropriate permits – including CWA Section 404 Nationwide Permit No. 14 issued by USACE and CWA Section 402 AZPDES permit issued by the ADEQ – would be required and obtained prior to the initiation of construction activities. With the implementation of all standard BMPs and all required permit conditions construction activities would result in less than significant impacts to surface water resources. Therefore, this resource area is not being carried forward for detailed analysis in the EA.
Groundwater	Groundwater underlying Tucson ANGB is encountered at approximately 90 feet below land surface. Under implementation of Alternative 1, proposed construction, demolition, and interior renovation activities would not require major excavation. Thus, construction activities would not affect existing groundwater underlying the installation. The establishment of approximately 2.6 acres of additional impermeable surface areas (i.e., from new pavements and facility construction) would incrementally reduce regional groundwater recharge capabilities. However, the reduction in surface area would be minor, and the existing drainage ditches would capture additional runoff. Additionally, none of the proposed facilities or improvements comprises a significant water user or wastewater generator. Therefore, this resource area is not being carried forward for detailed analysis in the EA.

Table 2-5. FAA Order 1050.1F, Environmental Impact Categories (Continued)

Resource	Location in the EA
Wild and Scenic Rivers	There are no designated wild and scenic rivers in the vicinity of Tucson ANGB or TUS. Therefore, the Proposed Action would not affect this resource area and it is not being carried forward for detailed analysis in the EA.
Geology and Soils*	The proposed building additions and interior renovations as well as the proposed sunshade reconfiguration would be constructed on existing pavements and would not result in any impacts related to ground disturbance. The proposed ECF and in-kind hangar replacement would occur on previously disturbed areas that already support similar improvements (e.g., existing hangars on the proposed ECF property). Construction of the proposed improvements would result in minor short-term soil disturbance; however, the implementation of appropriate standard construction BMPs (e.g., erosion and siltation prevention measures, soil stockpiling, etc.) would ensure that there would be no construction-related impacts. Therefore, the Proposed Action would not affect this resource area and it is not being carried forward for detailed analysis in the EA.

Notes: *Geology and Soils is a resource area that is analyzed by the USAF per 32 CFR Part 989; however, this resource areas is not required for consideration in the NEPA process by FAA Order 1050.1F.

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SECTION 3
AFFECTED ENVIRONMENT

This section describes pertinent existing environmental conditions for resources potentially affected by the Proposed Action. In compliance with the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations, Air Force Instruction (AFI) 32-7061, and Title 32 Code of Federal Regulations (CFR) Part 989, and Unified Facilities Criteria (UFC) 3-260-01, the description of the affected environment focuses on only those aspects potentially subject to impacts.

The affected environment description is limited primarily to Tucson Air National Guard Base (ANGB) at Tucson International Airport (TUS) and, regionally, to Pima County, Arizona. As described in Section 2.5, *Scope of the Environmental Analysis*, resource descriptions focus on the following areas:

- Airspace Management;
- Air Quality;
- Noise;
- Land Use;
- Biological Resources;
- Transportation and Circulation;
- Cultural Resources;
- Hazardous Materials and Wastes; and
- Safety.

3.1 AIRSPACE MANAGEMENT

3.1.1 Definition of Resource

Airspace management is defined by the U.S. Air Force (USAF) as the coordination, integration, and regulation of the use of airspace of defined dimensions. The objective of these established management practices is to meet military training requirements through the safe and efficient use of available navigable airspace in a peacetime environment while minimizing the impact on other aviation users and the public (AFI 13-201). There are two categories of airspace or airspace areas:

regulatory and nonregulatory. Within these two categories, further classifications include *controlled*, *uncontrolled*, *special use airspace*, and *other airspace*. The categories and types of airspace are determined by: 1) the complexity or density of aircraft movements; 2) the nature of the operations conducted within the airspace; 3) the level of safety required; and 4) national and public interest in the airspace.

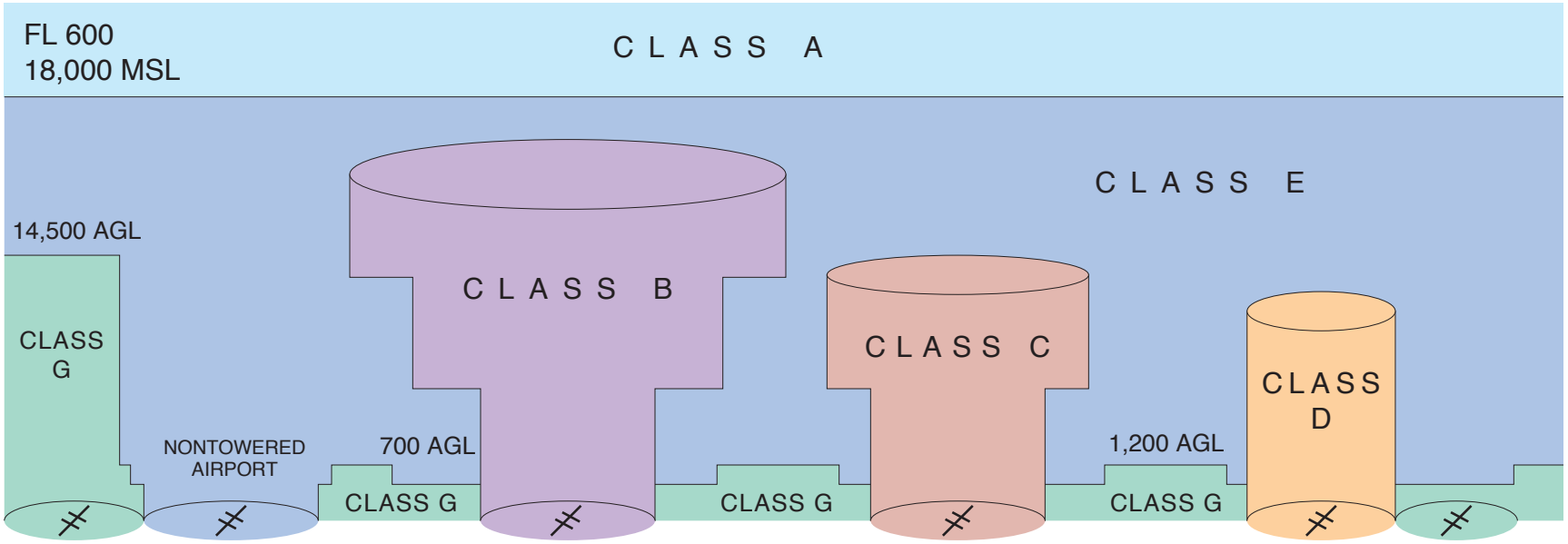
The Federal Aviation Administration (FAA) has divided the airspace overlying the continental U.S. into 20 geographic areas, each under Air Traffic Control (ATC) jurisdiction of an Air Route Traffic Control Center (ARTCC). The Albuquerque ARTCC, which has jurisdiction over TUS and the surrounding regional airspace, has delegated control of some of the local airspace to the Terminal Radar Approach Control (TRACON) facility at Davis-Monthan Air Force Base (AFB). Local ATC, for aircraft operating within a 5-mile radius of the airport and up to an altitude of 5,000 mean sea level (MSL) is provided by the FAA-operated ATC tower at TUS.

3.1.1.1 Controlled Airspace

Controlled airspace is a generic term that encompasses the different classifications of airspace (i.e., Class A, B, C, D, and E airspace as shown in Figure 3-1) and defines dimensions within which ATC service is provided to Instrument Flight Rules (IFR) and Visual Flight Rules (VFR) flights (U.S. Department of Transportation [DOT] 2016, 2017). All military and civilian aircraft are subject to Federal Aviation Regulations (FARs).

<u>Class A Airspace</u>

Class A airspace includes all flight levels or operating altitudes over 18,000 feet MSL. Formerly referred to as a Positive Control Area (PCA), Class A airspace is largely reserved for commercial aircraft utilizing routes between 18,000 and 60,000 feet MSL. Unless otherwise authorized, all operation in Class A airspace is conducted under IFR.



AGL – above ground level
FL – flight level
MSL – mean sea level

NOTE: Altitudes not to scale.
Source: FAA 1993.

EA

FAA Airspace Classification

FIGURE 3-1

Class B Airspace

Class B airspace typically comprises contiguous cylinders of airspace, stacked upon one another – often resembling an upside-down wedding cake – extending from the ground surface up to 10,000 feet MSL in the vicinity of the busiest airports (see Figure 3-1). To operate in Class B airspace, pilots must contact appropriate controlling authorities and receive clearance to enter the airspace. Additionally, aircraft operating within Class B airspace must be equipped with specialized electronics including altitude reporting capability. Class B airspace is typically associated with major metropolitan airports.

Class C Airspace

Airspace designated as Class C can generally be described as controlled airspace that extends from the surface, or from another designated altitude, to a specified higher altitude. Class C airspace is designed and implemented to provide additional ATC into and out of primary airports where aircraft operations are periodically at high-density levels. All aircraft operating within Class C airspace are required to establish and maintain two-way radio communication with local ATC entities prior to entering the Class C airspace. Aircraft must also have a transponder with Mode C. TUS is designated as Class C airspace.

Class D Airspace

Class D airspace is often cylindrical in shape and generally extends from the surface to 2,500 feet above ground level (AGL). The radius of Class D airspace is variable, but it is usually 4 nautical miles (NM) surrounding airports with an operational control tower. Class C or Class B airspace that is within the given radius is excluded from Class D airspace. Similar to Class C airspace, all aircraft operating within Class D airspace must establish a two-way radio communication with the airport's ATC facility prior to entering the Class D airspace and must maintain the two-way communication within the Class D airspace boundaries. Class D airspace may be full-time or part-time and when part-time reverts to Class E or G during hours when the tower is closed, or under other special conditions.

Class E Airspace

Generally, if controlled airspace is not designated as Class A, Class B, Class C, or Class D, it is Class E airspace (see Figure 3-1). Class E airspace extends upward from either the ground surface, or from a designated altitude, to the overlying or adjacent controlled airspace. Class E airspace also includes Federal Airways, beginning at either 700 or 1,200 feet AGL and used to transition to, or from, the terminal or en route environment and en route domestic and offshore airspace, designated below 18,000 feet MSL. Unless designated at a lower altitude, Class E airspace begins at 14,500 feet MSL over the continental U.S., including that airspace overlying the waters within 12 NM of the coast of the 48 contiguous states and Alaska, up to but not including 18,000 feet MSL, and the airspace above 60,000 feet MSL.

3.1.1.2 Uncontrolled Airspace

Class G Airspace

Uncontrolled airspace (i.e., Class G airspace) is not subject to restrictions that apply to controlled airspace described above. The limits of uncontrolled airspace typically extend from the ground surface to 700 feet AGL in urban areas and from the ground surface to 1,200 feet AGL in rural areas. Uncontrolled airspace may extend above these altitudes to as high as 14,500 feet MSL if no other types of controlled airspace have been assigned. ATC does not have authority to exercise control over aircraft operations within uncontrolled airspace. Primary users of uncontrolled airspace are general aviation aircraft operating in accordance with VFR.

3.1.1.3 Special Use Airspace

Special Use Airspace (SUA) consists of airspace within which specific activities must be confined, or wherein limitations are imposed on aircraft not participating in those activities. With the exception of controlled firing areas (CFAs), SUA is depicted on aeronautical charts, including hours of operation, altitudes, and the agency controlling the airspace. All SUA descriptions are described in FAA Order 7400.10, *Special Use Airspace*.

Prohibited and Restricted Areas are regulatory SUA and are established in 14 CFR Part 73 through the rulemaking process. Warning Areas (W-), CFAs, Alert Areas, and Military Operations Areas (MOAs) are nonregulatory SUA.

Warning Areas

Warning Areas are airspaces with defined dimensions located over international waters that contain activity that may be hazardous to nonparticipating aircraft. Because international agreements do not provide for prohibition of flight in international airspace, no restrictions to flight are imposed. As such, Warning Areas are established in international airspace to alert pilots of nonparticipating aircraft to potential danger.

Controlled Firing Areas

CFAs are established to contain activities that, if not conducted in a controlled environment, would be hazardous to nonparticipating aircraft. The approval of a CFA is considered for those activities that are either of short duration or of such a nature that they could be immediately suspended upon notice that such activity might endanger nonparticipating aircraft. Examples of such activities include: firing of missiles, rockets, anti-aircraft artillery, and field artillery; static testing of large rocket motors; blasting; and ordnance or chemical disposal.

Alert Areas

Alert Areas are depicted on aeronautical charts to inform nonparticipating pilots of areas that may contain a high volume of pilot training or an unusual type of aerial activity. Pilots of participating aircraft as well as pilots transiting the area must be equally responsible for collision avoidance.

Military Operations Areas

MOAs are airspace areas with defined vertical and lateral limits located outside of controlled airspace. MOAs are used to separate certain military flight activities (e.g., air combat maneuvers and air intercepts) from IFR traffic, and to identify for VFR traffic the areas where concentrated military aircraft operations may occur.

When a MOA is active, IFR traffic may be cleared to enter and pass through the area if adequate IFR separation criteria can be met and procedures are described in a Letter of Agreement between the unit and the ATC controlling agency (FAA Order 7400.2L, *Procedures for Handling Airspace Matters*). Nonparticipating VFR aircraft are not prohibited from entering an active MOA; however, extreme caution is advised when such aircraft transit the area during military operations. All MOAs within the U.S. are depicted on sectional aeronautical charts identifying the exact area, the name of the MOA, altitudes of use, published hours of use, and the corresponding controlling agency.

3.1.1.4 Air Traffic Control Assigned Airspace

Air Traffic Control Assigned Airspace (ATCAA) comprise airspace above 18,000 feet MSL that is designed to accommodate non-hazardous, high-altitude military flight training activities. This airspace remains in the control of the FAA and, when not in use by military aircraft, may be used to support civil aviation activities. ATCAAs allow military aircraft to conduct high-altitude air-to-air combat training, practice evasion maneuvers, perform aerial refueling, and initiate or egress from attacks on targets within a range. ATC routes IFR traffic around this airspace when activated; however, ATCAAs do not appear on any sectional or FAA IFR Enroute Aeronautical Charts.

3.1.1.5 Military Training Routes

Military Training Routes (MTRs) are flight paths that provide a corridor for low-altitude navigation and training. Low-altitude navigation training is important because aircrews may be required to fly at low altitudes for tens or hundreds of miles to avoid detection in combat conditions. To train realistically, the military and the FAA have developed a nationwide network of MTRs. This system allows the military to train for low-altitude navigation at air speeds in excess of 250 knots. There are two types of MTRs, instrument routes (IRs) and visual routes (VRs). The difference between IRs and VRs is that IRs are flown under ATC, while VRs are not.

3.1.2 Existing Conditions

The 162 WG at Tucson ANGB, which includes the 148th Fighter Squadron (148 FS), 125th Fighter Squadron Detachment 1 (125 FS Det 1), and the 195th Fighter Squadron (195 FS), trains in airspace located above southern Arizona and southwestern New Mexico (see Figure 3-3). These airspace areas include MOAs and Restricted Areas as well as MTRs designated as VRs and air refueling routes (ARs).

3.1.2.1 Tucson ANGB Aircraft Inventory

The 162 WG at Tucson ANGB currently supports 80 F-16 aircraft, which includes the single-seat C and E models and the two-seat D and F models. These aircraft are used for training of both Air National Guard (ANG) and international pilots. Current international fighter squadrons training at TUS include the Royal Netherlands Air Force (148 FS) and the Iraqi Air Force (125 FS Det 1).

3.1.2.2 TUS Airfield

TUS operates three active runways including Runway 03/21, Runway 11L/29R, and Runway 11R/29L.

Runway 11L/29R is located west of the TUS passenger terminal and measures 10,996 feet in length with a width of 150 feet. It is constructed of grooved asphalt and is the primary runway for commercial and military aircraft use. The runway is equipped with High Intensity Runway Lights (HIRL). Runway 11L is equipped with Medium Intensity Approach Lighting System and Runway Indicator Lights (MALSR) and both runways have four-light Precision Approach Path Indicators (PAPI) and Instrument Landing Systems (Airnav 2018).

Runway 11R/29L is also located to the west of the TUS passenger terminal parallel to Runway 11L/29R. This runway is approximately 8,408 feet in length with a width of 75 feet. Runway 11R has a four-light PAPI and a displaced threshold of 1,410 feet (Airnav 2018). In addition, Runway 29L is equipped with Runway End Identifier Lights (REIL) and PAPI.

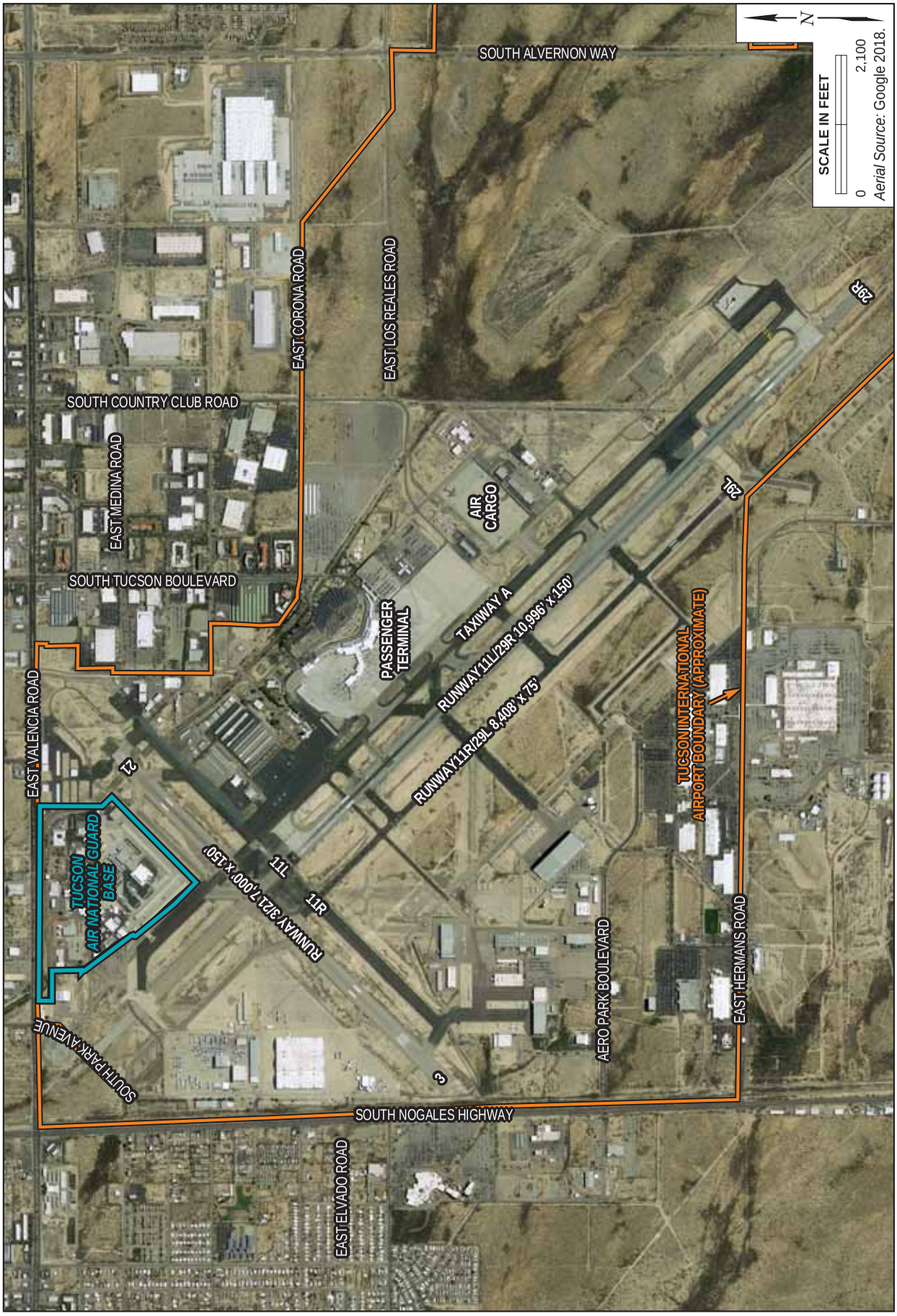


FIGURE 3-2

Tucson International Airport

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No warranty is made by the State/Territory/National Guard Bureau as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data. This map is a "living document," in that it is intended to change as new data become available and are incorporated into the Enterprise GIS database.

Runway 03/21 is oriented in a northeast-southwest configuration with a runway length and width of 7,000 feet and 150 feet, respectively. Runway 21 has REIL and Runway 03 has a displaced threshold of 850 feet (Airnav 2018).

3.1.2.3 Airspace and Aircraft Operations

TUS is located within Class C airspace immediately adjacent to Davis-Monthan AFB Class C airspace, with Interstate 10 (I-10) as the boundary for both airports. Class C airspace encompasses a 5-statute-mile radius of the ATC-controlled airport, extending from the ground surface to 5,000 feet MSL.

On average, there are approximately 384 total aircraft operations per day at TUS, with a total of approximately 140,270 operations annually. *Military* aircraft operations comprise approximately 20 percent of daily aircraft operations, 99 percent of which are F-16 operations. Similarly, *General Aviation* and *Air Taxi* account for approximately 51 percent of daily operations. The remaining daily aircraft operations include approximately 29 percent *Air Carrier* and *Air Cargo* (FAA 2018). The 162 WG currently has a Letter of Agreement (LOA) dated 5 September 2014 with Tucson Airport Authority (TAA) restricting Arizona ANG operations to no more than 40,000 operations per year with no more than 10 percent of the maximum allowable aircraft operations per year utilizing afterburners (TAA and Arizona ANG 2014).

3.1.2.4 Training Airspace and Auxiliary Fields

Airspace

SUA in the vicinity of TUS that supports the 162 WG's F-16 training requirements consists of MOAs, ATCAAs, MTRs, and Restricted Areas. The majority of 162 WG training is conducted within Sells MOA/ATCAA in combination with Restricted Area 2301E (R-2301E) and Tombstone MOA/ATCAA. Other MOAs/ATCAAs used for 162 WG F-16 training include Jackal MOA/ATCAA, Outlaw MOA/ATCAA, Ruby MOA/ATCAA, and Rustler MOA/ATCAA (see Table 3-1). Although not utilized often, VR-263 is a low-level MTR located south of TUS along the U.S. – Mexico border. This MTR extends through Sells, Ruby, and Tombstone MOAs and beyond (USAF 2012) (see Figure 3-3).

Table 3-1. Existing Military Training Airspace and 162 WG F-16 Operations

Airspace	Airspace Type	162 WG F-16 Operations	Total Operations
Jackal	MOA/ATCAA	1,675	2,125
Outlaw	MOA/ATCAA	1,283	1,627
Ruby[1]	MOA/ATCAA	1,668	2,115
Rustler[2]	MOA/ATCAA	1,939	2,460
Sells	MOA/ATCAA	8,321*	11,368*
Tombstone	MOA/ATCAA	2,685	3,406
R-2301E	Restricted Area	16,342*	21,230*
VR-263	MTR	246	299

Notes:
[1] Includes Fuzzy MOA
[2] Includes Morenci and the southwest section of Reserve MOAs/ATCAAs named so for scheduling with Albuquerque ARTCC
* Includes F-16 operations from the 56th Fighter Wing (56 FW) at Luke AFB
Jackal, Outlaw, Ruby, Rustler, and Tombstone MOAs/ATCAAs operations taken from 2012 F-35 Basing Environmental Impact Statement (EIS) Baseline Scenario for TUS while Sells MOA/ATCAA and R-2301E operations taken from Proposed Luke AFB Scenario 6.
Source: USAF 2012.

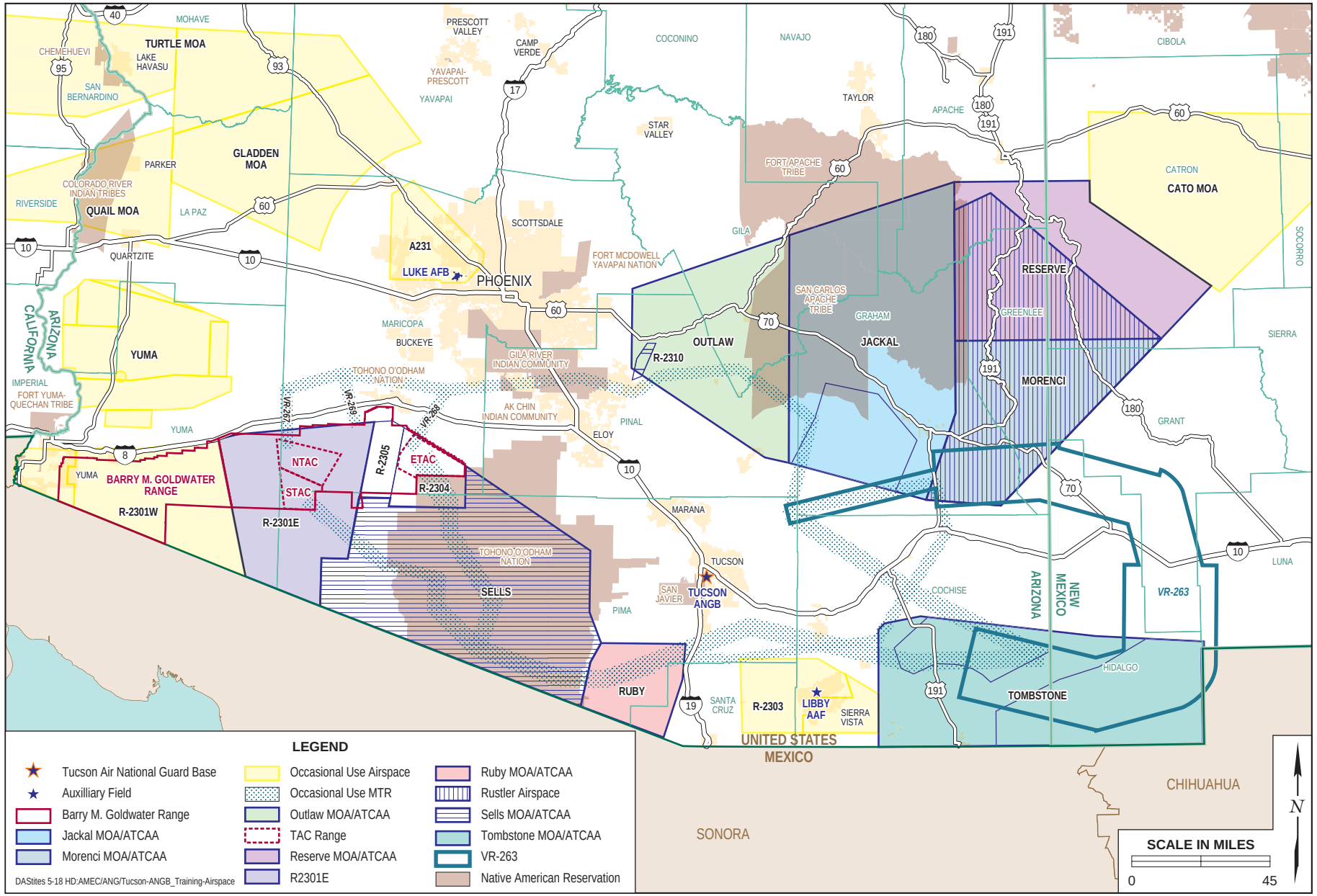
Additional SUA utilized occasionally by the 162 WG for F-16 training includes R-2304 and R-2305, and MTRs, AR-613, AR-639A, AR-647, VR-259, VR-260, VR-267, VR-268, and VR-269.

The Taiwan Air Force (TAF) (21st Fighter Squadron [21 FS]), under management of the 56th Operations Group at Luke AFB, also utilize Bagdad and Gladden MOAs/ATCAAs, in addition to Sells MOA/ATCAA and R-2301E.

Auxiliary Airfield

Libby Army Airfield (AAF) is an auxiliary airfield where the 162 WG completes approximately 14,852 aircraft operations annually. These operations consist of Simulated Flame Outs (SFOs), Low Approaches, And Touch-and-Go Landings. Libby AAF, which is located on Fort Huachuca, is a joint-use facility with the City of Sierra Vista and accommodates approximately 119,355 operations annually (Airnav 2018; USAF 2012).

Additional auxiliary airfields utilized occasionally by the 162 WG includes Gila Bend Air Force Auxiliary Airfield and Davis-Monthan AFB.



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Training Airspace Near Tucson International Airspace

FIGURE 3-3

3.2 AIR QUALITY

3.2.1 Definition of Resource

Air quality in a given location is determined by the concentration of various pollutants in the atmosphere. National Ambient Air Quality Standards (NAAQS) are established by the U.S. Environmental Protection Agency (USEPA) for criteria pollutants, including: ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter equal to or less than 10 microns in diameter (PM_{10}) and 2.5 microns in diameter ($PM_{2.5}$), and lead (Pb). NAAQS represent maximum levels of background pollution that are considered safe, with an adequate margin of safety, to protect public health and welfare.

3.2.1.1 Criteria Pollutants

Air quality is affected by stationary sources (e.g., industrial development) and mobile sources (e.g., motor vehicles). Air quality at a given location is a function of several factors, including the quantity and type of pollutants emitted locally and regionally as well as the dispersion rates of pollutants in the region. Primary factors affecting pollutant dispersion include wind speed and direction, atmospheric stability, temperature, topography, and the presence or absence of inversion layers.

Ozone (O_3). The majority of ground-level (or terrestrial) O_3 is formed as a result of complex photochemical reactions in the atmosphere involving volatile organic compounds (VOC), nitrogen oxides (NO_x), and oxygen. At low altitudes, O_3 is a highly reactive gas that damages lung tissue, reduces lung function, and sensitizes the lung to other irritants. Although *stratospheric* O_3 shields the earth from damaging ultraviolet radiation, *terrestrial* O_3 is a highly damaging air pollutant and is the primary source of smog.

As of May 2008, the USEPA issued the final rule for 8-hour O_3, revising the 1-hour O_3 NAAQS standard. The 8-hour standard is more protective of public health and more stringent than the 1-hour standard, and *nonattainment* areas for 8-hour O_3 are now designated.

Carbon Monoxide (CO). CO is a colorless, odorless, poisonous gas produced by incomplete burning of carbon in fuel. The health threat from CO is most serious for those who suffer from cardiovascular disease, particularly those with angina and peripheral vascular disease.

Nitrogen Dioxide (NO_2). NO_2 is a highly reactive gas that can irritate the lungs, cause bronchitis and pneumonia, and lower resistance to respiratory infections. Repeated exposure to high concentrations of NO_2 may cause acute respiratory disease in children. Because NO_2 is an important precursor in the formation of O_3 (i.e., smog), control of NO_2 emissions is an important component of overall pollution reduction strategies. The two primary sources of NO_2 in the U.S. are fuel combustion and transportation.

Sulfur Dioxide (SO_2). SO_2 is emitted primarily from stationary source coal and oil combustion, steel mills, refineries, pulp and paper mills, and from non-ferrous smelters. High concentrations of SO_2 may aggravate existing respiratory and cardiovascular disease; asthmatics and those with emphysema or bronchitis are the most sensitive to SO_2 exposure. SO_2 also contributes to acid rain, which can lead to the acidification of lakes and streams and damage vegetation. As of June 2010, the USEPA issued a final rule for 1-hour SO_2, revoking the annual and 24-hour standards during that same rulemaking. However, these previous standards remain in effect until one year after an area is designated for the 2010 standard, except in areas designated *nonattainment* for the 1971 standards, where the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standard are approved.

Particulate Matter (PM_{10} and $PM_{2.5}$). Particulate matter is a mixture of tiny particles that vary greatly in shape, size, and chemical composition, and can be comprised of metals, soot, soil, and dust. PM_{10} includes larger, coarse particles, whereas $PM_{2.5}$ includes smaller, fine particles. Sources of coarse particles include crushing or grinding operations, and dust from paved or unpaved roads. Sources of fine particles include all types of combustion activities (e.g., motor vehicles, power plants, wood burning) and certain industrial processes. Exposure to PM_{10} and $PM_{2.5}$ levels exceeding current standards can result in increased lung- and heart-related respiratory illness. The USEPA has concluded that finer particles are

more likely to contribute to health problems than those greater than 10 microns in diameter.

Airborne Lead (Pb). Airborne lead can be inhaled directly or ingested indirectly by consuming lead-contaminated food, water, or non-food materials such as dust or soil. Fetuses, infants, and children are most sensitive to Pb exposure. Pb has been identified as a factor in high blood pressure and heart disease. Additionally, direct exposure to Pb can lead to poisoning in fetuses, infants, and children and can cause permanent neurological disorders and damage to internal organs. Exposure to Pb has declined dramatically in the last 10 years as a result of the reduction of Pb in gasoline and paint, and the elimination of Pb from soldered cans.

3.2.1.2 Clean Air Act Amendments

The Clean Air Act Amendments (CAAA) of 1990 place the responsibility to achieve compliance with NAAQS on individual states. Areas not in compliance with any of the NAAQS can be declared *nonattainment* areas by the USEPA or the appropriate state or local agency. *Nonattainment* areas are declared for each pollutant addressed by the NAAQS. Once the USEPA declares an area as *nonattainment*, the USEPA requires each state to prepare a State Implementation Plan (SIP). A SIP is a compilation of goals, strategies, schedules, and enforcement actions that will lead the state into compliance with the NAAQS. Should the state and local air agencies fail to develop adequate SIPs, then the USEPA will develop a Federal Implementation Plan to remedy the state's failure. To be re-designated to *attainment*, the area must show through monitoring and modeling that the pollutant levels are consistently meeting the NAAQS and have been maintained for a minimum of two consecutive 10-year periods for each applicable criteria pollutant regulatory area. During this time, the declared area is in transitional attainment, also known as *maintenance*.

Under the CAAA, the Title V Operating Permit Program imposes requirements for air quality permitting on emission sources of air pollutants. The 162 WG would be categorized as a major source under the Title V program if its potential emissions from stationary sources exceed 100 tons per year (tpy) of any of the criteria pollutants; or 10 or 25 tpy of any single or combination of hazardous air

pollutants (HAPs), respectively. Also under the CAAA, the Aerospace National Emission Standards for Hazardous Air Pollutants (NESHAP) program specifies various provisions for regulated sources, including limits on HAP emissions, compliance demonstrations and performance testing, monitoring, record keeping, and reporting. The 162 WG would be subject to the NESHAP program if potential emissions of any HAP equals or exceeds 10 tpy or any combination of HAPs equals or exceeds 25 tpy.

3.2.2 Existing Conditions

3.2.2.1 Climate

Tucson, Arizona is characterized by a dry subtropical climate with mild winters and long, hot, and dry summers. Average temperatures in Tucson range from an average minimum of approximately 38 degrees Fahrenheit (^{o}F) in the winter months to an average maximum of approximately 98 ^{o}F in the summer months. The average annual precipitation in the region is approximately 12 inches. As a result of atmospheric convection, Tucson experiences monsoon systems with high-level winds and storms. As such, more than half of Tucson's annual precipitation falls during the months of July through September.

3.2.2.2 Local Air Quality

Tucson ANGB is located within the Tucson area of Pima County, under the jurisdiction of the Arizona Department of Environmental Quality (ADEQ), which publishes statewide air quality and permitting regulations. The Tucson area within Pima County is currently designated by the USEPA as a *maintenance* area for CO and an *attainment* area for all other NAAQS criteria pollutants (FAA 2018; USEPA 2018a). Consequently, under Title V, the major source threshold for each criteria pollutant (CO, NO_x, sulfur oxides [SO_x], VOC, and PM_{10}) is 100 tpy (USEPA 2018b).

3.2.2.3 Emissions at Tucson Air National Guard Base

According to the USEPA and Title 18 Arizona Administrative Code, Tucson ANGB would be categorized as a major source and would be required to obtain a

Title V General Permit from the ADEQ if the potential emissions from its stationary sources exceed 100 tpy for criteria pollutants CO, NO_x, SO_x, VOCs, and $PM_{10;}$ or 10 or 25 tpy of any single or combination of HAPs, respectively (USEPA 2018c). The 2017 actual stationary source emissions from the 162 WG were well below the Title V major source thresholds for all criteria pollutants and for HAPs. Consequently, the installation is not categorized as a major source and is not required to obtain a Title V General Permit. See Table 3-2 for a summary of the CY 2017 stationary source criteria pollutant emissions as well as the CY 2017 stationary source HAP emissions from Tucson ANGB.

Table 3-2. Stationary Source Emissions at Tucson ANGB

Category	Annual Emissions (tpy)						
	CO	NO_x	$PM_{2.5}$	PM_{10}	SO_x	VOCs	HAPs
2017 Stationary Source Emissions	3.96	7.30	0.57	0.62	0.44	3.79	0.50
Major Source Thresholds	100	100	--	100	100	50	25

Source: Arizona ANG 2017.

The installation currently emits HAPs during the course of operational activities, which include storing fuel, using paints, and running generators. However, with respect to NESHAP and Urban Air Toxics regulations, Tucson ANGB is considered to be an area source, as it is not a major source with the potential to emit 10 tpy or more of HAPs. Consequently, the NESHAP program developed for major industrial/manufacturing categories does not apply to the installation (Arizona ANG 2017).

Stationary emission sources at Tucson ANGB include:

- Combustion sources (e.g., jet engine tests, natural-gas-fired generators, water heaters, aircraft arresting barrier engines, diesel-fired generators, and fire pumps, etc.);
- Fuel storage and fuel transfer operations (e.g., fuel storage tanks); and
- Operational sources (e.g., solvents, cleaners, antifreeze, and other materials containing VOCs and HAPs).

Mobile emission sources at Tucson ANGB include:

- On- and off-road vehicles and equipment, Aerospace Ground Equipment (AGE), and aircraft operations.

Although mobile sources are a component of the total installation emissions and a major consideration in performing the conformity analysis, these emissions are not considered under the CAAA Title V Operating Permit Program.

3.3 NOISE

3.3.1 Definition of Resource

Noise is defined as unwanted sound or, more specifically, as any sound that is undesirable because it interferes with communication, is intense enough to damage hearing, or is otherwise annoying (Federal Interagency Committee on Noise [FICON] 1992). Human response to noise can vary according to the type and characteristics of the noise source, the distance between the noise source and the receptor, the sensitivity of the receptor, and the time of day.

Due to the wide range in sound levels, sound is expressed in decibels (dB), a unit of measure based on a logarithmic scale. As a general rule, a 3-dB change is necessary for noise increases to be noticeable to humans (Bies and Hansen 1988). A 10-dB increase in noise level corresponds to a 100-percent increase (or doubling) in perceived loudness. Sound measurement is further refined by using an A-weighted decibel (dBA) scale that emphasizes the range of sound frequencies that are most audible to the human ear (i.e., between 1,000 and 8,000 cycles per second). Sound frequency is measured in terms of hertz (Hz), and the normal human ear can detect sounds ranging from approximately 20 to 15,000 Hz. However, because all sounds in this wide range of frequencies are not heard equally well by the human ear, which is most sensitive to frequencies in the 1,000 to 4,000 Hz range, the very high and very low frequencies are adjusted to approximate the human ear's lower sensitivity to those frequencies. This is called "A-weighting" and is commonly used in measurement of community environmental noise. Unless otherwise noted, all decibel measurements presented in the following noise analysis are dBA.

Day-night sound level (DNL) is a noise metric that averages all A-weighted Sound Exposure Level (SEL) values over a 24-hour period, with an additional 10-dB penalty added to noise events occurring between 10:00 P.M. and 7:00 A.M. This penalty is intended to compensate for generally lower background noise levels at night and the additional annoyance of nighttime noise events. DNL is the preferred noise metric of the U.S. Department of Housing and Urban

Development (HUD), DOT, FAA, USEPA, Veterans Affairs, and Department of Defense (DoD).

Analyses of aircraft noise exposure and compatible land uses around DoD facilities are normally accomplished using a group of computer-based programs, collectively called NOISEMAP (USAF 1992). NOISEMAP – through its program BASEOPS – allows entry of runway coordinates, airfield information, flight tracks, flight profiles (i.e., engine thrust settings, altitudes, and speeds) along each flight track for each aircraft, numbers of flight operations, run-up coordinates, run-up profiles, and run-up operations. The FAA's Aviation Environmental Design Tool (AEDT) also allows entry of all of the aforementioned parameters and is used to analyze aircraft at public/civilian airports. Within this EA and given the joint use nature of TUS, AEDT was used to develop noise contours associated with TUS aircraft operations, both civilian and military.

In airport noise analyses, noise contours are used to help determine compatibility of aircraft operations and local land uses. Although noise resulting from aircraft flight operations represents the greatest contribution to the overall noise environment near the airfield, other noise sources (e.g., highway traffic) may also influence total ambient noise levels. Other activities that may generate substantial amounts of noise at an airport include engine preflight run-ups and aircraft maintenance activities, industrial operations, and construction activities.

For airspace, the Onset Rate-Adjusted A-weighted Day-Night Average Sound Level (L_{dnmr}) is utilized and adds to the DNL metric the startle effect of an aircraft flying low and fast where the sound can rise to its maximum very quickly. Because the tempo of operations is so variable in airspace units, L_{dnmr} is calculated based on the average number of operations per day in the busiest month of the year.

Although aircraft maintenance actions and industrial operations may generate large amounts of noise, they are typically confined to the airfield and industrial areas. Construction activities may result in disturbance to on-site personnel or off-site noise-sensitive receptors (e.g., residential areas and schools). However, construction noise tends to be localized and temporary and may be reduced through use of special equipment or scheduling restrictions.

Table 3-3. Sound Levels of Typical Noise Sources and Noise Environments

	Over-all Level (Noise level, dB(A))		**Community** (Outdoor)	**Home or Industry** (Indoor)	**Loudness** (Human Judgement of Different Sound Levels)
	120-130	Uncomfortably Loud	Military Jet Aircraft Take-Off With After-Burner From Aircraft Carrier @ 50 ft. (130)	Oxygen Torch (121)	32 times as loud as 70 dB(A)
	110-119		Turbo Fan Aircraft @ Take-Off Power @ 200 ft. (118)	Riveting Machine (110) Rock and Roll Band (108-114)	16 times as loud as 70 dB(A)
	100-109		Boeing 707, DC-8 @ 6080 ft. Before Landing (106), Jet Flyover @ 1000 ft. (103), Bell J-2A Helicopter @ 100 ft. (100)		8 times as loud as 70 dB(A)
	90-99	Very Loud	Power Mower (96) Boeing 707, CD-8 @ 6080 ft. Before Landing (97) Motorcycle @ 25 ft. (90)	Newspaper Press (97)	4 times as loud as 70 dB(A)
	80-89		Car Wash @ 20 ft. (89) Propellor Plane Flyover @ 1000 ft. (88) Diesel Truck, 40 mph @ 50 ft. (84) Diesel Train, 45 mph @ 100 ft. (83)	Food Blender (88) Milling Machine (85) Garbage Disposal (80)	2 times as loud as 70 dB(A)
	70-79	Moderately Loud	High Urban Ambient Sound (80) Passenger Car, 65 mph @ 25 ft. (77) Freeway @ 50 ft. From Pavement Edge @ 10 a.m. (76 +/- 6)	Living Room Music (76) TV-Audio, Vacuum Cleaner (70)	
	60-69		Air Conditioning Unit @ 100 ft. (60)	Cash Register @ 10 ft. (65-70)	1/2 as loud as 70 dB(A)
	50-59	Quiet	Large Transformers @ 100 ft. (50)		1/4 as loud as 70 dB(A)
	40-49		Bird Calls (44) Lower Limit of Urban Ambient Sound in daytime (40)		1/8 as loud as 70 dB(A)
		Just Audible	**dB(A) Scale Interrupted**		
	0-10	Threshold of Hearing			

Source: Branch and Beland 1970.

Table 3-3 identifies noise levels associated with some common indoor and outdoor activities and settings. Table 3-3 also indicates the subjective human judgments of noise levels, specifically the perception of noise levels doubling or being halved.

For reference purposes, a baseline noise level of 70 dB is described as moderately loud. As can be seen in the table illustrating the logarithmic dB scale, humans perceive an increase of 10 dB as a doubling of loudness, while an increase of 30 dB corresponds with an eight-fold increase in perceived loudness.

Guidelines established by FICON are used by HUD to determine acceptable levels of noise exposure for various land use categories. Land use categories most sensitive to ambient noise are residential, institutional, cultural, and some recreational uses. Industrial land uses are the least sensitive to surrounding noise, largely due to the inherently high levels of ambient noise associated with industrial activities. Ambient background noise in urbanized areas typically varies from 60 to 70 dBA but can be higher; suburban neighborhoods experience ambient noise levels of approximately 45 to 50 dBA (USEPA 1973). Noise levels from flight operations exceeding ambient background noise typically occur beneath main approach and departure corridors, or local air traffic patterns around the airfield, and in areas immediately adjacent to aircraft parking ramps and staging areas. As aircraft take off and gain altitude, their noise contribution is reduced.

3.3.2 Existing Conditions

3.3.2.1 Regional Setting

Much of the area to the north and northwest of TUS is moderately populated, with areas to the east comprised of industrial/commercial land use. Areas to the south, southeast, and southwest are primarily undeveloped with limited rural residential land use. Civilian and military aircraft operations at TUS are the dominant noise source in the surrounding areas, with limited contribution from local highways. While several local roadways surround TUS, I-10 is the closest major highway providing indirect access to TUS.

3.3.2.2 Tucson International Airport Operations

The primary source of noise in the area immediately surrounding TUS is civilian and military aircraft operations at TUS. On average, there are approximately 384 total aircraft operations per day at TUS (see Table 3-4). *Military* aircraft operations comprise approximately 20 percent of total daily aircraft operations at TUS. *Air*

Carrier and *Air Cargo* operations account for approximately 29 percent of daily operations and the remaining operations include approximately 51 percent *Air Taxi* operations and *General Aircraft* operations (FAA 2018).

Table 3-4. Existing Aircraft Operations at Tucson International Airport

	Daily Operations	Annual Operations
Civilian	308.43	112,577
Air Carrier and Air Cargo	*90.1*	*32,887*
Air Taxi and General Aviation	*218.33*	*79,690*
Military	75.87	27,693
Total	**384.3**	**140,270**

Source: FAA 2018.

FAR Part 150 was developed and implemented as a single system for measuring noise, determining noise exposure, and identifying noise-compatible land use surrounding airports. FAR Part 150 is the primary Federal regulation guiding and controlling planning for aviation noise compatibility on and around airports.

The 1991 Part 150 Noise Compatibility Study Update for TUS included 24 recommended measures. One of the recommended measures was to "[d]evelop a separate operating agreement with the Arizona ANG, comparable to past agreements, to limit Arizona ANG operations and the use of afterburners at the airport." An update to the 1991 Part 150 Noise Compatibility Program at TUS was completed in 2012. The 2012 Part 150 Noise Compatibility Study Update indicated that this recommended measure had been implemented and that an agreement was in place which limited the total operations and operations utilizing afterburner. The first agreement, dated August 8, 1994, restricted Arizona ANG operations to no more than 40,000 operations per year with no more than 10 percent of annual takeoffs by Arizona ANG F-16 aircraft utilizing afterburners. The August 8, 1994 agreement was superseded by a second agreement dated September 5, 2014 at the request of the Arizona ANG. The September 5, 2014 agreement also restricted Arizona ANG operations to no more than 40,000 operations per year with no more than 10 percent of the maximum allowable aircraft operations per year utilizing afterburners.

The 2012 Part 150 Noise Compatibility Program Update Noise Exposure Maps were developed using the FAA's Integrated Noise Model (INM). This noise model has since been replaced with the FAA's AEDT, which was used to develop noise contours based on existing aircraft operations at TUS (see Figure 3-4). As shown in Figure 3-4, existing aircraft operations generated noise contours of 65, 70, and 75 DNL. The 65 DNL noise contour extends approximately 4.3 miles to the southeast beyond the end of Runway 29R and approximately 4.7 miles to the southeast beyond the end of Runway 29L, over primarily vacant and undeveloped land, with some commercial/industrial uses located in Pima County. Northwest of the airport, the 65 DNL noise contour extends approximately 1.9 miles beyond the end of Runway 11L and approximately 1.6 miles beyond the end of Runway 11R, covering residential and commercial land uses within Tucson. The 70 and 75+ DNL contours are located on airport property or over compatible land use beyond the airport boundary (see Table 3-5).

Table 3-5. Existing TUS Noise Contour Land Area Coverage

Noise Level (DNL)	Coverage of Off-Airport Property (acres)	Coverage of On-Airport Property (acres)	Total Area (acres)
65 - 70	1,069	2,656	3,725
70 - 75	384	1,133	1,517
75+	77	1,363	1,440
Total	1,530	5,152	6,682

Source: FAA 2018.

Land uses near TUS are controlled in various ways. In addition to traditional zoning, Tucson and Pima County established specific regulations and ordinances addressing land use surrounding TUS. The Airport Environs Zone for Pima County consists of districts and zones, including the Compatible Use Zone (CUZ), Noise Control District, and Airport Hazard District. These zoning provisions are intended to promote public safety, reduce adverse impacts of the airport on adjacent properties, and reduce the effect of encroachment.

EA

Noise Contours Associated with Tucson International Airport

FIGURE 3-4

In addition to aircraft operations, other major contributors to an area's noise environment may include highways with high traffic volumes, heavily used railroads, and major industrial facilities. However, none of the surrounding ground-based noise sources near TUS – including I-10 – substantially contribute to the noise environment in the surrounding vicinity.

3.3.2.3 Training Airspace and Auxiliary Field

Airspace

Noise levels within airspace utilized for military training are presented in Table 3-6. These noise levels are representative of all military aircraft operations that occur within the airspace, which includes F-16 aircraft operations associated with 162 WG at Tucson ANGB and the 56 FW at Luke AFB (USAF 2012).

Table 3-6. Existing Military Training Airspace Noise Levels

Airspace	Noise Level (L_{dnmr})	Sonic Booms Per Day	Total Aircraft Operations
Jackal MOA	< 45	< 1	2,125
Outlaw MOA	< 45	< 1	1,627
Ruby MOA	53	< 1	2,115
Rustler MOA	< 45	< 1	2,460
Sells MOA	52	2	13,898
Tombstone MOA	< 45	< 1	3,406
R-2301E N TAC Range	70	1	7,317
R-2301E S TAC Range	70	1	7,317
VR-263	< 45	< 1	299

Notes: Jackal, Outlaw, Ruby, and Tombstone MOAs noise levels taken from *2012 F-35 Basing EIS* Baseline Scenario for TUS while Sells and R-2301E operations taken from Proposed Luke AFB Scenario 6.
Source: USAF 2012.

Auxiliary Airfield

Noise levels associated with aircraft operations at Libby AAF are presented in Table 3-7. The 162 WG completes approximately 41 daily aircraft operations at Libby AAF; however, these F-16 operations make up only 20 percent of total aircraft operations at Libby AAF.

Table 3-7. Libby AAF Noise Levels Land Area Coverage

Noise Level (DNL)	Coverage Off Fort Huachuca but On Airport (acres)	Coverage On Fort Huachuca (acres)
65 - 69	25	1,108
70 - 74	12	632
75 - 79	4	266
80 - 84	0	32
85+	0	0
Total > 65	41	2,038

Source: USAF 2012.

3.4 LAND USE

3.4.1 Definition of Resource

Land use can be separated into two primary categories: *natural* and *human modified*. *Natural* land cover includes woodlands, rangelands, grasslands, and other open or undeveloped areas. *Human-modified* land uses includes residential, commercial, industrial, communications and utilities, agricultural, institutional, recreational, and generally other areas developed from a natural land cover condition. Land use is regulated by management plans, policies, regulations, and ordinances (i.e., zoning) that determine the type and extent of land use allowable in specific areas along with protecting specially designated or environmentally sensitive areas.

Several specific siting criteria have been established for land use and development at commercial and military airfields. To maintain safety, the USAF has established siting criteria in AFI 32-1026, *Planning and Design of Airfields*, and Air Force Manual (AFM) 32-1013, *Airfield and Heliport Planning Criteria*, for land development of military installations. These criteria include clear zones, obstruction zones for runways, and Explosive Safety Quantity-Distance (ESQD) criteria governing the storage of munitions. While these criteria are related to safety, they are also used to assist decision-makers and planners with appropriate siting of facilities on military installations. FAA airfield criteria are used at commercial airports and are generally the same as the USAF criteria. In addition, several regulations address security requirements for military bases (e.g., Anti-Terrorism/Force Protection [AT/FP] criteria) and have implications on the physical layout and design of installations.

The DoD has developed AT/FP standards which are designed to reduce the likelihood of mass casualties from potential terrorist attacks. UFC 4-010-01, *DoD Minimum Anti-Terrorism Standards for Buildings*, and the 9 February 2012 update (UFC 4-010-02) outline various planning, construction, and operational standards to address potential terrorist threats. AT/FP standards and existing conditions are further described in Section 3.9, *Safety*.

3.4.2 Existing Conditions

3.4.2.1 Regional Characterization

Tucson ANGB is located at TUS within the unincorporated area of Pima County, surrounded by incorporated areas of the Tucson. Pima County, which covers a total of approximately 9,200 square miles, is divided into five districts, with one Board of Supervisors member from each district. Tucson ANGB is located within District 2. Incorporated lands are primarily within Districts 1, 2, 4, and 5. District 3 predominately consists of the Tohono O'odham Nation, the second largest Indian Reservation in the nation, and several national parks and preserves.

3.4.2.2 Local Land Use

TUS is situated on approximately 8,343 acres in eastern Pima County (FAA 2018). The areas immediately surrounding TUS consist of residential uses, commercial and industrial land uses, and open desert land. Land uses to the south and east of TUS are generally related to aviation and include industrial and commercial land uses occupied by large buildings/structures that are separated by undeveloped land. Along the southwest border of TUS is USAF-owned land, known as Air Force Plant 44, which is considered commercial/industrial. Residential developments consisting of single-family, multi-family, and manufactured housing residences are located to the north and northwest of TUS. The nearest residential land uses to the airport property boundary are located approximately 700 feet to the north, while other nearby residential areas are located approximately 1,500 feet west on South Nogales Highway. The area south of TUS is primarily vacant land. The San Xavier District of the Tohono O'odham Nation is located immediately southwest of TUS. The Los Reales Landfill is located approximately 3 miles east of TUS (FAA 2018).

Land uses near TUS are managed in various ways. Pima County's long-range plan for the County, known as *Pima Prospers Comprehensive Plan*, Tucson's general plan and sustainability plan, known as *Plan Tucson*, and TAA's *2014 Airport Master Plan* each describe planning goals for the areas surrounding TUS. In addition to traditional zoning, Pima County has established Airport Environs Zones that include provisions that limit the type and height of development in these zones.

Per Pima County Code Section 18.57.030, TUS is located within Airport Height Overlay Zone 1 and Airport Land Use Overlay Zone 1, which is composed of the Runway Safety Zone (RSZ) and CUZ-1, CUZ-3, and CUZ-4. These zones establish relevant requirements and standards, some of which are briefly summarized below:

RSZ

- Only agricultural uses are permitted.

CUZ-1

- Permissible uses within CUZ-1 includes those allowable within the Campus Park Industrial Zone, Light Industrial/Warehousing Zone (CI-1), General Industrial Zone (CI-2), and Heavy Industrial Zone (CI-3) and subsections defined in Pima County Code Section 18.57.030 except administrative or professional offices as primary uses and airport facilities, child care centers, and banks and financial institutions as secondary uses; and retail lumber yards, motion picture studios, restaurants, doctors' offices or clinics, general stores, racetracks, sports stadiums, and rifle ranges.
- Enclosed sales and display areas incidental to light manufacturing or assembly are permissible provided no more than 25 percent of the floor area is occupied for such use.
- Accessory uses are permissible for employees only including cafeterias, offices, and indoor entertainment facilities.
- Automotive, aircraft, marine, farm equipment, mobile home and recreational vehicle sales are permissible along with auto, truck and equipment rental uses.
- For uses permitted within the Campus Park Industrial Zone, the total ground floor area is restricted to 25 percent of the net lot area and the total floor area is restricted to 37.5 percent of the net lot area.
- For all other uses, the total ground floor area is restricted to 35 percent of the net lot area.

- Any structure or use, or contiguous structure or use, shall not accommodate more than 50 employees and 50 non-employees at any time.

CUZ-3

- The interior noise level of new noise-sensitive land uses, and accessory offices and indoor areas where the public is received, shall not exceed 45 DNL.
- Residential uses are permitted only on existing residentially zoned lots.
- Prohibited uses: outdoor entertainment and sports events; swap meets and auctions; playgrounds, parks, and public swimming pools; and animal breeding.

CUZ-4

- The interior noise level of new noise-sensitive land uses, and accessory offices and indoor areas where the public is received, shall not exceed 45 DNL.

The City of Tucson has also established an Airport Environs Zone (Unified Development Code Article 5.6), which differs slightly from that of Pima County. The City of Tucson Airport Environs Zone for TUS includes an Airport Hazard District, two Noise Control Districts (designated areas at TUS with noise exposures of 65-70 DNL and greater than 70 DNL), and three CUZs.

Specific airport uses within this area include the terminal area, general aviation, air cargo, military, aviation related airfield approach and future terminal and airfield approach areas. The passenger facilities at TUS are comprised of a terminal building with two concourses, referred to as Concourse A and Concourse B. International flights are processed through the Federal Inspection Service Facility located in Concourse A. Tucson ANGB is located on the north side of TUS along East Valencia Road.

3.4.2.3 Land Use at Tucson Air National Guard Base

As previously described, Tucson ANGB occupies a roughly triangular 94-acre parcel on the northwestern portion of TUS. This parcel is USAF fee-owned land. The installation is bordered to the north by East Valencia Road and to the southeast and southwest by TUS. Land use planning for the Tucson ANGB has been outlined in the 162 WG's Installation Development Plan (IDP) (Arizona ANG 2011a). The purpose of the IDP is to provide an inventory and analysis of Tucson ANGB facilities, identify goals and objectives for ongoing operations, and analyze constraints and opportunities for development. The IDP seeks to accurately reflect the 162 WG's current mission while allowing the maximum amount of flexibility to accommodate potential future missions.

Land Use Inventory

The 162 WG's IDP divides land use at Tucson ANGB into eight general categories: safety zones and airfield clearance areas, airfield pavement areas, aircraft operations, maintenance facilities, industrial facilities, command and support, special categories, and open space. Most of the installation is utilized for airfield and direct mission-related activities. These areas include runways, taxiways, aprons, fuels storage facilities, hangars, and aircraft maintenance facilities, which occupy most of the southern portion of Tucson ANGB. Industrial and special category areas comprise most of the northern portion of the installation and include industrial uses, munitions and hazardous waste storage facilities, and small arms and fire training areas. Command and support facilities are separated into five distinct locations and include administrative office space, medical, community, and recreational facilities. Open space occurs along the western and southwestern installation boundaries, in addition to the northernmost section of the installation on both sides of manmade wash (Arizona ANG 2003). Table 3-8 describes the eight traditional land use categories at Tucson ANGB in further detail.

Table 3-8. Installation Land Use

Land Use	Approximate Acres	Description
Safety Zones and Airfield Clearance Areas	N/A	Appropriate building setbacks are required to protect aircraft moving under their own power on runway, taxiways, and aircraft parking aprons. Both USAF and FAA criteria are to be considered when identifying these land use restrictions.
Airfield Pavement Areas	22.0	This land use category includes runways, taxiways, and aircraft parking aprons. The aircraft parking apron is located on Tucson ANGB property, while the runway and taxiways are maintained and controlled by the FAA.
Aircraft Operations	4.5	This land use category includes the squadron operation facilities, flight simulator, and fire/rescue station. The fire/rescue station must maintain direct access to the flightline without crossing other traffic, while squadron operations facilities and associated flight simulators do not necessarily require direct access to the flightline or the aircraft parking apron.
Maintenance Facilities	26.6	Aircraft maintenance facilities—including maintenance hangars, fuel cell/corrosion control docks—should be located adjacent to aprons or taxiways. Facilities such as the propulsion shop, avionics, non-destructive inspection, and aerospace ground equipment (AGE) shops should be sited near other aircraft maintenance facilities.
Industrial Facilities	16.7	This land use category includes the base civil engineer administration and shop areas, base supply, vehicle maintenance, and the petroleum, oils, and lubricants (POL) fuel farm. These work areas may sometimes generate unsightly open storage areas, which may detract from the overall appearance of the installation. Base supply needs a location that permits quick access to and from the aircraft hangars, while also providing direct access for frequent commercial deliveries. The POL fuel farm includes jet fuel storage and dispensing islands, fuel trucks parking and liquid oxygen/ nitrogen storage.
Command and Support	7.9	This land use category includes Headquarters Operational Training (O&T), dining facility, medical clinic, and communications. The O&T facility should be one of the first buildings encountered after passing through the entry gate. Security forces should be near the main entry gate, as well. The dining facility and medical clinic should be centralized on the installation, as unit members frequent them during unit training assemblies.

Table 3-8. Installation Land Use (Continued)

Land Use	Approximate Acres	Description
Special Categories	3.6	This land use category includes activities such as small arms ranges, munitions maintenance and training, munitions storage igloos, hazardous waste storage, and fire training facilities. All of these facilities require some pre-determined ESQD arcs or safety zones. At Tucson ANGB the munitions storage area is located near the center of this densely developed installation.
Open Space	12.7	Permanent open space provisions for security buffers and landscaped areas are necessary and desirable. Temporary open space is often needed to ensure appropriate space is preserved for future facility expansion.

Note: Safety Zones and Airfield Clearance Areas cover a variety of land use types at Tucson ANGB.
Source: Arizona ANG 2011b.

3.5 BIOLOGICAL RESOURCES

3.5.1 Definition of Resources

Biological resources include native or naturalized plants and wildlife and the habitats in which they occur. Sensitive biological resources are defined as those plant and wildlife species listed as threatened or endangered, or proposed as such, by the U.S. Fish and Wildlife Service (USFWS) or Arizona Game and Fish Department (AGFD). The Federal Endangered Species Act (ESA) of 1973 protects listed species against killing, harming, harassing, or any action that may damage their habitat. Federal Species of Concern are not protected by law; however, these species could become listed and protected. The State of Arizona's State Wildlife Action Plan is used to manage Arizona's fish, wildlife, and wildlife habitats for a 10-year period and is renewed by the USFWS every 5 years.

Migratory birds, as listed in 50 CFR §10.13, are ecologically and economically important to the U.S. In 2001, Executive Order (EO) 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*, was issued to focus attention of Federal agencies on the environmental effects to migratory bird species and, where feasible, implement policies and programs, which support the conservation and protection of migratory birds.

Under provisions of the Title 17 Arizona Revised Statutes and Title 12 Arizona Administrative Code Chapter 4, the AGFD is responsible for managing wildlife and has developed Arizona's State Wildlife Action Plan, a comprehensive wildlife conservation strategy for the state. This strategy included the identification of Arizona's species of greatest conservation need, including wildlife species most in need of conservation actions that depend on Arizona habitats for survival. The species of greatest conservation need are listed in the AGFD's Heritage Data Management System. The species of greatest conservation need and State Wildlife Action Plan are used to inform management decisions by land management and non-governmental conservation organizations in planning decisions.

The Arizona Native Plant Law, enacted in 1929, aims to protect the native plants of Arizona. The Arizona Department of Agriculture (AZDA) administers the legislation while the AGFD maintains the database and tracks many of the

protected plants. These protected plants may not be removed from any lands without permission of the land owner and a permit from the AZDA. A landowner may remove a protected native plant on their own property if the landowner receives a permit from the AZDA within 20 to 60 days prior to the removal of the plant. Native plants protected by the Arizona Native Plant Law are listed in the Title 3 Arizona Administrative Code Chapter 3. These plants are categorized as highly safeguarded, salvage restricted, salvage assessed, and harvest restricted. The highly safeguarded category includes native plants in Arizona that are in jeopardy or in danger of extinction. The salvage restricted category is extensive and includes native plants that are not in the highly safeguarded category but are vulnerable to theft or vandalism. This category includes, but is not limited to, all species of the agave, cactus, lily, and orchid families. Salvage assessed plants are not included in the highly safeguarded or salvage restricted categories but have sufficient value to support the cost of salvage. Harvest restricted plants are not included in the highly safeguarded category but are subject to excessive harvest because of their intrinsic value.

The *Sonoran Desert Conservation Plan* was established to ensure the long-term survival of plants and wildlife that are indigenous to Pima County through maintaining or improving the habitat conditions and ecosystem function necessary for their survival. The conservation plan identifies 56 priority vulnerable species warranting further analysis, consideration, and conservation in Pima County, of which 44 species are protected under the Multiple Species Conservation Plan. The plan permits Pima County a specified level of incidental take under Section 10 of the ESA in exchange for perpetual protection of sensitive habitat in the Conservation Lands System, implementation of management prescriptions therein, and mitigation measures for habitat modification.

Pima County has also enacted several ordinances to protect native vegetation and habitat. The *Pima County Native Plant Preservation Ordinance* (Pima County Code Section 18.72) generally requires that projects that disturb more than 14,000 square feet and contain protected native upland plants prepare a Native Plant Preservation Plan. Pima County's list of protected native plants includes 11 tree/shrub species, 7 agaves, 4 yuccas, 14 cacti, and all federally threatened and endangered plants in the state. All Native Plant Preservation Plans must use one or a combination of methods to preserve native plants and to salvage and mitigate

protected plants that will be impacted by construction, except in areas of regulated riparian habitat. The *Watercourse and Riparian Habitat Protection Ordinance* (Pima County Code Section 16.30) generally requires projects that disturb more than one third of an acre of a property's regulated riparian habitat to submit a permit application to Pima County.

3.5.2 Existing Conditions

3.5.2.1 Regional Setting

TUS and Tucson ANGB are located within the Sonoran Basin and Range Level III Ecoregion of Arizona (Griffith et al. 2014). This ecoregion covers approximately 28.8 million acres of desert landscape across southeastern California and southwestern Arizona (Calzia and Wilson 2012). The Arizona Upland of the northeastern Sonoran Desert has relatively dense vegetation with a diverse mix of leguminous trees, shrubs, and cacti. The saguaro cactus (*Carnegiea gigantea*) is the largest cactus in the U.S. and is characteristic of the Sonoran Desert. This species is found on the slopes of the Arizona Uplands/Eastern Sonoran Mountains and the upper bajadas (i.e., alluvial material at the base of a mountain) within the Arizona Uplands/Eastern Sonoran Basins above the valley floors (Griffith et al. 2014).

More specifically, TUS and Tucson ANGB are located within the Arizona Uplands/Eastern Sonoran Basins Level IV Ecoregion. This region includes the broad alluvial plains, fans, and bajadas that occur between the higher relief mountain ranges of the Eastern Sonoran Mountains (Griffith et al. 2014). Five minor mountain ranges surround the region, including the Santa Catalina Mountains and the Tortolita Mountains to the north, the Santa Rita Mountains to the south, the Rincon Mountains to the east, and the Tucson Mountains to the west (Arizona ANG 2011a). Elevations generally range between 1,500 and 3,000 feet, but reach as low as 900 feet in the north and as high as 3,600 feet on some of the upper slopes. Sediments filling the basins represent combinations of fluvial, colluvial, and alluvial deposits. Creosotebush (*Larrea tridentate*) and bursage are common in the plains and lower bajadas, although more thornscrub elements of the Sonoran Arizona Upland occur. Common vegetation includes saguaro, foothills paloverde (*Parkinsonia microphylla*), ironwood (*Olneya tesota*), triangle-leaf

bursage (*Ambrosia deltoidea*), ocotillo (*Fouquieria splendens*), mesquite (*Prosopis* spp.), acacia (*Acacia* spp.), a variety of cholla species (*Opuntia* spp.), and some bush muhly (*Muhlenbergia porteri*).

There are 30 endangered and 14 threatened wildlife species protected under the Federal ESA known to occur or with potential to occur in the State of Arizona. In addition, 14 federally endangered and 6 federally threatened plant species, including several species of cactus, are known to occur or with potential to occur in the State of Arizona (USFWS 2015).

3.5.2.2 Tucson International Airport

A vegetation survey was conducted at TUS during the Spring and Summer of 2017 as a part of the *Draft Environmental Impact Statement (EIS) for the Proposed Airfield Safety Enhancement Project* (FAA 2018). An additional vegetation survey was conducted in November 2017 at the request of the USFWS, also in support of the EIS. During the preparation of this EA, Amec Foster Wheeler conducted a focused vegetation survey covering 9 acres of TAA property – the proposed in-kind hangar replacement site (refer to Section 2.4.1, *Alternative 1: TAF F-16 FTU Relocation to Tucson International Airport*) – located immediately southwest of the ATC tower (Amec Foster Wheeler 2018a).

These surveys were used in conjunction with the USFWS Information, Planning, and Conservation System (IPaC) and the AGFD Online Environmental Review Tool to assess the potential for listed species and critical habitat at TUS and Tucson ANGB.

<u>Vegetation</u>

Vegetation communities in the vicinity of TUS consist of upland vegetation and bottomland vegetation communities. Upland vegetation communities in the vicinity include creosote – mesquite and mixed scrub, creosote – mixed scrub, foothills paloverde – creosote – mixed cacti – mixed scrub, desert broom – mixed shrub, fountain grass – mixed grasses, ornamental landscaping, and developed areas. The creosote – mesquite – mixed scrub association consists of fishhook barrel cactus (*Ferocactus wislizenii*) and several cholla species (*Cylindoputnia* spp.).

Locally common species within the creosote – mixed scrub association are fishhook barrel cactus, several cholla species, and ocotillo, as well as whitethorn (*Acacia constricta*) and catclaw acacia (*A. greggii*) along the ephemeral drainages. The foothills paloverde – creosote – mixed cacti – mixed scrub association consists of foothills paloverde, mesquite, and whitethorn acacia, saguaro, fishhook barrel cactus, hedgehog cactus (*Echinocereus engelmannii*), and chainfruit (*Cylindropuntia fulgida*) teddybear (*C. bigloveii*), cane (*C. spinosior*), and Christmas chollas (*C. leptocaulis*), creosote, triangle-leaf bursage (*Ambrosia deltoidea*), and shrubby coldenia (*Tiquilia canescens*). The desert broom – mixed shrub association occurs near drainages or where runoff accumulates and is dominated by dense patches of desert broom (*Baccharis sarothroides*). The fountain grass – mixed grasses association is dominated by buffelgrass (*Pennisetum ciliare*) but contains various proportions of other grasses.

Bottomland vegetation areas in the vicinity of TUS include mesquite – acacia – desert broom xeroriparian association and mixed exotic – native mesoriparian association. The mesquite – acacia – desert broom xeroriparian vegetation association occurs along drainages and is primarily mesquite interspersed with whitethorn acacia and desert broom to create dense mosaic patches. The dense mixed exotic – native mesoriparian association is a unique vegetation community that occurs in the manmade wash near the western edge of TUS. It contains many exotic and invasive species including salt cedar (*Tamarix ramosissima*), African sumac (*Rhus lancea*), fan palm, Mexican paloverde, and natives such as mesquite and western black willow (*Salix gooddingii*). Common riparian scrub species include mesquite, foothill paloverde, blue paloverde (*Parkinsonia florida*), whitethorn and catclaw acacia, desert hackberry, and canyon ragweed (*Ambrosia ambrosioides*) (FAA 2018).

Ornamental plants at TUS are primarily exotic and occur in landscaped areas around buildings. Most of these areas consist of Chilean mesquite (*Prosopis chilensis*), Mexican paloverde (*Parkinsonia aculeata*), fan palm (*Washingtonia* sp.), and a few native species such as mesquite and foothills paloverde. Developed areas at TUS are highly disturbed, and many areas are covered with gravel and other road bed material. Small forbs, shrubs and/or mixed grasses are locally dense; however, the vegetation is mowed in areas near the runways and between taxiways (FAA 2018).

Amec Foster Wheeler conducted a vegetation survey on 4 April 2018, which included 9 acres of TAA property located immediately southwest of the ATC tower (Amec Foster Wheeler 2018a). This undeveloped area consists of healthy creosote bush scrub. Creosote bush was the dominant plant species, although barrel cactus and cholla were also found throughout the property. The portion of the property within the TAA fenceline appears to have been subject to more disturbance, and has notably fewer cacti, but also has manmade drainage features that support species associated with desert riparian communities (Amec Foster Wheeler 2018a). A list of the observed species found during the pedestrian survey is provided in the TAA Vegetation Survey Report (see Appendix E).

Additionally, the 18 acres of TAA property identified to support the proposed Entry Control Facility (ECF) (refer to Section 2.4.1, *Alternative 1: TAF F-16 FTU Relocation to Tucson International Airport*) is heavily disturbed and developed. Much of this area has been paved and remaining unpaved lands are disturbed by vehicles and aircraft use. Sparse shrubs, mixed grasses, and weedy vegetation occur along the boundaries of this parcel.

Wildlife

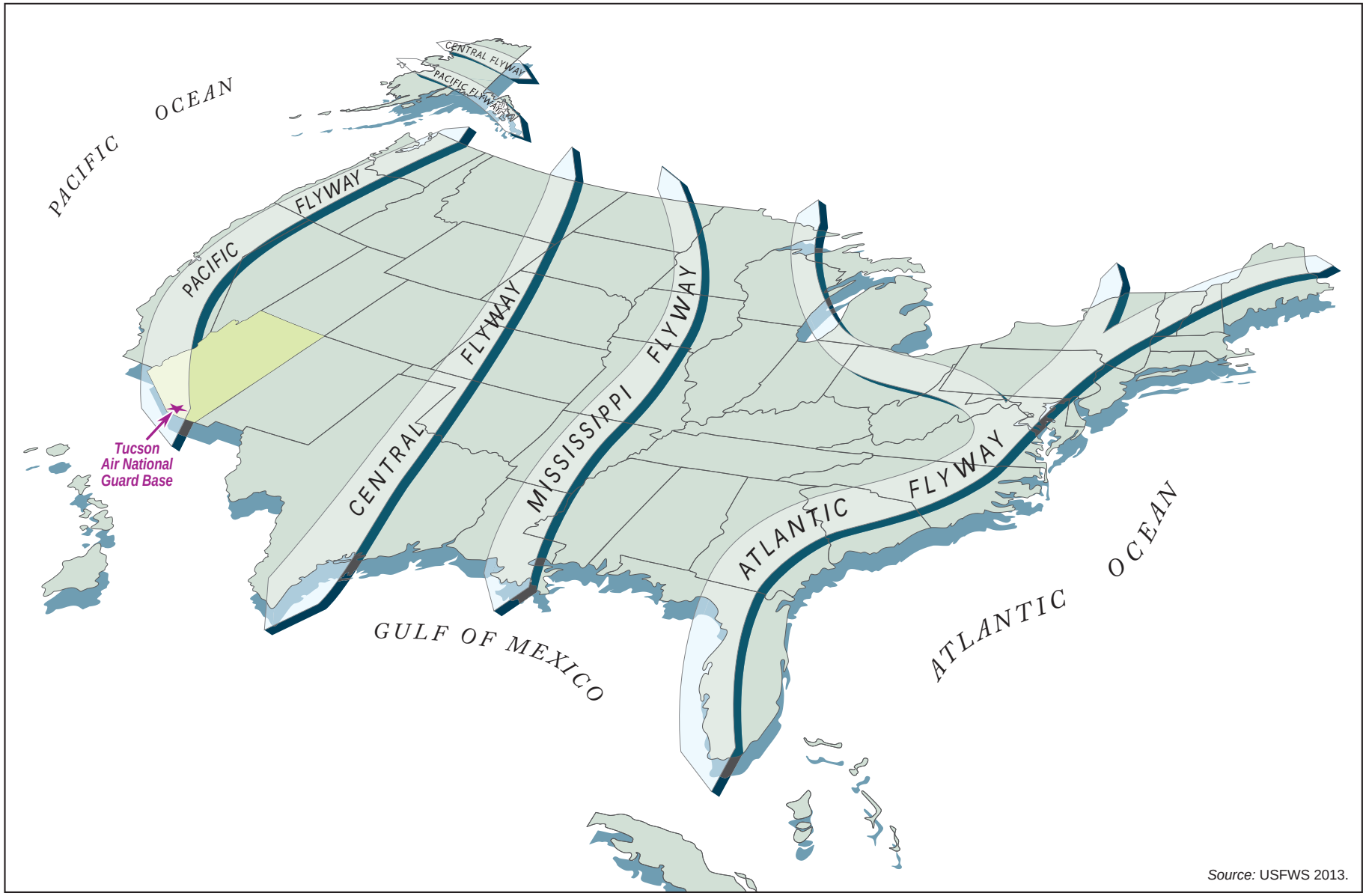
Mammals observed at TUS during field surveys for the *Draft EIS for the Proposed Airfield Safety Enhancement Project* include black-tailed jackrabbit (*Lepus californicus*), desert cottontail (*Sylvilagus auduboni*), badger (*Taxidea taxus*), coyote (*Canis latrans*), and javelina (*Tayassu tajacu*). Reptiles include coachwhip (*Masticophus flagellum*) and regal horned lizard (*Phrynosoma solare*). Birds observed during the surveys include the northern harrier (*Circus cyaneus*), lark bunting (*Calamospiza melanocorys*), white-crowned sparrow (*Zonotrichia leucophrys*), black-throated sparrow (*Amphispiza bilineata*), evidence (i.e., burrows with whitewash and bones) of burrowing owl (*Athene cunicularia*), common raven (*Corvus corax*), red-tailed hawk (*Buteo jamaicensis*), green-tailed towhee (*Pipilo chlorurus*), Gila woodpecker (*Melanerpes uropygialis*), loggerhead shrike (*Lanius ludovicianus*), verdin (*Auriparus flaviceps*), mourning dove (*Zenaida macroura*), Gambel's quail (*Callipepla gambelii*), horned lark (*Eremophila alpestris*), vesper sparrow (*Pooecetes gramineus*), and lesser nighthawk (*Chordeiles acutipennis*). Additionally, one nighthawk nest containing two eggs was observed.

In addition to these surveys conducted in support of the EIS, Amec Foster Wheeler's vegetation survey of the 9-acre TAA property included evidence of coyote (i.e., scat) and recorded observations of several other species, including black-tailed jackrabbit, rattlesnake, side-blotched lizard, and a number of birds and bird nests (Amec Foster Wheeler 2018a). A complete list of the species observed during this pedestrian survey is provided in the TAA Vegetation Survey Report (see Appendix E).

Migratory Birds

To date, monitoring efforts in the Sonoran Desert have documented eight priority species for Arizona Partners in Flight, a network of partner organizations dedicated to bird conservation. Identified species include Brewer's sparrow (*Spizella breweri*), Costa's hummingbird (*Calypte costae*), gilded flicker (*Colaptes chrysoides*), grasshopper sparrow (*Ammodramus savannarum*), Lucy's warbler (*Oreothlypis luciae*), purple martin (*Progne subis*), rufous-winged sparrow (*Peucaea carpalis*), and savannah sparrow (*Passerculus sandwichensis*). Brewer's, savannah, and grasshopper sparrows are wintering species in southern Arizona. Grasshopper sparrows also breed in the southeastern portion of Arizona, and likely occur only during the winter season within the vicinity of TUS. Costa's hummingbird and Lucy's warbler maintain breeding territories on TUS; both species are considered common Sonoran Desert breeders. The gilded flicker, purple martin, and rufous-winged sparrow may also breed in the area. Additionally, several grassland species (e.g., Brewer's sparrow, Cassin's sparrow, grasshopper sparrow, savannah sparrow, and western meadowlark) were observed and documented during field surveys conducted at TUS (FAA 2018).

The airport is located within the Pacific Migratory Flyway, so sporadic, short-term use by migratory bird species for rest and feeding is assumed to occur (see Figure 3-5). As shown in Table 3-9, three migratory bird species have been observed or have the potential to occur on TUS: cactus ferruginous pygmy-owl (*Glaucidium brasilianum cactorum*), western burrowing owl (*Athene cunicularia hypugaea*), and rufous-winged sparrow (*Aimophila carpalis*). However, vegetation at TUS is mowed regularly to discourage birds in order to avoid potential Bird/Wildlife Aircraft Strike Hazard (BASH) incidents (see Section 3.9, *Safety*). Therefore, the potential for these species to occur as residents on the airfield is low.



Source: USFWS 2013.

EA

Migratory Flyways over the United States

FIGURE 3-5

Special Status Species

The USFWS IPaC System and the AGFD Online Environmental Review Tool were used to determine whether any special status species, federally designated critical habitat, or other special management areas occur within the vicinity of TUS. Identified special status species with the potential to occur in the vicinity of TUS are shown in Table 3-9. During the 2017 field surveys conducted in support of the *Draft EIS for the Proposed Airfield Safety Enhancement Project*, the federally endangered Pima pineapple cactus (*Coryphantha robustispina*) as well as nine other native plant species protected under the AZDA Native Plant Law were observed and documented at TUS (see Table 3-9).

The 9 acres of TAA property surveyed during the Amec Foster Wheeler's most recent vegetation survey did not include any special status plant species. Additionally, no burrowing owls or potential burrows were observed during this survey (Amec Foster Wheeler 2018a).

3.5.2.3 Tucson Air National Guard Base

AFI 32-7064, which implements Department of Defense Instruction (DoDI) 4715.03, *Natural Resources Conservation Program*, and Air Force Policy Directive (AFPD) 32-70, *Environmental Quality*, establishes requirements for managing natural resources on USAF installations in accordance with applicable Federal, state, and local laws and regulations. Per AFI 32-7064, Tucson ANGB is considered a Category II installation and does not require preparation of an Integrated Natural Resources Management Plan (INRMP). The USAF defines Category II as lacking significant natural resources requiring conservation and management as defined by the Category I criteria, including: threatened and endangered species; permitted use of hunting, fishing, or other natural resources-based outdoor recreation activities (e.g. off-road vehicles); outgrants (i.e., leases, licenses, permits) for livestock grazing, crop production, or stable operations that allow horseback riding on unimproved lands; significant BASH issues; or important or unique biological resources such as wetlands or unique habitats that support wildlife protected by Federal or state law. Due to the absence of these significant natural resources, Tucson ANGB is exempt from the INRMP requirement and has an INRMP waiver.

Table 3-9. Special Status Species with the Potential to Occur at TUS

Common Name	Scientific Name	Federal Status	State Status	Pima County Code		Observed on TUS Property
				Section 18.72	Section 16.30	
Mammals						
Western red bat	*Lasiurus blossevillii*	-	-	PC	PC	-
Western yellow bat	*Lasiurus xanthinus*	-	-	PC	PC	-
Merriam's mouse	*Peromyscus merriami*	-	-	PC	PC	-
Reptiles						
Tucson shovel-nosed snake	*Chionactis occipitalus klauberi*	-	-	PC	PC	-
Birds						
Cactus ferruginous pygmy-owl	*Glaucidium brasilianum cactorum*	MBTA	-	PC	PC	-
Western burrowing owl	*Athene cunicularia hypugaea*	MBTA	-	PC	-	✓
Rufous-winged sparrow	*Aimophila carpalis*	MBTA	-	PC	PC	-
Plants						
Pima pineapple cactus	*Coryphantha scheeri* var. *robustispina*	FE	HS	PC	-	✓
Tumamoc globeberry	*Tumamoca macdougalii*	-	SR	PC	PC	-
Saguaro	*Carnegiea gigantea*	-	HS, SR	PC	-	✓
Chainfruit/jumping cholla	*Cylindropuntia fulgida*	-	SR	-	-	✓
Cane cholla	*Cylindropuntia imbricata*	-	SR	-	-	✓
Christmas cholla	*Cylindropuntia leptocaulis*	-	SR	-	-	✓
Fishhook barrel cactus	*Ferocactus wislizenii*	-	SR	PC	-	✓

Table 3-9. Special Status Species with the Potential to Occur at TUS (Continued)

Common Name	Scientific Name	Federal Status	State Status	Pima County Code		Observed on TUS Property
				Section 18.72	Section 16.30	
Ocotillo	*Fouquieria splendens*	-	SR	PC	-	✓
Long-spined prickly pear	*Opuntia macrocentra*	-	SR	-	-	✓
Littleleaf palo verde	*Parkinsonia microphylla*	-	SA	-	-	✓
Velvet mesquite	*Prosopis velutina*	-	SA, HR	PC	-	✓

Notes:
FE = Endangered
MBTA = Migratory Bird Treaty Act
HS = Highly Safeguarded under the Arizona Native Plant Law
SR = Salvage Restricted under the Arizona Native Plant Law
SA = Salvage Assessed under the Arizona Native Plant Law
HR = Harvest Restricted under the Arizona Native Plant Law
PC = Protected by Pima County Ordinances
Sources: AGFD 2017; Pima County 2016; USFWS 2017.

Vegetation

Tucson ANGB shares air support facilities (e.g., runways) and air support services (e.g., fire protection) with TUS. Development of the installation and the airport has removed much of the historic, native vegetative cover and replaced it with non-native landscaping. Additionally, current TAA management practices maintain an urban environment as a result of required airfield maintenance as well as management activities intended to minimize potential for bird/wildlife strikes.

Wildlife

A variety of mammals, birds, and reptiles are known to utilize habitat on and around Tucson ANGB. Due to the developed nature of the installation, wildlife found on Tucson ANGB consists primarily of small bird and mammal species, which are accustomed to human activity. Common species that are known to occur in the vicinity of Tucson ANGB are listed in Table 3-10. However, Tucson ANGB does not provide habitat suitable for long-term wildlife residence.

Special Status Species

As previously described, Tucson ANGB does not provide suitable habitat to support special status species given the abundance of urbanized/industrial development and the lack of native habitats, natural surface water features, or agricultural areas on the installation.

Table 3-10. Common Wildlife Species at Tucson ANGB and Vicinity

Common Name	Scientific Name
Mammals	
Coyote	*Canis latrans*
Desert mule deer	*Odocoileus hemionus crooki*
Collared peccary	*Tayassu tajacu*
Cactus mouse	*Peromyscus eremicus*
White-throated woodrat	*Neotoma albigula*
Round-tailed ground squirrel	*Spermophilus tereticaudus*
Black-tailed jackrabbit	*Lepus californicus*
Desert cottontail	*Sylvilagus audubonii*
Mexican free-tailed bat	*Tadarida brasiliensis*
Reptiles	
Western whiptail lizard	*Cnemidophorus tigris*
Side-blotched lizard	*Uta stansburiana*
Gopher snake	*Pituophis melanoeucus*
Desert spiny lizard	*Sceloporus magister*
Western diamondback rattlesnake	*Crotalus atrox*
Birds	
Gila woodpecker	*Melanerpes uropygialis*
European starling	*Sturnus vulgaris*
Cactus wren	*Campylorhynchus brunneicapillus*
Red-tailed hawk	*Buteo jamaicensis*
Burrowing owl	*Athene cunicularia*
Black-throated sparrow	*Amphispiza bilineata*
House finch	*Carpodacus mexicanus*
Phainopepla	*Phainopepla nitens*
Verdin	*Auriparus flaviceps*
Mockingbird	*Mimus polyglottus*
Mourning dove	*Zenaida macroura*
Roadrunner	*Geococcyx californicus*
Gambel's quail	*Callipepla gambelii*
Loggerhead shrike	*Lanius ludovicianus*

Source: Arizona ANG 2003.

3.6 TRANSPORTATION AND CIRCULATION

3.6.1 Definition of Resource

Transportation and circulation refer to the movement of vehicles throughout a road and highway network. Primary roads are principal arterials, such as major interstates, designed to move traffic and not necessarily to provide access to all adjacent areas. Secondary roads are arterials such as rural routes and major surface streets, which provide access to residential and commercial areas, hospitals, and schools.

3.6.2 Existing Conditions

3.6.2.1 Regional and Local Circulation

TUS is located in southeastern Arizona within Pima County. Two major interstate highways provide regional access to the airport, including I-19, located approximately 2 miles to the west, and I-10, located approximately 3.5 miles to the east, both of which extend north and intersect in downtown Tucson. Other major roadways providing regional access to TUS include South Nogales Highway, located approximately 0.5 miles east of the airport and South Tucson Boulevard, which feeds directly into the passenger pick-up and drop-off area at TUS. East Valencia Road, a divided east-west highway with three travel lanes in each direction, serves as the main thoroughfare for traffic enroute to TUS and surrounding local businesses (Arizona ANG 2018). Primary access to Tucson ANGB is currently provided by East Valencia Road, which connects TUS and Tucson ANGB to I-19 to the west and I-10 to the east. The annual average daily traffic count for the connecting portion of East Valencia Road was 47,400 vehicles per day in 2011 (Pima Association of Governments 2013).

3.6.2.2 Tucson Air National Guard Base

Installation Access

As previously described, the existing ECF is accessed directly from East Valencia Road. Vehicles entering Tucson ANGB from East Valencia Road must travel across

a short three-lane bridge that spans a manmade wash, before reaching the existing ECF. The ECF is located near the center of installation's northern boundary, approximately 120 feet from the intersection of East Valencia Road and Air Guard Way. Vehicle inspection occurs on the center outbound left-turn lane of the bridge, which is also used as a reversible lane to provide additional inbound vehicle processing during the morning peak period (i.e., 6:00 A.M. to 7:00 A.M.). The ECF also consists of an inbound identification and vehicle processing lane and an outbound lane.

During the morning peak period, generally one guard manually checks identification to process vehicles in the two inbound lanes. This is a slow process and vehicles requiring inspection are inspected in the center section of the bridge surrounded by traffic. Additionally, while East Valencia Road is equipped with left-hand turning lanes allowing westbound vehicles space for deceleration and queuing, there is no deceleration or queuing space for eastbound lane vehicles making a right-hand turn towards the ECF. As there is also no queuing capability on the bridge itself, most vehicles queue on East Valencia Road – a heavily trafficked civilian thoroughfare – during periods of heavy traffic.

Further, there are several AT/FP inconsistencies associated with the existing ECF at Tucson ANGB. The approach currently provides straight-line access to the installation, and is lacking a serpentine (i.e., S-shaped) roadway configuration necessary for vehicle slowing/denial. The gate area is so small that many commercial vehicles have difficulty maneuvering in and out of the installation. As such, rejected vehicles must proceed to the center of the installation before reaching a turnaround area. Additionally, visitors are required to pull past the gate into a pull-off area and then either are escorted to their destination or to obtain visitor badges. The pull-off area is large enough to accommodate two small vehicles. For the reasons listed above, the existing ECF does not comply with UFC 4-022-01, *Security Engineering, Entry Control Facility [ECF]/Access Control Point [ACP]*, UFC 4-010-01, *DoD Minimum Anti-terrorism Standards for Buildings*, and has failed previous Vulnerability Assessment Team inspections (Arizona ANG 2011a).

A secondary entrance is located at the intersection of South Park Avenue and East Super Sabre Drive on the eastern border of the installation. Access onto the installation from this secondary entrance is via East Super Sabre Drive.

Circulation

A network of roadways and access ways serve the installation. Entry to the installation is provided along Air Guard Way, which extends from the ECF to its intersection with Super Sabre Drive, which serves the southern portion of the installation. Perimeter Way provides access to the northwestern and northeastern portions of the installation. El Tigre Way also runs east-west and connects the two segments of Perimeter Way in the central area of the installation (Arizona ANG 2011a). Super Sabre Drive provides a connection from the installation's largest parking lot at the intersection with Air Guard Way to the second largest parking lot on the western border of the installation. The eastern portions of Perimeter Way and Super Sabre Drive, as well as El Tigre Way and Deuce Drive are considered the primary access routes of the installation, while the western portions of Perimeter Way and Super Sabre Drive provide secondary access.

Current vehicular circulation constraints at Tucson ANGB include inadequate turning radii for large trucks, an unclear hierarchy of streets, and a lack of separation between parking areas and roadways. The circulation system also includes few sidewalks, and in most parts of the installation, pedestrians and bicyclists must use roads or parking areas, resulting in potential safety issues (Arizona ANG 2011a).

Parking

There are currently two large parking lots south of Super Sabre Drive, while parking is dispersed and surrounds the buildings on the northern half of the installation. The USAF has established guidelines intended to ensure that adequate parking is available at USAF and ANG facilities. According to these guidelines, the ratio of available parking spaces to personnel should be no less than 0.75 spaces per person. As described in Section 2.4.1, *Alternative 1: TAF F-16 FTU Relocation to Tucson International Airport*, total personnel strength associated with the 162 WG is approximately 1,900, which equates to a requirement of 1,425 spaces. According to the 2011 IDP, the installation has a total of 1,465 privately owned vehicle (POV) parking spaces throughout the installation, with spaces concentrated in the central and southern portions of the installation. These parking spaces serve personnel at the installation, reaching a parking ratio of

approximately 0.77 spaces per person, which exceeds the USAF requirement of 0.75 spaces per person. However, as discussed in Section 3.9, *Safety*, approximately 396 POV parking spaces at Tucson ANGB do not meet current AT/FP standoff requirements. In particular, Building 1 and Building 40, two primary gathering buildings that would be affected by the Proposed Action, do not meet vehicular standoff distances to the north, west, and south of the buildings (Arizona ANG 2011a).

3.7 CULTURAL RESOURCES

3.7.1 Definition of Resource

Cultural resources represent and document activities, accomplishments, and traditions of previous civilizations and link current and former inhabitants of an area. Depending on their conditions and historic use, these resources may provide insight to living conditions in previous civilizations and may retain cultural and religious significance to modern groups.

Archaeological resources comprise areas where prehistoric or historic activity measurably altered the environment or deposits of physical remains (e.g., lithic materials, ceramics, historic refuse) discovered therein. Architectural resources include standing buildings, districts, bridges, dams, and other structures of historic or aesthetic significance. Architectural resources generally must be more than 50 years old to be considered for inclusion in the National Register of Historic Places (NRHP), an inventory of culturally significant resources identified in the U.S. More recent structures, such as Cold War-era resources, may also warrant protection if they have the potential to gain significance in the future. Traditional cultural resources can include archaeological resources, structures, neighborhoods, prominent topographic features, habitats, plants, wildlife, and minerals that Native Americans or other groups consider essential for the persistence of traditional culture.

The principal Federal law addressing cultural resources is the National Historic Preservation Act (NHPA) of 1966, as amended (54 U.S. Code [USC] §§30010 et seq.), and its implementing regulations (36 CFR Part 800). Compliance with these regulations, commonly referred to as the Section 106 process, involves identifying and evaluating historic or potentially historic properties; assessing the effects of Federal actions on historic properties; and consulting to avoid, reduce, or minimize adverse effects. As part of the Section 106 process, agencies are required to consult with the State Historic Preservation Office (SHPO). In response to the NHPA, the State of Arizona established the State Historic Preservation Act (SHPA) in 1982 to protect cultural resources from the activities of state agencies.

The term "historic properties" refers to cultural resources that meet specific criteria for eligibility for listing on the NRHP; historic properties need not be formally listed on the NRHP. According to the *National Register Bulletin #15, How to Apply the National Register Criteria for Evaluation,* historical significance is assigned to a property based on its association with individuals or events significant in local, state, or national history (Criterion A and B); its ability to embody the distinctive characteristics of a type, period, or method of construction (Criterion C); or its potential to yield information important to prehistory or history (Criterion D). Properties less than 50 years of age must possess exceptional historical importance to be included on the NRHP (Criteria Consideration G). Section 106 of the NHPA does not require the preservation of historic properties, but ensures that the decisions of Federal agencies concerning the treatment of these places result from meaningful considerations of cultural and historic values and of the options available to protect the properties. The Proposed Action is an undertaking as defined by 36 CFR §800.3 and is subject to requirements outlined in Section 106.

DoDI 4710.02, *Department of Defense Interactions with Federally Recognized Tribes* governs DoD's interactions with federally recognized tribes. The policy outlines DoD trust obligations, communication procedures with tribes on a government-to-government basis, consultation protocols, and actions to recognize and respect the significance that tribes ascribe to certain natural resources and properties of traditional cultural or religious importance. The policy requires consultation with federally recognized tribes for proposed activities that could significantly affect tribal resources or interests.

3.7.2 Existing Conditions

3.7.2.1 Regional History

The periods of cultural significance for the Tucson Basin include the following: Paleoindian (10,000-8,500 B.C.), Archaic (8,500-1,700 B.C.), Early Agricultural (1,700 B.C.- A.D. 150), Early Ceramic (A.D. 150-650), and Hohokam (A.D. 650-1450).

The Paleoindian Period (10,000–8,500 B.C.) has been characterized by evidence of mobile groups of hunter-gatherers who occupied temporary camps as they moved across the landscape in small groups hunting megafauna in conditions that were both wetter and cooler than today (Cordell 1997). Ruelas Canyon is the only known Early Archaic site in the Tucson Basin, located at the south side of the Tortolita Mountains (Thiel 2005). The Early Archaic is characterized by frequent milling stones and flaked stone tools in the Cazador Stage (O'Mack and Klucas 2004). The Early Agricultural Period (1,700 B.C. –A.D. 150) was formerly known as the Late Archaic period, but was changed for clarity due to the substantial occurrence agriculture during this time. By 400 B.C. groups were living in substantial agricultural settlements along the Santa Cruz River. All excavated sites in the Tucson Basin from this period have small pithouses with internal storage pits, including some larger structures that may have been used for communal or ritual purposes. The Early Ceramic Period (A.D. 150–650), named for the widespread use of ceramic containers, is characterized by increased reliance on agricultural and associated decreased mobility and more substantial and formalized architecture. Records from this period demonstrate a greater variety of cultigens, including maize, beans, cotton, agave, and squash. Architecture during the Hohokam Period (A.D. 650–1450) is represented by formalized pithouse courtyard groupings, which are in turn part of larger villages with individual roasting areas and cemeteries. Expanded irrigation canal systems, construction of ball courts and platform mounds demonstrate social organization and a significant expenditure of organized labor. By the end of the Hohokam Period most populations abandoned smaller sites and aggregated into a handful of large settlements, which may be linked to increased conflict and/or warfare. By A.D. 1450 the Hohokam tradition disappears from the archaeological record (Thiel 2005).

3.7.2.2 History of Development at Tucson Air National Guard Base

The 162 WG originated as the 152d Fighter Interceptor Squadron (152 FIS), which was derived from the 152d Observation Squadron, established in Rhode Island on 13 October 1939. The 152 FIS and was later transferred to Tucson, Arizona as part of the Arizona ANG (Glady 1971). The 152 FIS initially occupied an old hangar; a farmhouse, which was converted to offices; and tents at the Tucson Municipal Airport until permanent facilities were constructed in September 1958 (Glady

1971). The installation included a hangar and annex (Building 9), squadron headquarters (which was later demolished), base supply warehouse (Building 5), motor pool (Building 27), fire station (now part of Building 33), two rocket storage sheds (one of which was demolished, the other which is now identified as Building 41), a paint storage shed (which was later demolished), a pump house, a 200,000-gallon water tank and well house (Building 19), and four underground fuel storage tanks. A bridge was also constructed to span the manmade wash that borders the north edge of the property.

In 1958, the 162d Tactical Fighter Group (162 TFG) was assigned to the Air Defense Command runway alert program (Cullen 2006), which was federally recognized on 25 June 1958 (Glady 1971). The 152 FIS constituted the flying squadron of the 162 TFG. The alert mission and reorganization to group status more than doubled the authorized personnel strength of the 162 TFG. The installation also grew in response to these changes, as new facilities were added. Munitions storage (Building 29), an engine shop (Building 33), and a maintenance facility (Building 21) were constructed.

In 1969, the unit was placed under the Tactical Air Command and became a fighter pilot training group. The 162 TFG was re-equipped with F-100s and trained active duty and air guardsmen pilots who were flying this aircraft. The 162 TFG ran the only F-100 training program in the USAF or ANG, providing both flying and maintenance training (Arizona Military Department 1973). Despite the change in mission to combat fighter pilot training, no new buildings or structures were constructed on the Tucson ANGB in the 1970s. Nevertheless, several existing buildings, such as supply and armament (Building 5), the engine shop (Building 33), and maintenance (Building 21), were renovated and enlarged with additions, and various functions were relocated to different facilities.

Beginning in 1989, the 162 TFG began a new mission training F-16 pilots from ally countries (Cullen 2006). Fighter pilots from the Netherlands were the first to matriculate in the F-16 International Military Training (IMT) Program (Arizona ANG 2009). Throughout the 1990s and early 2000s, several nations sent their F-16 fighter pilots to Tucson to train with the 162 TFG, which was designated as the 162d Fighter Wing (162 FW) in 1995 (Arizona ANG 2009). Since the inception of the IMT Program, more than 700 F-16 pilots from 21 countries, including

Belgium, Portugal, Chile, Morocco, Israel, Japan, Taiwan, and Singapore have trained at Tucson ANGB (Arizona ANG 2009; Cullen 2006).

Several major facilities were constructed at the Tucson ANGB as a result of the arrival of the F-16s and the establishment of the F-16 IMT Program, including the composite squadron operations and academic training facility (Building 44) in 1983. In 1987, an aerospace ground equipment (AGE) shop (Building 28) and Avionics (Building 49) were added to the installation. Three major facilities were completed in 1989: a machine and welding shop (Building 32), jet engine maintenance shop (Building 34), and corrosion control (Building 35). Today, the 162 WG includes more than 1,400 military personnel in its three flying squadrons including the Royal Netherlands Air Force (148 FS), Iraqi Air Force (125 FS Det 1), and the 195 FS as well as numerous mission support, maintenance, and medical units (Arizona ANG 2009).

3.7.2.3 Cultural Resources at Tucson Air National Guard Base

In accordance with DoDI 4715.16, *Cultural Resources Management* and AFI 32-7065, *Cultural Resources Management*, an installation may request a waiver for exemption from preparation and implementation of an Integrated Cultural Resources Management Plan (ICRMP) provided that:

a. The absence of cultural resources on an installation must be confirmed by a professionally-prepared Cultural Resources Survey (CRS).
b. The CRS must be coordinated with and reviewed by the ANG Cultural Resources Program, Plans and Requirements Branch.
c. The CRS must be concurred upon (or agreed to) by the appropriate SHPO and Tribal Historic Preservation Office (THPO), if required.

A CRS completed for the three NGB installations in Arizona found no historic and/or archaeological resources at Tucson ANGB (Arizona ANG 2011b). The Arizona SHPO concurred with the CRS's finding of no historic properties present in a letter dated 21 December 2010 (Arizona SHPO 2010). Therefore, the NGB issued an ICRMP waiver to the 162 WG at Tucson ANGB, with a period of validity between 1 April 2018 and 31 March 2023 (NGB 2012). (It should be noted that the

ICRMP wavier is only applicable to Tucson ANGB lands represented in the CRS, and does not apply to new real estate activities or geographically separate units managed by the 162 WG.) As such, the 2011 CRS did not evaluate the 18-acre TAA property identified to support development of the proposed ECF or the 9-acre TAA property for the in-kind replacement of the Aerovation Hangar.

Archaeological Resources at Tucson ANGB

As part of the statewide CRS, an intensive surface archaeological survey was conducted at the Tucson ANGB facilities on 20 July 2010. The archaeological study included review of online databases for sites within 1 mile of the installation, as well as review of Arizona site forms, the NRHP, and U.S. Geological Survey topographic maps. The only undeveloped space remaining at Tucson ANGB is a manmade wash that wraps around the north and east sides of the installation. At the request of the Arizona SHPO, this potentially undisturbed area was included in the archaeological survey. However, no archaeological resources were encountered during the archaeological inventory at Tucson ANGB, including the previously undisturbed section of the wash.

Archaeological Resources on Tucson International Airport Property

A *Class III Cultural Resources Investigation of 704 Acres at the Tucson International Airport in Support of Proposed Runway 11R/29L Relocation* (FAA 2007) included the 9-acre replacement Aerovation Hangar area. No archaeological resources were observed in this area during the investigation. The 2007 cultural resources investigation did not include the 18-acre TAA property for the proposed ECF; however, this area has been extensively disturbed during previous grading and construction activities for the three existing facilities at the site. Therefore, the potential for unknown buried archaeological resources in this area is low.

Historic Resources at Tucson ANGB

In addition to the archaeological survey completed in July 2010 at the Tucson ANGB as part of the CRS for the Arizona ANG installations, an architectural survey was also conducted. The architectural survey involved inventorying and evaluating all above-ground resources built before the end of

the Cold War (i.e., before 1990). The surveyed resources were photographed and recorded on Arizona Historic Property Inventory forms and evaluated for NRHP eligibility. Archival and historical research was also conducted during the survey. The 162 WG currently owns and operates 43 buildings, structures, and objects and maintains 6 static aircraft displays (Arizona ANG 2011b). Tucson ANGB as a whole was determined not to constitute a significant Cold War Asset under NRHP criteria. The architectural survey evaluated 20 buildings, 1 structure (a bridge), and 1 object (a memorial) at Tucson ANGB, all of which were constructed before 1990. Table 3-11 provides a summary of the facilities that were evaluated in the survey, none of which were considered to meet NRHP eligibility criteria. The remaining built resources not evaluated in the architectural survey were built after 1990. Thus, these buildings are less than 50 years old, have no associations with the Cold War-era, and are not eligible for listing on the NRHP. The Arizona SHPO has concurred on all status evaluations as of 11 February 2011 (see Appendix C).

Historic Resources on Tucson International Airport Property

An additional historic architectural survey was conducted by Amec Foster Wheeler in March 2018 for the 18-acre TAA property for the proposed ECF, which currently includes two unoccupied buildings (i.e., warehouse and support facility) and the Aerovation Hangar (Amec Foster Wheeler 2018b). The three facilities, which date from 1953 to 1968, were constructed for Hamilton Aviation and were considered secondary structures to a larger facility. As such, these buildings do not hold exceptional significance in relation to Hamilton Aviation, nor is there evidence that suggests that a specific event occurred in association with any of the three facilities. The three facilities are not unique, and represent typical industrial buildings that can be found on a number of airfields throughout the region and across the country, meaning they lack architectural significance. Further, all three facilities have been altered following their original construction and therefore lack material integrity. The three facilities do not yield or have the potential to yield additional information regarding the history of the site (Amec Foster Wheeler 2018b). Consequently, these three facilities have been recommended as not eligible for the NRHP (see Appendix F). The Arizona SHPO was consulted under Section 106 of the NHPA and concurred that the three historic-age facilities (i.e., warehouse, support facility, Aerovation Hangar) are not eligible for inclusion on the NRHP in a letter dated 18 May 2018.

Table 3-11. Facilities Evaluated for NRHP Eligibility at Tucson ANGB

Building Number	Date Constructed	Description/Use at Time of Evaluation	Status	SHPO Concurrence
1	1966	Operations and Training	Not eligible	✓
5	1958	Dining Hall	Not eligible	✓
6	1986	Storage	Not eligible	✓
9	1958	Warehouse and Vehicle Maintenance	Not eligible	✓
15	ca. 1943	Recreation	Not eligible	✓
19	1958; ca. 1988-1993	Valve House	Not eligible	✓
20	1989	Administrative (Recruiting)	Not eligible	✓
21	1960	Administrative (Base Civil Engineering)	Not eligible	✓
22	1981	Storage (Grounds Maintenance)	Not eligible	✓
27	1958	Munitions Support	Not eligible	✓
28	1987	Operations (Disaster Preparedness)	Not eligible	✓
29	1961	Munitions Storage	Not eligible	✓
32	1989	Equipment Shop	Not eligible	✓
33	1960	Weapons/Release Systems Shop	Not eligible	✓
34	1989	Jet Engine Maintenance Shop	Not eligible	✓
35	1989	Maintenance Shop	Not eligible	✓
40	1959	Squadron Operations	Not eligible	✓
41	1958	Munitions Shop	Not eligible	✓
44	1983	Operations and Training	Not eligible	✓
49	1987	Avionics	Not eligible	✓
86	1978	Monument/Memorial	Not eligible	✓
91	1958; 1959	Vehicular Bridge	Not eligible	✓

Source: Arizona ANG 2011a.

3.7.2.4 Federally Recognized Native American Tribes

As previously described, the relevant federally recognized tribes within the State of Arizona were notified of the Proposed Action and consulted as required by AFI 90-2002, which implements DoDI 4710.02, DoD *Interactions with Federally-Recognized Tribes*, as a part of the tribal coordination process associated with this

EA (see Appendix B). See Section 4.7.2, *Federally Recognized Tribes*, for a detailed description of the tribal consultation efforts conducted for this EA.

- Ak-Chin Indian Community
- Cocopah Indian Tribe
- Colorado River Indian Tribes
- Fort McDowell Yavapai Nation
- Fort Yuma-Quechan Tribe
- Gila River Indian Community
- Havasupai Tribe
- Hopi Cultural Preservation Office
- Hualapai Tribe
- Kaibab-Paiute Tribe
- Navajo Nation
- Pascua Yaqui Tribe
- Salt River Pima-Maricopa Indian Community
- San Carlos Apache Tribe
- San Juan Southern Paiute Tribe
- Tohono O'odham Nation
- Tonto Apache Tribe
- White Mountain Apache Tribe
- Yavapai-Apache Nation
- Yavapai-Prescott Indian Tribe

3.8 HAZARDOUS MATERIALS AND WASTES

3.8.1 Definition of Resource

Hazardous materials are defined as substances with strong physical properties of ignitability, corrosivity, reactivity, or toxicity, which may cause an increase in mortality, a serious irreversible illness, incapacitating reversible illness, or pose a substantial threat to human health or the environment. Hazardous wastes are defined as any solid, liquid, contained gaseous, or semisolid waste, or any combination of wastes, which pose a substantial present or potential hazard to human health or the environment.

Issues associated with hazardous materials and wastes typically center around underground storage tanks (USTs); aboveground storage tanks (ASTs); and the storage, transport, and use of pesticides, bulk fuel, and POL. When such resources are improperly handled, they can threaten the health and well-being of wildlife species, botanical habitats, soil systems, water resources, and people.

To protect habitats and people from inadvertent and potentially harmful releases of hazardous substances, DoD has dictated that all facilities develop and implement *Hazardous Waste Management Plans* and *Spill Prevention and Response Plans*. Also, DoD has developed the Environmental Restoration Program (ERP), intended to facilitate thorough investigation and cleanup of contaminated sites located at military installations. These plans and programs, in addition to established legislation (e.g., the Comprehensive Environmental Response, Compensation, and Liability Act [CERCLA] and Resource Conservation and Recovery Act [RCRA]) effectively form the "safety net" intended to protect the ecosystems on which most living organisms depend.

3.8.2 Existing Conditions

3.8.2.1 Hazardous Materials and Wastes

The 162 WG currently uses and stores hazardous materials and generates and stores hazardous wastes associated with daily operations during maintenance and operation of ground support equipment and facilities. Hazardous waste is

managed under the 162 WG Hazardous Waste Management Plan (HWMP) (Arizona ANG 2013), in accordance with all Federal, state, and local regulations. The installation is currently defined as a hazardous waste Small Quantity Generator (SQG) pursuant to 40 CFR Part 261 because the installation generates between 100 and 1,000 kilograms (approximately 220 to 2,200 pounds) per month and maintains USEPA Identification Number AZ9573124055 (Arizona ANG 2013). Hazardous materials frequently used at the installation include fuel, oil, solvents, detergent/cleaners, paint, and lubricants. Hazardous wastes generated at the installation include excess solder, lead-acid batteries, waste fuel, solvents, used oil, waste sealants, adhesives, paints, and other wastes (Arizona ANG 2013). The 162 WG is also a small quantity handler of universal waste. Universal waste consists of materials that are more easily managed and less costly to dispose of including, used batteries, pesticides, mercury containing equipment, and lamps.

The maximum size of a non-bulk hazardous waste container is 119 gallons or 882 pounds; however, hazardous wastes are generally stored in labeled 55-gallon containers within satellite accumulation points (SAPs) where the wastes are generated. A single container is considered full at 90 percent capacity, or at 50 gallons for a 55-gallon container, at which time it must be moved to a centralized accumulation point (CAP). Transfer of a container from a SAP to a CAP must take place within 72 hours after the container has been declared full. Alternately, waste may accumulate at a SAP for a maximum of 1 year if the appropriate quantity has not been reached, after which it must be moved to a CAP. USEPA regulations permit a SQG to accumulate hazardous wastes in CAPs up to 180 days after accumulation start date (or up to 270 days under certain conditions) (Arizona ANG 2013). Tucson ANGB maintains one CAP for hazardous waste at the installation located at Building 9 (Southeast Storage Yard). Additionally, there are eight SAPs throughout the installation. The 162 WG does not utilize tanks to store hazardous waste, or export hazardous waste outside the U.S.

According to the 2006 Environmental Baseline Survey (EBS), two spills were recorded within the last 5 years at Tucson ANGB. One release of approximately 150 gallons of motor oil occurred in December 2000 and was contained to an impervious surface and remediated. In April 2004, approximately 150 gallons of Jet Propellant 8 (JP-8) was released from an aircraft near Building 34. The jet fuel entered a storm drain and was released into the manmade wash along the

northern boundary of the installation. Subsequent sampling revealed that there was minimal impact to the sediment in the airport wash and no contamination was detected at levels above ADEQ Residential Soil Remediation Levels (SRLs).

Additionally, a Phase II EBS was conducted in June 2014 on the 18-acre TAA property for the proposed ECF (Arizona ANG 2014). The EBS included a visual site inspection, surface and subsurface soil sampling, and a lead-based paint and asbestos survey. The property has been historically (i.e., since at least 1950) been used for various aircraft and vehicle maintenance-related activities. Consequently, VOCs, semi-VOCs, polynuclear aromatic hydrocarbons, lead, and Total Petroleum Hydrocarbons were detected on the site. However, none of the detected concentrations exceeded the ADEQ Residential or Non-Residential SRLs. No follow-up surface or subsurface soil sampling was recommended during the Phase II EBS (Arizona ANG 2014).

3.8.2.2 Fuel Storage Tanks

There are two 200,000-gallon ASTs within Tucson ANGB that are used to store JP-8 jet fuel. Additionally, twelve R-11 refueler vehicles and one C300 tanker are used to transport JP-8 jet fuel from the four existing fuel stands located near the ASTs to aircraft on the apron. Each R-11 is capable of transporting 6,000 gallons of jet fuel (Arizona ANG 2011a).

3.8.2.3 Environmental Restoration Program and Site Contamination

Tucson ANGB is located within the boundaries of contamination from the TUS Area Superfund Site, designated on the USEPA National Priorities List (NPL). The site is believed to be caused by waste-related activities beginning in 1942 associated with the development of airplane refitting operations at the present-day location of the Tucson Aviation Center. These activities led to VOC (primarily trichloroethylene and hexavalent chromium) contamination across the 15,360-acre TUS Area Site. The site encompasses TUS, Air Force Plant #44, portions of the San Xavier Indian Reservation, and residential areas of South Tucson west of the airport. As the TUS Area Superfund Site covers such a large area, the site consists of seven separate project areas (USEPA 2018d). Tucson ANGB is located within

Site B, which extends from the existing northwestern boundary of the installation across the maintenance facilities and aircraft sunshades to east of Runway 03/21.

To establish procedures and protocols for groundwater remediation at the installation property, a Federal Facility Agreement was signed by the ANG, USEPA Region IX, and ADEQ on 30 December 1994. Under this agreement, USEPA agreed to transfer the lead responsibility for the groundwater remediation relating to the installation property to the Arizona ANG. A total of 40 groundwater monitoring wells, as well as groundwater pumping and treatment systems, were constructed and are operational within the installation boundary. Nine groundwater extraction wells, six piezometers, and five recharge wells were installed on the installation property as part of the Groundwater Extraction, Treatment, and Recharge Systems (GWETRS), which began operation on 15 May 1997 (Arizona ANG 2011a). Cleanup, operation and maintenance activities, and monitoring are ongoing (USEPA 2018d).

The ERP was developed by the DoD to identify and address environmental contamination from past military operations. Future development of sites identified through the ERP program may be constrained depending on the severity of the contamination or the extent of the remedial action required. The overall objective of the ERP is to identify potential environmental issue areas and provide timely remedies to protect the public health and environment. In addition to the Superfund Site at Tucson ANGB, the installation has eight ERP sites, as identified by the 2006 EBS (Arizona ANG 2006). ERP Site 5 has been approved as closed by the ADEQ and USEPA, and the remaining sites have been recommended for No Further Action (NFA). ERFP Sites 5 and 7 have been recommended NFA for soils; however, groundwater contamination from the TUS Area Superfund Site has been detected at these sites and is currently being addressed on an installation-wide basis by the GWETRS. A summary of the ERP sites and their status is provided in Table 3-12 below. Figure 3-6 identifies the locations of contamination sites on Tucson ANGB.

Table 3-12. Summary of ERP Sites at Tucson ANGB

Site Number	Site Name	Materials Released	Active Dates	Characteristics
1	Fire Training Area	Solvents, oil, Jet Propellant 4 (JP-4) jet fuel	1950s-1965	PA, SI and RI completed; RI recommended NFA
2	Solvent Dumping Area – East Fenceline	POLs, waste trichloroethene, Petroleum Distillate-680, solvents	1950-1972	PA and RI completed; RI recommended NFA
3	Storm Drain Discharge Point – Gatehouse	POLs, waste trichloroethene, Petroleum Distillate-680	1959-1985	PA and RI completed; RI recommended NFA
4	Base Parking Lot – West-side	POLs, and solvents	1950-1980	PA, RI, and FFS completed; RI recommended NFA for soils; groundwater to be addressed on installation-wide basis
5	Old Washrack Area	POLs, waste trichloroethene, Petroleum Distillate-680, tetrachloroethylene	1959-1985	PA, RI, FFS, ROD, RD, RA, completed; soils closure approved by ADEQ and USEPA; groundwater to be addressed on installation-wide basis
6	Solvent Dumping Area	Waste trichloroethene	1950-1977	PA and RI completed; RI recommended NFA
7	Edges of Aircraft Parking Apron	POLs, waste trichloroethene, Petroleum Distillate-680, solvents, JP-4 jet fuel	1959-1985	PA and RI completed; RI recommended NFA for soils; groundwater to be addressed on installation-wide basis
8	POL Area	POLs, JP-4 jet fuel	Present	PA and RI completed; RI recommended NFA

Source: AZANG 2006; Environmental Resources Management 1999.
Acronyms:
PA - Preliminary Assessment
RD - Remedial Design
NFA - No Further Action
SI - Site Investigation
RA - Remedial Action
RI - Remedial Investigation
ROD - Record of Decision
FFS- Focused Feasibility Study

3.8.2.4 Asbestos and Lead-Based Paint

AFI 32-1052, *Facility Asbestos Management*, establishes requirements and assigns responsibilities to incorporate facility asbestos management principles and practices. Installations must remove asbestos-containing material (ACM) likely to release airborne asbestos fibers that cannot be reliably maintained, repaired, or isolated. All facilities must be closely monitored to ensure ACM does not become airborne and each installation must develop a written management and operating plan to carry out the objectives of facility asbestos management. Asbestos surveys for the 162 WG were performed in 1994 and 2002, and are updated continuously as ACM is abated. Table 3-13 presents the current location of ACM at Tucson ANGB (Arizona ANG 2006).

Table 3-13. Buildings Identified with ACM at Tucson ANGB

Building	Location	ACM Type	Action
1	Men's Room Mechanical Room	Floor tile Mastic Water fitting	None – non-friable None – non-friable Maintain in place
9	NW Corner of Building Mechanical Room #4	Exterior paint Heating system fitting	None – non-friable Maintain in place
33	Mechanical Room #4 Office	Heating system fitting Floor tile	Maintain in place None – non-friable

Sources: ANG Civil Engineering Technical Services Center 1994; AZANG 2006.

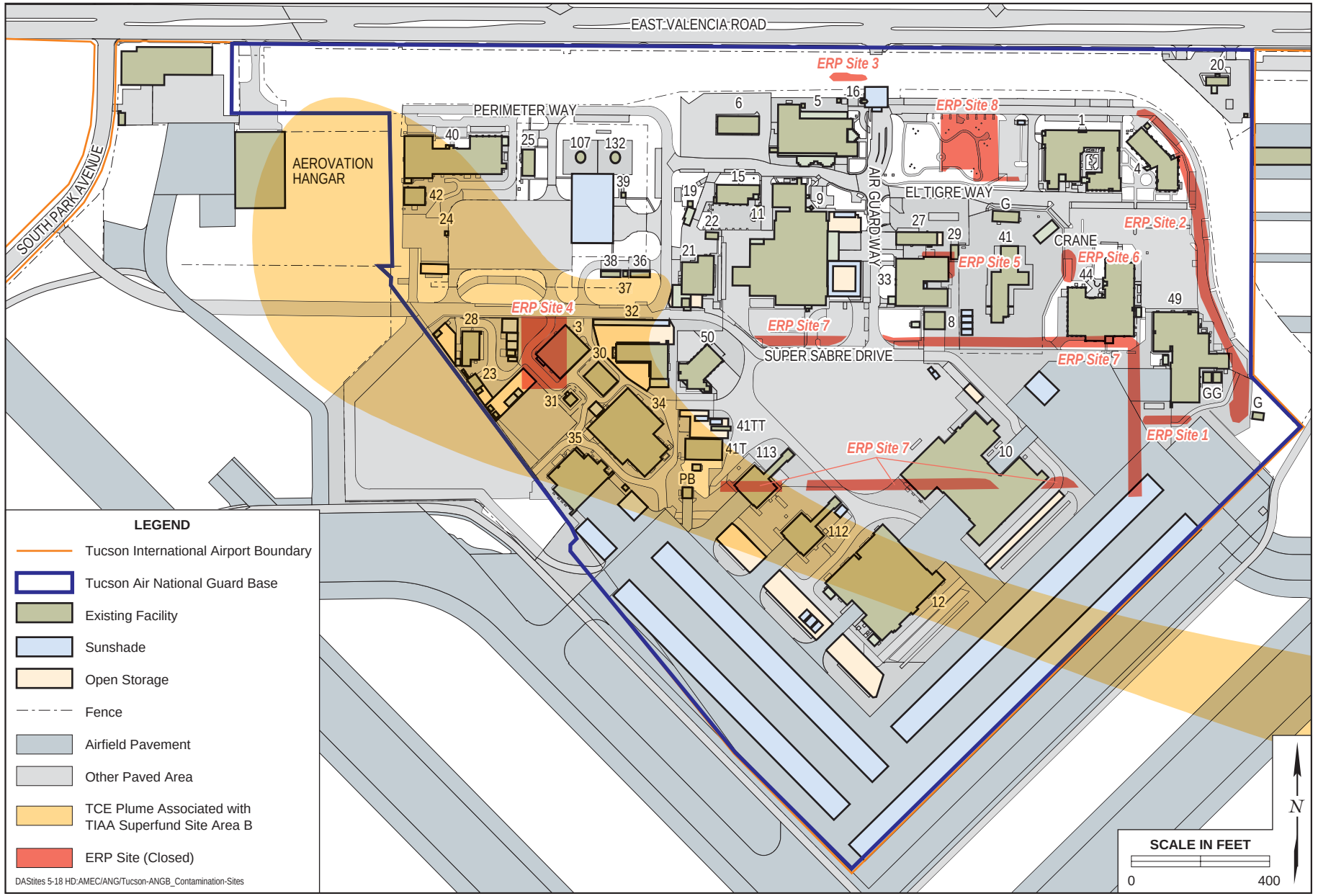
During the 2014 Phase II EBS conducted on the 18-acre TAA property for the proposed ECF, Chrysotile asbestos was observed in concentrations of 1 percent and above in 25 of the 122 building material samples collected from the warehouse and the support building (Arizona ANG 2014). Due to the concentrations of asbestos above 1 percent, building materials at the warehouse and support building must be treated as ACM.

While lead-based paint (LBP) surveys have not been conducted at the installation (Arizona ANG 2006), the 2014 Phase II EBS collected and tested samples for LBP. Samples collected from the TAA property did not contain concentrations above the 5 milligrams per liter threshold (Arizona ANG 2014). Most of the built resources on Tucson ANGB are painted and this paint is considered to be in good

condition. However, all buildings on the installation constructed prior to 1978 are presumed to contain LBP and are tested for LBP prior to demolition or interior renovation.

3.8.2.5 Pesticides

Limited applications of pesticides and herbicides around the installation are performed by installation pesticide shop personnel in civil engineering, who are certified or who operate under the supervision of a certified applicator. Most applications are conducted on an "as needed" basis, as opposed to routine application. A variety of herbicides and pesticides (e.g., Dursban Pro, Round-up, Raid Ant Bait, boric acid, Combat) are used for maintenance within the installation and are usually stored in storage cabinets in the pesticide shop (Building 22). No significant spills or releases of pesticides/herbicides have been reported on the installation and environmental investigations conducted at the installation did not identify any releases with respect to historic pesticide/herbicide storage, application, or disposal.



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Contamination Sites at Tucson Air National Guard Base

FIGURE 3-6

3.9 SAFETY

3.9.1 Definition of Resource

The primary concern with regard to military training flights is the potential for aircraft mishaps (i.e., crashes), which may be caused by mid-air collisions with other aircraft or objects, weather difficulties, or bird-aircraft strikes. With regard to planning, airfield safety criteria are important in the siting of proposed development for expansion of facilities. For example, airfield setback zones are identified to limit vertical height of buildings based on their proximity to runways. Areas closest in proximity to runways are restricted to any building construction.

The DoD has developed AT/FP standards which are designed to reduce the likelihood of mass casualties from potential terrorist attacks. UFC 4-010-01, *DoD Minimum Anti-Terrorism Standards for Buildings*, and the 9 February 2012 update (UFC 4-010-02) outline various planning, construction, and operational standards to address potential terrorist threats. A key element of the AT/FP standards is the establishment of minimum setbacks and other security standoffs between mass gathering facilities and potentially non-secure adjacent uses (e.g., parking lots, areas outside of security fences, etc.). AT/FP setbacks typically extend outward from the sides and corners of facilities for a prescribed distance (e.g., 45 meters); and development is either limited or altogether prohibited in such setback areas. Additional AT/FP standards address other facility design and operational considerations, including internal building layout, facility access and security, site circulation, and emergency mass notification.

Siting requirements for explosive materials storage (e.g., munitions) and handling facilities are based on safety and security criteria. AFM 91-201, *Explosives Safety Standards*, requires that defined distances, ESQD arcs, be maintained between these facilities and a variety of other types of facilities. ESQD arcs are determined by the specific type and quantity of explosive materials to be stored and each explosive material storage or handling facility has ESQD arcs extending outward from its sides and corners for a prescribed distance. Within defined ESQD arcs, development is either restricted or altogether prohibited in order to maintain safety of personnel and minimize the potential for damage to other facilities in the event of an accident. ESQD arcs for multiple facilities at a single site may overlap,

leaving a series of arcs as edges of the safety zone. Explosive materials storage and build-up facilities must be located in areas where security can be assured.

3.9.2 Existing Conditions

3.9.2.1 Mishap Potential

Five mishap classifications have been defined by the USAF. Class A mishaps result in a fatality or permanent total disability; total cost in excess of $2 million for injury, occupational illness, and property damage; or destruction or damage beyond repair to military aircraft. Class B mishaps result in a permanent partial disability; total cost in excess of $500,000 but less than $2 million for injury, occupational illness, and property damage; or hospitalization of five or more personnel. Class C mishaps result in total damages between $50,000 and $500,000, and Class D mishaps result in total damages between $20,000 and $50,000. The fifth mishap category, Class E, include occurrences that do not meet reportable mishap classification criteria, but are deemed important to investigate and/or report for mishap prevention.

The 162 WG reported eight non-BASH aircraft mishaps between March 2017 and March 2018. Of the eight mishaps that occurred during this time, seven were classified as Class E mishaps that resulted in no property damage. One Class A mishap resulted in a fatality when the pilot of a F-16D foreign aircraft experienced G-force induced loss of consciousness and crashed during a training mission flight.

3.9.2.2 Bird-Aircraft Strike Hazard

BASH is the threat of aircraft collision with birds during flight operations and is a safety concern at all airfields due to the frequency of aircraft operations and the possibility of encountering birds at virtually all altitudes. Most birds fly close to ground level, and more than 95 percent of all reported bird-strikes occur below 3,000 feet AGL. At most military bases, approximately half of reported bird-strikes occur in the immediate vicinity of the airfield and another 25 percent occur during low-altitude local training exercises. Because migratory bird species are considered of special ecological value, EO 13186, *Responsibilities of Federal Agencies*

to Protect Migratory Birds, was introduced in 2001 to ensure that Federal agencies focus attention on the environmental effects to migratory bird species and, where feasible, implement policies and programs, which support the conservation and protection of migratory birds.

Waterfowl present the greatest BASH potential due to their congregational flight patterns and because, when migrating, they can be encountered at altitudes up to 20,000 feet AGL. Raptors also present a substantial hazard due to their size and soaring flight patterns. In general, the threat of bird-aircraft strikes increases during April and May and from August through November due to migratory activity. TUS, including Tucson ANGB, is located within the Pacific Migratory Flyway. Between March 2017 and March 2018, the 162 WG reported 12 BASH incidents. A majority of these incidents were Class E mishaps that resulted in no injuries and no damage to the aircraft. Three of these incidents resulted in reportable damage to the aircraft.

3.9.2.3 Clearance Areas and Runway Protection Zones

Airfield clearance requirements are designed to minimize the potential for accidents during take-offs and landings. Airfield clearance zones consist of two- and three-dimensional areas which are associated with specific runways. Restrictions also center around taxiways and parking aprons. The USAF and the FAA regulate airfield clearances for the facilities under their respective jurisdictions. Applicable regulations criteria may be found in the following documents: AFM 32-1123, *Airfield and Heliport Planning Criteria*; FAA Advisory Circular 150/5300-13, Airport Design; and FAR Part 77 Paragraph 77.28.

Runways 03/21, 11L/29R, and 11R/29L at TUS are all located adjacent to Tucson ANGB. As such, their clearance zones are in close proximity to the installation. The northeastern end of Runway 03/21 runs along the southeast edge of the installation, while the northern ends of Runway 11L/29R and Runway 11R/29L are located off the south corner of Tucson ANGB. The various types of clearance zones which pertain to these runways are described below in Table 3-14.

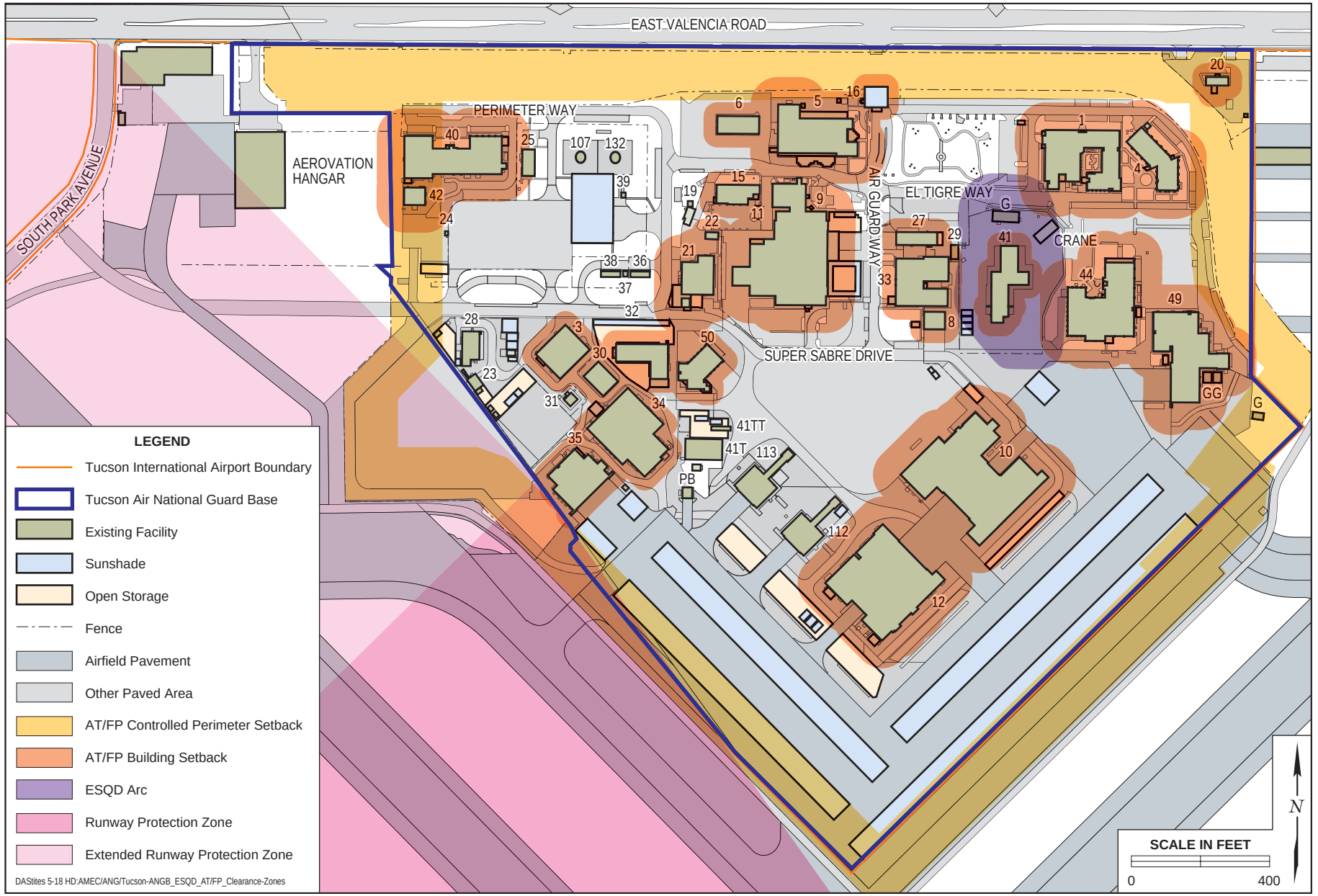
Table 3-14. Clearance Area Descriptions

Clearance Area	Description
Primary Surface	Imaginary surface that is longitudinally centered on the runway. Other than navigational aids (NAVAIDS), fixed objects are not permitted within this surface, which extends 200 feet beyond each end of the runway. The primary surface for Runway 11L/29R is 1,000 feet wide. The primary surfaces for Runways 03/21 and 11R/29R is 500 feet wide.
Approach Surface	Imaginary inclined surface longitudinally centered on an extended runway centerline, extending from each end of the Primary Surface. Slopes are 50:1 for Runway 11L/29R and 20:1 for Runways 03/21 and 11R/29R.
Transitional Surface	Imaginary inclined surface with a slope of 7:1, extending from the edges of the Primary and Approach Surfaces, extending to the Horizontal Surface (i.e., 150 feet above the established airport runway elevation). The surface should not be penetrated by fixed objects.
Runway Safety Area (RSA)	Two-dimensional surface surrounding the runway to reduce the risk of damage to airplanes in the event of an undershoot or excursion from the runway. The RSA width is centered on the centerline of the runway, while the length is based on the runway end. The RSAs for Runways 03/21 and 11L/29R measure 500 feet wide and extend 1,000 feet beyond the runway ends. The RSA for existing Runway 11R-29L measures 150 feet wide and extends 300 feet beyond each runway end.
Runway Object Free Area (ROFA)	Two-dimensional ground area surrounding the runway. The ROFA clearance standard precludes parked airplanes and objects, except those whose locations are fixed by function. The ROFAs for Runways 03/21 and 11L/29R extend 1,000 feet from each runway end and measures 800 feet in width. The ROFA for Runway 11R/29L extends 300 feet from the runway end and measures 500 feet in width.
Obstacle Free Zone (OFZ)	Three-dimensional volume of space centered on the runway that supports the transition of ground to airborne aircraft operations (and vice versa). The runway OFZ and, when applicable, the inner approach OFZ and the inner-transitional OFZ comprise the obstacle free zone. • The Runway OFZ is the volume of space above a surface longitudinally centered on the runway. For Runways 03/21, 11L/29R, and 11R/29L the OFZs extend 200 feet beyond each end of the runway and measure 400 feet wide. The required OFZ is 250 feet for visual and non-precision runways serving small airplanes. For design purposes, Runways 03/21, 11L/29R, and 11R/29L should all be designed for large aircraft, resulting in an OFZ width of 400 feet for each runway. The OFZ must be free of all fixed objects and vehicles as well as parked, holding, or taxiing aircraft in the proximity of an airplane conducting an approach, landing, or takeoff.

Table 3-14. Clearance Area Descriptions (Continued)

Clearance Area	Description
Obstacle Free Zone (OFZ) (Continued)	• The Inner Approach OFZ applies only to runways with an approach lighting system, such as Runway 11L. It is the volume of space above a surface having the same width as the runway OFZ and rising at a slope of 50:1 into the approach area. It begins 200 feet from the end of the runway and extends 200 feet beyond the last light unit in the approach lighting system. The same obstacle restrictions apply to each OFZ. • The Inner Transitional OFZ is a defined volume of airspace along the sides of the Runway OFZ and Inner Approach OFZ. It applies to precision approach runways such as Runway 11L. For CAT I runways, the inner transitional OFZ slopes 6:1 laterally from the edges of the Runway OFZ and Inner approach OFZ out to a height of 150 feet above the established airport elevation.
Runway Protection Zones (RPZs)	Trapezoidal zones extending outward from the ends of active runways at ground level, which delineate those areas recognized as having the greatest risk for an aircraft mishap (i.e., during takeoff or landing). Development restrictions within RPZs are intended to preclude incompatible land use activities from being established in these areas. The RPZ dimensions are a function of the aircraft, type of operation, and visibility minimums. The RPZ inner width, of the trapezoid for Runways 03/21 and 11L/29R are 500 feet, with an outer width of 1,010 feet and a length of 1,700 feet. The RPZ inner widths of Runways 11R/29L and 3-21 are 500 feet, with an outer width of 700 feet and a length of 1,000 feet.
Extended Clear Zone	TUS currently maintains a clear zone policy that is more stringent that those recommended by the FAA design standards. The Extended Clear Zone is the area extending beyond the RPZ in a line parallel to the existing runway centerline continuing to either the TUS property boundary or major roadway, whichever is met first. The Clear Zone Policy extends the RPZ width parallel to the extended runway centerline in a rectangular area that corresponds to the shape of the City of Tucson's and Pima County's airport "Compatible Use Zones" (See Section 3.4, *Land Use*). Exceptions include roadways, NAVAIDS, parking, and compatible low-density recreational activities.
Building Restriction Line	Line generally parallel to and on both sides of the runway that identifies areas suitable for building location. Generally located at a perpendicular distance from the runway so that a 35-foot object would not penetrate into the 7:1-slope FAR Part 77 Transitional Surface.
Apron Clearance Setback	Adequate physical separation between aircraft parking apron and fixed or mobile objects is computed in accordance with UFC 3-260-01, by multiplying 0.5x the wingspan of the largest aircraft, adding the appropriate wingtip clearance required, and subtracting the distance from the taxi-lane centerline to the apron boundary marking.

Sources: Arizona ANG 2011b.



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ESQD Arcs, AT/FP Setbacks, and Clearance Zones at Tucson Air National Guard Base

FIGURE 3-7

3.9.2.4 Explosives Safety

AFI 91-201, *Explosives Safety Standards* outlines USAF explosives safety directives for handling and storage of ordnance at installations. The Munitions Storage Area (MSA) is located in a compound centered on Building 41, near the center of the installation, and is licensed to accommodate Hazard Division 1.3 explosives. As such, it fails to meet ESQD arcs and has no permissible potential for expansion. The MSA may only be used for chaff, flares and small arms ammunition. Arizona ANG has been granted an explosives safety waiver that permits the continued limited munitions operations in the present location (Arizona ANG 2011a).

3.9.2.5 Anti-Terrorism/Force Protection

In 2002, the DoD issued its UFC System, including *DoD Minimum Anti-Terrorism Standards for Buildings* in order to minimize the possibility of mass casualties in buildings or portions of buildings owned, leased, privatized, or otherwise occupied, managed, or controlled by or for DoD. The standards provide appropriate, implementable, and enforceable measures to establish a level of protection against terrorist attacks. The intent of these standards may be achieved through prudent master planning, real estate acquisition, and design and construction practices. Though established in 2002, these standards were applied to existing facilities starting with the Fiscal Year (FY) 2004 program and since then have been mandated when any facility is proposed to undergo major investments, conversion of use, building additions, and/ or glazing replacement.

Entry Control Points

AT/FP requirements have become more stringent since the installation was originally constructed. Additionally, requirements for installation ECFs have changed in a manner that necessitates greater quantities of land than currently available at the Tucson ANGB (Arizona ANG 2011a). For example, more recent AT/FP standards require a serpentine (i.e., S-shaped) entrance to increase vehicle denial capabilities. The current ECF area at Tucson ANGB is small and provides straight-line access to the installation. Consequently, without interfering traffic, a vehicle could use this stretch to reach a high speed and immediately penetrate the gate area to access the installation and flight line as there is no functional pop-up

barrier at the existing ECF. The current gate is also located immediately adjacent to the Dining Facility, a primary gathering facility that frequently houses a large number of installation personnel for both dining and official functions. Additionally, due to the small gate area, commercial vehicles have difficulty maneuvering in and out of the installation. Vehicles requiring inspection are inspected in the center section of the roadway surrounded by traffic, and rejected vehicles must proceed to the center of the installation before reaching a turnaround area. Visitors are required to pull past the gate into a pull-off area (large enough for two small vehicles) and are then either escorted to their destination or to obtain visitor badges (Arizona ANG 2016).

Standoff Distances

Appropriate standoff distance must be provided from buildings to roadways, parking areas, and controlled perimeters (installation boundary) to protect personnel. Minimum standoff distances and building separations presented below are based on *primary gathering buildings*, which are defined as inhabited buildings in which 50 or more DoD personnel routinely gather.

- Controlled Perimeter – 148 feet
- Parking lot(s)/roadway(s) – 82 feet
- Building Separation – 33 feet

AT/FP criteria also impact available POV parking capacity. As described in Section 3.6, *Transportation and Circulation*, parking should be provided for up to 75 percent of authorized unit strength, which equates to approximately 1,425 spaces. While 1,465 parking spaces currently exist at the installation, only 1,069 of these parking spaces comply with current AT/FP facility standoff criteria, leaving 356 deficient parking spaces (Arizona ANG 2011a).

SECTION 4
ENVIRONMENTAL CONSEQUENCES

This section evaluates the potential environmental impacts that would result following the proposed relocation of the Taiwan Air Force (TAF) from Luke Air Force Base (AFB). Analyses are presented by resource area, as presented in Section 3, *Affected Environment.*

As described in Federal Aviation Administration (FAA) Order 1050.1F, the Council on Environmental Quality (CEQ) regulations state that the determination of a significant impact, as used in the National Environmental Policy Act (NEPA), requires consideration of both context and intensity (40 Code of Federal Regulations [CFR] §1508.27). The significance of an impact may vary with the context and setting of an action. Depending on the action, the *context* may be society as a whole, nationwide, an affected region, affected interests, or a locality. For a site-specific action, significance would usually depend upon local impacts. Both short and long-term impacts are relevant. According to the CEQ regulations, *intensity* refers to the severity of the impacts and includes, but is not limited to, consideration of the following:

- Unique characteristics of the geographic area (e.g., proximity to historic or cultural resources, parks, prime farmlands, wetlands, wild and scenic rivers, ecologically critical areas);
- Adverse impacts on properties listed or eligible for listing in the National Register of Historic Places (NRHP);
- Loss or destruction of significant scientific, cultural, or historical resources;
- Adverse impacts on endangered or threatened species or critical habitat;
- Whether an action threatens a violation of Federal, state, or local law or requirements imposed for the protection of the environment;
- Impacts that may be both beneficial and adverse. A significant impact may exist even if the Federal agency believes that on balance the impact will be beneficial;
- The degree to which the effects on the quality of the human environment are likely to be highly controversial; and

- Whether the action is related to other actions with individually insignificant but cumulatively significant impacts. Significance cannot be avoided by terming an action temporary or by breaking it down into component parts.

4.1 AIRSPACE MANAGEMENT

4.1.1 Approach to Analysis

The significance of potential impacts to airspace management depend on the degree to which the proposed TAF F-16 Formal Training Unit (FTU) beddown and additional F-16 operations would affect the structure, use, or management of the regional military, commercial, and general aviation airspace environment. Significant impacts could result if an action would: 1) impose major restrictions on air commerce opportunities; 2) significantly limit airspace access to a large number of users; or 3) require modifications to air traffic control (ATC) systems.

4.1.2 Impacts

4.1.2.1 Alternative 1: TAF F-16 FTU Relocation to Tucson International Airport

Tucson International Airport

Under Alternative 1, the TAF F-16 FTU (21st Fighter Squadron [21 FS]) would beddown 14 F-16 A/B aircraft (12 Primary Authorized Aircraft [PAA] and two Backup Aircraft Inventory [BAI]) at Tucson Air National Guard Base (ANGB). Following departure of the Iraqi Air Force (125th Fighter Squadron Detachment 1 [125 FS Det 1]) in June 2019 and the relocation of the 21 FS to Tucson ANGB by 31 December 2019, total F-16 aircraft operations at TUS would increase by 16 percent. Total aircraft operations at TUS would increase to approximately 396 operations per day with *Military* aircraft operations comprising approximately 22 percent of daily TUS aircraft operations, 99 percent of which would be F-16 operations. *General Aviation* and *Air Taxi* would account for approximately 55 percent of daily TUS operations and *Air Carrier* and *Air Cargo* operations would account for the remaining 23 percent of daily TUS operations (FAA 2018a). The 162d Wing (162 WG) currently has a Letter of Agreement (LOA) dated 5 September 2014 with Tucson Airport Authority (TAA) restricting Arizona Air National Guard (ANG) operations to no more than 40,000 operations per year with no more than 10

percent of the maximum allowable aircraft operations per year utilizing afterburners (TAA and Arizona ANG 2014). With the departure of the Iraqi Air Force and the relocation of the TAF to Tucson ANGB, total operations would remain below this threshold at 31, 723 operations per year (refer to Table 2-3). Similar to the 162 WG, the TAF would complete all aircraft training operations between the hours of 7:00 A.M. and 10:00 P.M. and would utilize afterburner on approximately 47 percent of all departures. However, the 47 percent afterburner use proposed under Alternative 1 exceeds the 10 percent maximum afterburner use agreed upon in the 2014 LOA. Thus, a new LOA between TAA and Arizona ANG resolving this issue would need to be negotiated prior to implementing the Proposed Action. Given that proposed F-16 aircraft operations would only result in a 3 percent increase in total aircraft operations at TUS and that no new F-16 operating parameters would result from the implementation of Alternative 1, impacts to the airfield would be less than significant.

Airspace

Implementation of Alternative 1 would result in a 16 percent increase in F-16 operations within Special Use Airspace (SUA) currently utilized by the 162 WG, with the exception of Sells Military Operations Area (MOA) / Air Traffic Control Assigned Airspace (ATCAA) and Restricted Area 2301E (R-2301E) where the TAF already train under existing conditions (see Table 4-1). Thus, this increase in F-16 operations would not exceed the established capacities of respective airspaces and would remain below previously assessed thresholds in the *Environmental Impact Statement* (*EIS) for F-35A Training Basing (2012)*. Additionally, the altitude utilization within these airspaces would not measurably change from existing conditions. Relative to regional aircraft activity, net increases in flight activity under Alternative 1 would be minor. Existing scheduling/coordination processes and procedures currently used to manage existing military airspace are well established by, and in coordination with, the FAA and would not require modification to support the proposed training operations. Ongoing and proposed training activities would therefore not impose any major restrictions on air commerce opportunities, significantly limit access, or require any modifications to ATC systems. Therefore, implementation of Alternative 1 would result in less than significant impacts to airspace.

Additional SUA utilized occasionally by the 162 WG includes R-2304 and R-2305 and the following Military Training Routes (MTRs): Air Refueling Routes (AR-) AR-613, AR-639A, AR-647, Visual Routes (VR-) VR-259, VR-260, VR-267, VR-268, and VR-269. Operations within designated SUA would increase by 16 percent with implementation of Alternative 1; however, given the occasional use of the listed SUA, utilization of these airspaces would not increase substantially and impacts would be less than significant.

Table 4-1. Existing and Proposed 162 WG Training Airspace Operations

Airspace	Existing 162 WG F-16 Operations	Proposed 162 WG and TAF F-16 Operations	Existing Total Operations	Proposed Total Operations
Jackal MOA/ATCAA	1,675	1,943	2,125	2,393
Outlaw MOA/ATCAA	1,283	1,488	1,627	1,832
Ruby[1] MOA/ATCAA	1,668	1,935	2,115	2,382
Rustler [2] MOA/ATCAA	1,939	2,249	2,460	2,770
Sells MOA/ATCAA	8,321*	8,321	11,368*	11,368
Tombstone MOA/ATCAA	2,685	3,115	3,406	3,836
R-2301E Restricted Area	16,342*	16,342	21,230*	21,230
VR-263 MTR	246	285	299	338

Notes:
[1] Includes Fuzzy MOA
[2] Includes Morenci and the southwest section of Reserve MOAs/ATCAAs named so for scheduling with Albuquerque Air Route Traffic Control Center (ARTCC)
* Includes F-16 operations from the 56th Fighter Wing (56 FW) at Luke AFB
Jackal, Outlaw, Ruby, Rustler, and Tombstone MOAs/ATCAAs operations taken from 2012 F-35 Basing Environmental Impact Statement (EIS) Baseline Scenario for TUS while Sells MOA/ATCAA and Restricted Area 2301E (R-2301E) operations taken from Proposed Luke AFB Scenario 6.
Source: U.S. Air Force (USAF) 2012.

With the implementation of Alternative 1 impacts to Bagdad and Gladden MOAs/ATCAAs, where the TAF currently train, would be beneficial as the TAF would no longer train within these MOAs/ATCAAs. Under Alternative 1, TAF

training within Sells MOA/ATCAA and R-2301E would remain as described in Section 3.1, *Airspace Management* and impacts in these locations would remain unchanged.

Auxiliary Airfield

Tucson ANGB F-16 operations that occur at Libby Army Airfield (AAF) would increase by 16 percent (i.e., 2,376 total aircraft operations) annually. Thus, a total of 17,228 F-16 operations involving aircraft from Tucson ANGB would include training at Libby AFF. These operations would consist of Simulated Flame Outs (SFOs), Low Approaches, and Touch-and-Go Landings. Currently, Libby AAF accommodates approximately 119,355 operations annually and this nominal increase (i.e., 2 percent) in total operations would result in a less than significant impact to airfield operations at Libby AAF (Airnav 2018; USAF 2012).

4.1.2.2 Alternative 2: No-Action Alternative

Under the No-Action Alternative, the TAF would not beddown 14 F-16 aircraft at Tucson ANGB and airspace management associated with ongoing 162 WG operations at TUS, within MOAs/ATCAAs (Jackal, Outlaw, Ruby, Rustler, Sells, and Tombstone), Visual Routes (VR-263), and Restricted Areas (R-2301E) would remain as described in Section 3.1, *Airspace Management*. The TAF F-16 FTU would continue to operate at Luke AFB until a suitable alternative relocation site is identified. Consequently, the Air Education and Training Command (AETC) would not meet its mandate to eventually remove all F-16s from Luke AFB (i.e., via either relocation or retirement) by 2023.

4.2 AIR QUALITY

4.2.1 Approach to Analysis

The Clean Air Act Amendments (CAAA) of 1990 require that all Federal agency activities conform to the State Implementation Plan (SIP) with respect to achieving and maintaining attainment of National Ambient Air Quality Standards (NAAQS) and addressing potential air quality impacts. Consistent with FAA Order 1050.1F, an impact to air quality would be considered significant if it would exceed one or more of the NAAQS for any of the time periods analyzed. The U.S. Environmental Protection Agency (USEPA) General Conformity Rule requires that a conformity analysis be performed to demonstrate that an action would not: 1) cause or contribute to any new violation of any NAAQS in the area; 2) interfere with provisions in the SIP for maintenance or attainment of any NAAQS; 3) increase the frequency or severity of any existing violation of any NAAQS; or 4) delay timely attainment of any NAAQS, any interim emission reduction, goals, or other milestones included in the SIP for air quality. Provisions in the General Conformity Rule allow for exemptions from performing a conformity determination only if total emissions of individual nonattainment area pollutants resulting from the action fall below the *de minimis* (i.e., significant) threshold values.

With respect to the General Conformity Rule, effects on air quality would be considered significant if an action would result in an increase of the Regional Emissions Inventory above the *de minimis* threshold levels established in 40 CFR §93.153(b) for individual *nonattainment* or *maintenance* pollutants. As described in Section 3.2.2.2, *Local Air Quality*, the Tucson area within Pima County is currently designated by the USEPA as a *maintenance* area for carbon monoxide (CO) and an *attainment* area for all other NAAQS criteria pollutants (FAA 2018b; USEPA 2018).

4.2.2 Impacts

4.2.2.1 Alternative 1: TAF F-16 FTU Relocation to Tucson International Airport

Air emissions associated with Alternative 1 were estimated using the USAF Air Conformity Applicability Model (ACAM) in accordance with the Air Force Instruction (AFI) 32-7040, Clean Air Act Section 176(c), Air Quality Compliance

and Resource Management; the Environmental Impact Analysis Process (32 CFR Part 989); and the General Conformity Rule (40 CFR Part 93 Subpart B). Table 4-2 indicates the estimated total annual emissions for each pollutant under Alternative 1. For a full list of ACAM assumptions, emission factors, and emission category subtotals see Appendix D.

Table 4-2. Potential Annual Emissions under Alternative 1

Pollutant	Projected Emissions (tpy)				Air Quality Indicator	
	2018	2019	2020	2021*	*de minimis* Thresholds	Significant Impact?
VOC	0.152	0.087	3.417	2.893	100	No
NO_x	1.017	0.557	23.364	20.102	100	No
CO	0.849	0.523	38.585	35.214	100	No
SO_x	0.002	0.001	1.805	1.798	100	No
PM_{10}	0.096	0.026	5.670	2.670	100	No
$PM_{2.5}$	0.046	0.026	2.491	2.338	100	No
Pb	0.000	0.000	0.000	0.000	100	No
NH_3	0.001	0.000	0.027	0.024	100	No

*Emissions indicated for Fiscal Year (FY) 2021 represents the steady state annual operational emissions – primarily mobile emissions from F-16 operations – that would occur indefinitely under Alternative 1.

Short-term Impacts

Short-term pollutant emissions associated with the proposed construction and demolition activities at Tucson ANGB would include fugitive dust emissions during ground disturbance and combustion emissions from vehicles and heavy-duty equipment.

Fugitive Dust Emissions

Under Alternative 1, fugitive dust would be generated during facility construction activities, including site preparation, clearing, and grading. Since none of the other proposed interior renovation projects would include site preparation, clearing, grading, and associated ground disturbance, fugitive dust would not be generated during these activities.

The proposed construction and demolition projects included in Alternative 1 would disturb a total area of approximately 6.02 acres. ACAM assumes that the emissions resulting from construction-related activities are uncontrolled. However, fugitive dust resulting from activities related to implementation of Alternative 1 could be reduced through standard dust minimization practices (e.g., regularly watering exposed soils, soil stockpiling, etc.). These dust minimization measures can reduce dust generation by up to 50 percent (USEPA 2006).

Although any substantial increase in fugitive dust emissions is inherently adverse, increased fugitive dust emissions associated with Alternative 1 would be short-term and temporary, resulting in less than significant impacts to air quality.

Combustion Emissions

Combustion emissions would be associated with construction-related equipment, workers' vehicles, and transport of construction materials. Emissions associated with construction equipment (e.g., grader, backhoe, dozer, etc.), construction worker commutes, and the transportation of materials would be minimal given the temporary nature of the activities.

Impacts due to combustion emissions from construction are generally not considered significant because they are temporary and of short duration. Anticipated combustion emissions during construction activities would remain below *de minimis* threshold values (refer to Table 4-2) and would result in less than significant short-term impacts to air quality.

Long-term Operational Impacts

As described in Section 2, *Description of the Proposed Action and Alternatives*, there would be a net increase of personnel and F-16 aircraft operations at Tucson ANGB with the implementation of Alternative 1. Relocation of the TAF to Tucson ANGB would result in a net increase of 9 officer personnel, 147 support contractor personnel, 17 civilian personnel, and 18 positions to be staffed by the TAF, 1,619 landing and take-off cycles (LTOs) per year, and 536 Touch-and-Go Landings per year beginning in FY 2020.

As described in Section 3.2, *Air Quality,* the Tucson area is in *maintenance* for CO and is in *attainment* for all other criteria pollutants, and the Title V permitting program only applies to stationary sources. Because annual operational emissions would be below the *de minimis* thresholds for criteria pollutants (refer to Table 4-2), air quality impacts associated with Alternative 1 would be less than significant.

4.2.2.2 Alternative 2: No-Action Alternative

If the No-Action Alternative were selected, the proposed TAF relocation and associated construction, demolition, and interior renovation projects would not occur. Consequently, there would be no fugitive dust or combustion emissions associated with the selection of this alternative. Long-term operational emissions associated with TAF F-16 FTU operations would remain the same at Luke AFB. Operational air emissions at Tucson ANGB would remain as described in Section 3.2, *Air Quality*, until the departure of the 125 FS Det 1 – and their inventory of eight Iraqi F-16 aircraft – in June 2019, after which time operational air emissions at Tucson ANGB would decrease slightly.

4.3 NOISE

4.3.1 Approach to Analysis

Noise impact analyses typically evaluate potential changes to the existing noise environment that would result from the implementation of an action. These potential changes may be beneficial if they reduce the number of sensitive receptors exposed to unacceptable noise levels. Conversely, impacts may be significant if they result in an introduction of unacceptable noise levels or increased exposure to unacceptable noise levels for sensitive receptors. Noise associated with an action is compared with existing noise conditions to determine the magnitude of potential impacts.

Consistent with FAA Order 1050.1F, significant noise impacts would occur if an action would cause noise-sensitive areas to experience an increase in noise of 1.5 decibels (dB) or more at or above the 65 Day-Night Average A-weighted Sound Level (DNL) noise exposure when compared to the No-Action Alternative for the same timeframe. As a general rule, a 3-dB change is necessary for noise increases to be noticeable to humans (Bies and Hansen 1988).

4.3.2 Impacts

4.3.2.1 Alternative 1: TAF F-16 FTU Relocation to Tucson International Airport

Construction-Related Noise

Implementation of Alternative 1 would have minor, temporary effects on the noise environment in the vicinity of the proposed construction, demolition, and interior renovation project sites at TUS. Use of heavy equipment for site preparation and development (e.g., vegetation removal, grading, and backfill) for the proposed renovation and demolition activities in FY 2018 and the construction of the proposed Entry Control Facility (ECF) and associated in-kind hangar replacement in FY 2020 would generate short-term noise exposure above typical ambient levels at the installation and within the surrounding vicinity. However, noise generation would be typical of construction activities, short-term, and confined to normal working hours (i.e., between 7:00 A.M. and 5:00 P.M.). Additionally, construction

noise could be reduced through the use of equipment sound mufflers. Short-term noise-generating activities associated with Alternative 1 would primarily occur within the installation and on TAA property located beneath the flightpath, along the airfield, or within developed areas of the installation, which contain land uses that are not considered to be noise sensitive. Given the type of construction and demolition activities (e.g., sporadic, during daytime hours, short-term, etc.), implementation of Alternative 1 would not be expected to substantially alter the ambient noise environment. Consequently, the impacts of construction-related noise would be negligible and no significant construction-related noise impacts would be expected to occur as a result of Alternative 1.

Operational Noise

Facilities

Under Alternative 1, additions to existing buildings necessary to support the TAF relocation as well as the proposed ECF would be located within the 65 and greater DNL noise contours. However, the proposed industrial-type facilities (e.g., squadron operations facilities) are typical within an airfield environment and would be considered compatible with existing noise levels at TUS. Consequently, impacts to proposed facilities within the airfield noise environment would be less than significant.

Aircraft Operations at TUS

The implementation of Alternative 1 would result in the relocation of 14 F-16 A/B aircraft from Luke AFB to Tucson ANGB, and a 16-percent increase in total F-16 operations out of TUS. As described in Section 2, *Description of Proposed Action and Alternatives* (refer to Table 2-1) annual operations would increase from 27,414 in FY 2018 to 31,723 in FY 2019. This comparatively minor increase would result in no greater than a 0.64-dB increase over existing conditions. As previously described, a 3-dB change is necessary for noise increases to be noticeable to humans (Bies and Hansen 1988).

Under Alternative 1, the 65 DNL noise contour would extend approximately 4.41 miles to the southeast beyond the end of Runway 29R and approximately 4.83

miles to the southeast beyond the end of Runway 29L, primarily over vacant and undeveloped land, with some commercial/industrial uses located in Pima County (see Figure 4-1). To the northwest of the airport, the 65 DNL noise contour would extend approximately 2.11 miles beyond the end of Runway 11L and 1.76 miles beyond the end of Runway 11R, covering residential and commercial land uses within Tucson. The 70 and 75+ DNL contours would be located within airport property or over compatible land use beyond the airport boundary (see Table 4-3) (FAA 2018b). However, based on the minimal increase in noise exposures associated with Alternative 1 (i.e., less than 1.5 dB at or above 65 DNL and less than 3 dB within the 60 to 65 DNL noise zone), noise impacts resulting from implementation of Alternative 1 surrounding the airfield environment would be less than significant.

Table 4-3. Noise Exposure at TUS under Alternative 1

Noise Level (DNL)	Baseline Noise Exposure (Total Acres)	Baseline Noise Exposure (Acres Beyond Airport Property)	Alternative 1 Noise Exposure (Total Acres)	Alternative 1 Noise Exposure (Acres Beyond Airport Property)
65-69	700.3	12.7	2,069	968
70-74	311.9	0	958	260
75+	152.5	0	1,109	11
Total > 65	**1,237.3**	**12.7**	**4,136**	**1,239**

Source: FAA 2018.

Aircraft Operations in Training Airspace

Under Alternative 1, noise levels within airspace utilized for 162 WG training would increase by no more than 0.64 dB resulting from a 16-percent increase in F-16 operations associated with the TAF relocation to Tucson ANGB. However, this noise level increase would not occur at Sells MOA/ATCAA and R-2301E where noise levels would remain as described in Section 3.3, *Noise*, given that the TAF would continue to train within this designated SUA, a continuation of the SUA training operations they conduct currently from Luke AFB. The noise levels presented in Table 4-4 are representative of all military aircraft operations that occur within the airspace, which includes proposed F-16 aircraft operations out of Tucson ANGB (USAF 2012). Based on the nominal increase in noise levels within SUA associated with Alternative 1, noise impacts resulting from Alternative 1 within SUA would be less than significant.

EA

Projected Noise Contours at Tucson International Airport

FIGURE 4-1

Table 4-4. Proposed Training Airspace Noise Levels

Airspace	Existing Noise Level (L_{dnmr})	Existing Sonic Booms per day	Proposed Noise Level (L_{dnmr})	Proposed Sonic Booms per day
Jackal MOA	< 45	< 1	45*	< 1
Outlaw MOA	< 45	< 1	45*	< 1
Ruby MOA	53	< 1	54	< 1
Rustler MOA	< 45	< 1	45*	< 1
Sells MOA	52	2	52	2
Tombstone MOA	< 45	< 1	45*	< 1
R-2301E N TAC Range	70	1	70	1
R-2301E S TAC Range	70	1	70	1
VR-263	< 45	< 1	45*	< 1

Notes: Jackal, Outlaw, Ruby, and Tombstone MOAs noise levels taken from 2012 F-35 Basing EIS Baseline Scenario for TUS while Sells and R-2301E operations taken from Proposed Luke AFB Scenario 6.
* Assumes existing < 45 L_{dnmr} was 44 L_{dnmr}.
Source: USAF 2012.

Auxiliary Airfield

Similar to SUA, noise levels at Libby AAF would increase by no more than 0.64 dB under Alternative 1. While F-16 operations would increase by 16 percent, these operations account for approximately 14 percent of total operations at Libby AAF. Noise levels exceeding 65 DNL would not extend beyond the Fort Huachuca boundary; therefore, impacts would be less than significant.

4.3.2.2 Alternative 2: No-Action Alternative

If the No-Action Alternative were selected, the proposed relocation of the TAF F-16 FTU from Luke AFB to Tucson ANGB would not be implemented. Additionally, associated supporting proposed construction, demolition, and interior renovation projects associated with the proposed relocation would not be implemented. As such, noise conditions would remain as described in Section 3.3, *Noise*, until the departure of the 125 FS Det 1 – and their inventory of eight Iraqi F-16 aircraft – in June 2019, after which time operational noise at Tucson ANGB would decrease slightly.

The 21 FS training operations would continue at Luke AFB until a suitable alternative relocation site is identified. However, AETC's mandate to eventually remove all F-16s from Luke AFB (i.e., via either relocation or retirement) by 2023, would not be met under the No-Action Alternative.

4.4 LAND USE

4.4.1 Approach to Analysis

Determination of land use impacts is based on the degree of land use sensitivity in the area. In general, land use impacts would be considered significant if an action would: 1) be inconsistent or non-compliant with applicable land use plans or policies; 2) preclude an existing land use of concern from continuing to exist; 3) preclude continued use of an area; or 4) be incompatible with adjacent or nearby land uses such that the public health or safety is endangered. Additionally, pursuant to FAA Order 1050.1F, a significant land use impact would occur if a noise-sensitive land use was placed into a noise level greater than with which it is considered compatible. In general, for most noise-sensitive land uses, a significant impact would occur if noise levels increased by 1.5 dB or more at or above 65 DNL. However, the FAA recognizes that there are settings where the 65 DNL standard may not apply (e.g., National Wildlife Refuges or other land uses where natural quiet is an expected attribute). The analysis of potential impacts to land use includes: 1) identification and description of land use areas that may be affected by implementation of an action; 2) examination of an action and its potential effects on land use; 3) assessment of the compatibility of an action with existing zoning; 4) assessment of the significance of potential impacts to land use based on the criteria described above; and 5) provision of mitigation measures to minimize potential adverse impacts. The Department of Defense (DoD) reauthorization in 1997 provided that "[n]o military flight operations (including a military training flight), or designation of airspace for such an operation, may be treated as a transportation program or project for purposes of 49 U.S. Code (USC) §303(c) (Public Law 105-85)."

4.4.2 Impacts

4.4.2.1 Alternative 1: TAF F-16 FTU Relocation to Tucson International Airport

Under Alternative 1, all construction and demolition projects as well as interior renovation projects would be implemented as described in Section 2, *Description of the Proposed Action and Alternatives*. Building 1 would be renovated, reconfigured, and expanded to support two Foreign Military Sales (FMS) programs including

the 21 FS and the 148th Fighter Squadron (148 FS), which is currently located in Building 40. A F-16V Unit Training Device/Simulator (UTD/SIM) would also be installed in Building 1 for TAF use. Building 40 would be renovated, reconfigured, and expanded to support wing headquarters and communications functions that would be relocated from Building 1. Implementation of these projects included in Alternative 1 would accomplish the goals of the 162 WG's Installation Development Plan (IDP) to collocate all operational functions and flight simulator activities around Building 44 and all squadron operations functions to the east side of the installation (Arizona ANG 2011a).

In addition to these interior renovations, Alternative 1 includes construction and demolition activities associated with the proposed ECF and the associated in-kind hangar replacement. The existing ECF at Tucson ANGB does not meet traffic calming or final denial/security requirements in accordance with Anti-Terrorism/Force Protection (AT/FP) standards. Under Alternative 1, the 162 WG would acquire (via lease and/or purchase) the 18-acre TAA property to support construction of a new ECF to bring Tucson ANGB into compliance with current AT/FP standards. This project was identified as a priority project in the 162 WG's IDP, and it would provide sufficient queuing capacity and vehicle denial capabilities as well as ensure compliance with other existing AT/FP requirements. Additionally, the proposed ECF would include the construction of a 1,500-square-foot (sf) recruiting facility. This would also result in beneficial impacts related to AT/FP as the existing recruiting facility is located outside the installation's boundaries and construction of a new facility would relocate this function within the fenceline.

As previously described, the 162 WG would acquire (via lease and/or purchase) an 18-acre TAA owned property located immediately to the west of Tucson ANGB, to support construction of an appropriately sized and reconfigured ECF. Additionally, the three existing facilities on the property would be demolished, and the Aerovation Hangar and associated pavements would be replaced on an undeveloped 9-acre TAA owned property located adjacent to the ATC tower. These proposed activities – including the real estate transaction – would require the TAA to amend the Airport Layout Plan (ALP) at TUS. Nevertheless, all proposed construction, demolition, and interior renovation activities are consistent with the 162 WG's IDP and are consistent with ANG

planning policies and guidelines. Additionally, the projects included in Alternative 1 would result in beneficial impacts with regard to squad operations efficiencies, transportation and circulation, and AT/FP standards. Therefore, impacts to land use associated with Alternative 1 would be beneficial.

4.4.2.2 Alternative 2: No-Action Alternative

If the No-Action Alternative were selected, the proposed TAF relocation and associated construction, demolition, and interior renovation projects would not occur and land use at Tucson ANGB and TUS would remain unchanged from existing conditions as described in Section 3.4, *Land Use*. The existing squadron operations and wing headquarters functions would remain in their current locations, and operational efficiencies envisioned in the 162 WG's IDP would not be achieved. Further, without construction of the proposed ECF, the existing ECF at Tucson ANGB would continue not to meet AT/FP standards.

4.5 BIOLOGICAL RESOURCES

4.5.1 Approach to Analysis

Determination of the significance of potential impacts to biological resources is based on applicable legal protection of sensitive resources (e.g., Arizona State Law, Federal Endangered Species Act [ESA], Migratory Bird Treaty Act [MBTA], Bald and Golden Eagle Protection Act [BGEPA]). Consistent with FAA Order 1050.1F, impacts to biological resources would be considered significant if special status plant or wildlife species or habitats of special concern were adversely affected or disturbances caused substantial reductions in population size or distribution. (It should be noted that the FAA has not established a significance threshold for non-listed species.) The Federal ESA further provides that an impact to biological resources would be considered significant if the U.S. Fish and Wildlife Service (USFWS) determines that an action would: 1) jeopardize the continued existence of a federally listed threatened or endangered species; or 2) result in the destruction or adverse modification of federally designated critical habitat. For federally listed threatened and endangered species and federally designated critical habitat, formal consultation with USFWS under section 7(a)(2) of the Federal ESA is triggered when: 1) it is determined that an action "may affect" federally listed species or designated critical habitat, unless the USFWS concurs in writing that an action is not likely to adversely affect any listed species or critical habitat; or 2) the USFWS does not concur with the determination that an action is not likely to adversely affect federally listed species or designated critical habitat.

As described in Section 3.5, *Biological Resources*, previous field surveys and data from the USFWS and the Arizona Game and Fish Department (AGFD) were reviewed to determine the presence or potential occurrence of sensitive species and habitats on Tucson ANGB and the affected areas of TUS. Potential physical impacts such as habitat loss, noise, and impacts to surface water were evaluated to assess potential impacts to biological resources.

4.5.2 Impacts

4.5.2.1 Alternative 1: TAF F-16 FTU Relocation to Tucson International Airport

Vegetation

As described in Section 3.5, *Biological Resources*, Tucson ANGB provides almost no natural habitat. Virtually all stands of native vegetation at Tucson ANGB have been removed or permanently altered by construction and maintenance activities related to airport operations. The majority of the proposed construction, demolition, and interior renovation projects under Alternative 1 would occur on previously disturbed land within the developed portion of the installation. As such, these projects would require minimal vegetation removal that would be limited to small areas of disturbed or landscaped vegetation. The only proposed project included under Alternative 1 that would involve ground disturbing activities on undeveloped land is the proposed in-kind hangar replacement. This proposed project – including the construction of a 35,000-sf metal hangar along with a 53,000-sf asphalt aircraft apron and 22,000-sf vehicle parking lot – would remove areas of creosote bush scrub across the 9-acre, TAA owned property. Amec Foster Wheeler conducted a vegetation survey at this location and determined that creosote bush was the dominate plant species with barrel cactus (*Ferocactus wislizeni*) and several cholla species (*Cylindropuntia* spp.) also present (see Appendix E). Due to the lack of sensitive vegetation communities or special status native plant species, proposed construction would not have significant impacts on vegetation or the habitat that it may provide. Short- and long-term impacts to vegetation as a result of Alternative 1 would not be significant.

Wildlife

Implementation of Alternative 1 could potentially affect wildlife through permanent habitat alteration and temporary disturbance due to noise and human presence. Construction activities could temporarily displace wildlife from otherwise marginally suitable habitat in the immediate vicinity of the proposed project sites. However, due to the disturbed character of Tucson ANGB and adjacent TAA owned property, wildlife species are generally acclimated to human presence and indirect disturbance from noise. Further, any wildlife disturbed by

construction activities or displaced by habitat loss could temporarily or permanently relocate to similar or higher quality habitat nearby. Smaller, less mobile species and those seeking refuge in burrows could inadvertently be harmed during ground-disturbing activities; however, no special status species would be impacted and long-term impacts to population dynamics of more common wildlife species would not occur.

The proposed beddown of 14 F-16 aircraft would increase annual operations at TUS (refer to Table 2-2) resulting in a minor increase in noise exposure to wildlife on-site and in the surrounding areas (refer to Section 4.4, *Noise*). However, ongoing wildlife hazard management practices limit the potential for wildlife, particularly bird species, from congregating in the vicinity of TUS. Further, surrounding habitats that may support a relatively greater diversity and abundance of wildlife, including birds and small mammals, are likely impacted by edge effects resulting from the proximity of industrial land uses in the vicinity and flight operations-related noise. Therefore, impacts to wildlife at Tucson ANGB and TUS from the implementation of Alternative 1 would be less than significant. Further, no impacts to biological resources would occur within or beneath the affected airspaces as the total F-16 operations would remain below the number of operations that were previously assessed for these airspaces. Additionally, increases to noise levels beneath the airspace utilized for 162 WG training would increase by no more than 0.64 dB relative to existing conditions.

Special Status Species

According to previous field surveys at TUS as well as an online review conducted through the USFWS Information, Planning, and Conservation (IPaC) System and the AGFD Online Environmental Review Tool, several special status species have the potential to occur on or in the vicinity of TUS (refer to Table 3-9). However, no federally listed threatened or endangered species or other special status species have been observed at Tucson ANGB. As described in Section 3.5, *Biological Resources*, given the abundance of urbanized development and the lack of native habitats, natural surface water features, or agricultural areas on the installation, it is highly unlikely that suitable habitat would exist to support these species, or that conditions and/or resources on the installation would be sufficient to maintain a population. Additionally, areas immediately adjacent to the installation are not

likely to contain suitable habitat due to the nature of land use and development at TUS. For example, the 18-acre TAA owned property to be acquired (via lease and/or purchase)for the proposed ECF was surveyed as a part of the *Draft EIS for the Proposed Airfield Safety Enhancement Project* and no special status plants or wildlife were observed (FAA 2018b). Further, as described in Section 3.5.2.2, *Tucson International Airport*, the 9-acre, TAA owned property identified for the proposed in-kind hangar replacement was surveyed for special status species – with a focus on federally endangered Pima pineapple cactus (*Coryphantha scheeri* var. *robustispina*) and burrowing owl (*Athene cunicularia hypugaea*) – in April 2018. Neither of these species nor any other special status species were observed during the field survey. Therefore, construction activities on Tucson ANGB and TAA property as well as increased aircraft operations at TUS associated with Alternative 1 would have no effect on special status species.

4.5.2.2 Alternative 2: No-Action Alternative

If the No-Action Alternative were selected, the proposed TAF relocation and associated construction, demolition, and interior renovation projects would not occur. Therefore, there would be no changes to existing conditions associated with biological resources and wildlife hazard management practices would continue to be implemented at the installation as well as at TUS. Consequently, no impacts to existing biological resources would result from selection of the No-Action Alternative and conditions would remain as described in Section 3.5, *Biological Resources*.

4.6 TRANSPORTATION AND CIRCULATION

4.6.1 Approach to Analysis

Potential impacts to transportation and circulation are assessed with respect to anticipated disruption or improvement of current transportation patterns and systems; deterioration or improvement of existing levels of service; and changes in existing levels of transportation safety. Adverse or beneficial impacts may arise from physical changes to circulation (e.g., closing, rerouting, or creating roads), construction activity, introduction of construction-related traffic on local roads, or changes in daily or peak-hour traffic volumes created by either direct or indirect workforce and population changes related to ANG activities. Adverse impacts on roadway capacities would be significant if roads with no history of capacity exceedance were forced to operate at or above their full design capacity.

4.6.2 Impacts

4.6.2.1 Alternative 1: TAF F-16 FTU Relocation to Tucson International Airport

Construction-Related Impacts

Implementation of Alternative 1 would require delivery of construction materials to and removal of demolition-related debris from project sites at Tucson ANGB and TUS. Construction traffic would comprise only a small portion of the total existing traffic volume on vicinity roadways. Additionally, many of the vehicles would be driven to and kept on-site at Tucson ANGB for the duration of construction or renovation activities, resulting in very few actual increased trips. Overlap of project construction and demolition activities would be limited, and associated potential increases in traffic volume would be minor. Further, any increases in traffic volumes on the installation associated with construction or demolition activity would be temporary. Therefore, implementation of Alternative 1 would have a less than significant short-term impact on traffic within the installation and the surrounding community.

The construction of the proposed ECF would also result in minor, temporary impacts to traffic circulation on Tucson ANGB due to temporary road closures and

detours. However, the existing ECF at Tucson ANGB would not be demolished or closed until construction of the new ECF is complete. Construction activities would be short-term in duration and would occur only during non-peak traffic hours in coordination with applicable agencies. Additionally, changes in lane configuration and signal phasing at East Valencia Road and South Park Avenue would occur over a brief period (e.g., less than 1 week) and would not substantially affect existing traffic along East Valencia Road. Consequently, construction activities under Alternative 1 would result in less than significant short-term impacts on circulation within the surrounding transportation network.

Operation-Related Impacts

Installation Access

Under Alternative 1, the only proposed project that would affect long-term, operational transportation and circulation at Tucson ANGB and the immediate surrounding vicinity would be the construction of the proposed ECF. As described in Section 2, *Description of the Proposed Action and Alternatives*, the existing ECF does not provide sufficient queuing capacity and vehicle denial capabilities in accordance with AT/FP standards. This proposed project would include construction of a new ECF on the 18-acre TAA owned property directly west of the installation to be acquired (via lease and/or purchase) by the 162 WG. Elements of the proposed ECF would include a check house, vehicle inspection areas, truck inspection, circulation improvements, and lighting. Additionally, the proposed ECF would include a new recruiting facility. The existing non-compliant ECF would be abandoned in place and fenced to prevent access across the existing bridge, after the new ECF is operational. The proposed ECF would alleviate safety concerns, allow more space for vehicle queuing and inspection, and improve traffic flow at the checkpoint, resulting in beneficial impacts to installation access.

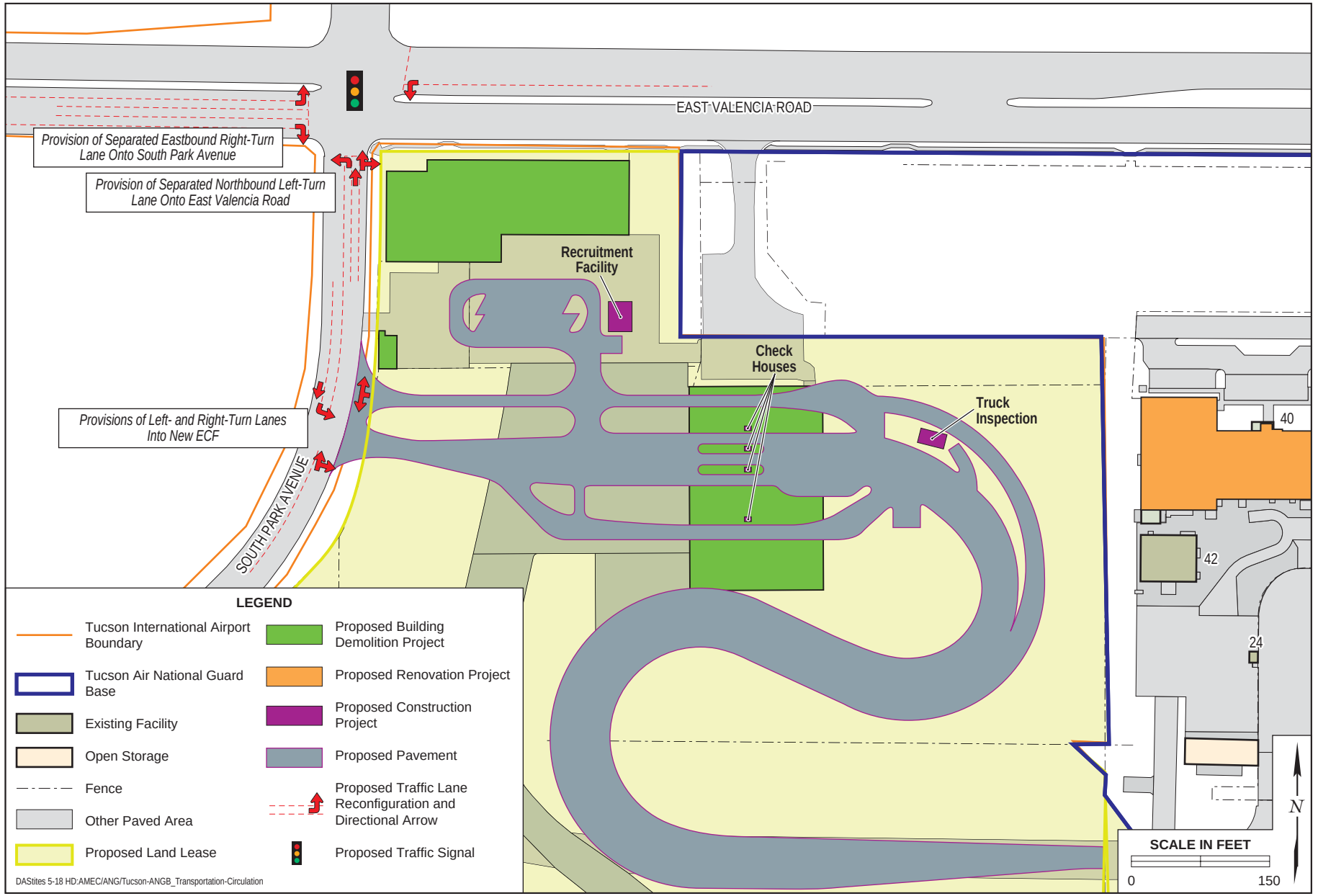
Under Alternative 1, instead of entering the installation from East Valencia Road, installation access would be provided from South Park Avenue, south of its intersection with East Valencia Road (see Figure 4-2). Improvements to this intersection, necessary to accommodate the proposed ECF, would include extending the left turn lanes on both the westbound and eastbound approach, as well as adding a right turn lane on the eastbound approach. A left-turn lane would

be added to the northbound approach extending from the proposed ECF intersection. The signal would be changed to accommodate protected left turn phasing for all approaches. A southbound left turn lane would also be provided on South Park Avenue to access the proposed ECF (see Figure 4-2).

A traffic study has been prepared for the proposed ECF, which included traffic and pedestrian counts collected between 5 November and 7 November 2015. These data and survey response data were used to determine how traffic would be impacted with the construction of the proposed ECF (see Appendix G).

The largest weekday and drill weekend peak hour design demand volumes, 744 vehicles (Main Gate) and 796 vehicles (Secondary Gate), respectively, were used to calculate the number of inbound processing lanes required at the proposed ECF. The demand volumes were used as input to the ACP/ECF SMART Decision Evaluator, which is a software tool developed by SDDCTEA (i.e., the DoD Transportation Engineering Agency) to calculate lane requirements. This evaluation determined that although five lanes would be required for single manual processing during the drill weekends, four lanes with tandem processing would also be sufficient. Since drill weekends are an infrequent occurrence, the manpower can be increased temporarily during the A.M. peak hour to facilitate tandem processing.

Traffic volumes and lane configurations at the intersection Main Gate and East Valencia Road, South Park Avenue and East Valencia Road, and the Secondary Gate and South Park Avenue were analyzed using Synchro 9, a software application used to determine intersection levels of service (LOS). LOS describes the operational condition of an intersection and usually falls into one of six categories: A through F. LOS A represents operating conditions with relatively little traffic and no congestion, while LOS F represents relatively high traffic and unpredictable operating conditions, including high delay and driver discomfort. Generally, a facility operating at or better than LOS D is considered acceptable. With the construction of the proposed ECF, including the intersection and lane configuration improvements at East Valencia Road and South Park Avenue, all of the intersections in the surrounding vicinity would continue to operate with acceptable LOS (see Appendix G). Following completion of the proposed ECF and



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Transportation and Circulation Project Improvements

FIGURE 4-2

the intersection signal improvements, access to the installation would be more efficient and would address potential AT/FP concerns, resulting in beneficial impacts (see Section 3.9, *Safety*).

Installation Traffic and Parking

Under Alternative 1, personnel levels at Tucson ANGB would increase from approximately 1,900 to 2,091. These additional 191 personnel associated with the TAF F-16 FTU, an approximately 9-percent increase, would function to support the 21 FS mission. New personnel would have the potential to incrementally increase vehicle trips to and from the Tucson ANGB; however, the proposed ECF would include four check houses compared to the one full-time and one part-time identification and vehicle processing lanes associated with the existing ECF. Therefore, identification and vehicle processing would be significantly more efficient with construction of the proposed ECF.

Implementation of Alternative 1 would also reconfigure the hierarchy of flow throughout the installation. Following the construction of the proposed ECF, the new primary circulation route would enter from South Park Avenue and utilize Super Sabre Drive as a spine to access secondary roads and/or privately owned vehicle (POV) parking. Additionally, the proposed renovations to Building 1 and Building 40 would include designation of nearby vehicular access as restricted to accommodate fire and emergency vehicles and comply with AT/FP standoff distances. As such, the roads surrounding these buildings would be changed from primary roads to secondary roads or controlled vehicular access. These changes to the circulation network on Tucson ANGB would implement primary goals identified in the 162 WG's IDP. Consequently, implementation of Alternative 1 would have beneficial impacts on traffic and circulation on the installation.

As noted in Section 3.6, *Transportation and Circulation* the USAF has established guidelines intended to ensure that adequate parking is available at USAF and ANG facilities. According to these guidelines, the ratio of available parking spaces to personnel should be no less than 0.75 spaces per person. The installation currently has a total of 1,465 parking spaces throughout the installation. With the addition of 191 personnel associated with the proposed TAF F-16 FTU relocation and the departure of the Iraqi Air Force in June 2019 as well as the parking

improvements included in the proposed construction project, overall parking availability on Tucson ANGB would remain adequate. With reconfiguration of the non-compliant POV parking spaces surrounding Buildings 1 and 40, there would be a net increase in the total number of AT/FP compliant POV parking spaces at Tucson ANGB. Therefore, implementation of these projects included in Alternative 1 would result in less than significant impacts to installation parking.

4.6.2.2 Alternative 2: No-Action Alternative

If the No-Action Alternative were selected, the proposed TAF relocation and associated construction, demolition, and interior renovation projects would not be implemented at Tucson ANGB. Baseline conditions, as described in Section 3.6, *Transportation and Circulation*, would remain unchanged. There would be no installation access improvements associated with the proposed ECF and there would be no parking reconfigurations, necessary to meet AT/FP requirements. Consequently, implementation of this alternative would not bring the installation into compliance with existing AT/FP requirements.

4.7 CULTURAL RESOURCES

4.7.1 Approach to Analysis

Cultural resources are subject to review under both Federal and state laws and regulations. Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, empowers the Advisory Council on Historic Preservation (ACHP) to comment on federally initiated, licensed, or permitted projects that have the potential to affect cultural sites listed on or eligible for inclusion on the National Register of Historic Places (NRHP).

Once cultural resources have been identified, the evaluation of their significance is the process by which those resources are assessed in the context of criteria for scientific or historic research, for the general public, and for traditional cultural groups (e.g., federally recognized Native American tribes). Only cultural resources determined to be significant (i.e., eligible for inclusion in the NRHP) are protected under the NHPA.

Analyses of potential impacts to cultural resources consider both direct and indirect impacts. Direct impacts may occur by any of the following: 1) physically altering, damaging, or destroying all or part of a resource; 2) altering the characteristics of the surrounding environment that contribute to resource significance; 3) introducing visual, audible, or atmospheric elements that are out of character with the property or alter its setting; or 4) neglecting the resource to the extent that it deteriorates or is destroyed. Direct impacts are assessed by identifying the locations of disturbance and determining if an action would coincide with the locations of identified significant cultural resources and thereby have the potential to result in a direct, adverse impact to that cultural resource. Indirect impacts may result from the effects of project-induced changes in the local communities or environment. These activities may disturb or destroy cultural resources.

4.7.2 Impacts

4.7.2.1 Alternative 1: TAF F-16 FTU Relocation to Tucson International Airport

Archaeological Resources

Under Alternative 1, ground disturbing activity at Tucson ANGB would be limited to the expansion of Building 1 and Building 40. As described in Section 3.7, *Cultural Resources*, a cultural resources survey (CRS) – including a database search and an intensive surface archaeological survey – was previously conducted at Tucson ANGB. The survey area included existing Tucson ANGB property as well as a manmade wash adjacent to the north and east sides of the installation. No archaeological resources were identified during this survey and the Arizona State Historic Preservation Office (SHPO) concurred with these findings in a letter dated 21 December 2010 (Arizona SHPO 2010). Therefore, it is highly unlikely that ground disturbing activities at Tucson ANGB would impact buried archaeological resources.

Implementation of Alternative 1 would also include the demolition of three existing facilities (i.e., warehouse, support facility, Aerovation Hangar) and the construction of the proposed ECF on the 18-acre TAA owned property to be acquired (via lease and/or purchase) by the 162 WG. However, this property has been extensively disturbed during previous grading and construction activities for the three existing facilities at the site. Therefore, the potential for unknown buried archaeological resources in this area is low. Related to the proposed ECF, Alternative 1 would also include the in-kind replacement of the Aerovation Hangar and associated pavements in a 9-acre, TAA owned property adjacent to the ATC tower. A *Class III Cultural Resources Investigation of 704 Acres at the Tucson International Airport in Support of Proposed Runway 11R/29L Relocation* (FAA 2007) included this 9-acre area proposed for the in-kind hangar replacement. No archaeological resources were observed in this area during the investigation.

Based on information currently available – including previous archaeological investigations at Tucson ANGB and TUS – there would be no impact to buried archaeological resources. Nevertheless, should it be determined that archaeological or cultural resources are present during regular inspection of the

construction site, any project-related construction activities would be suspended until a qualified archaeologist had documented and evaluated the resource for NRHP eligibility, in compliance with Section 106 of the NHPA.

Historic Built Resources

As described in Section 3.7, *Cultural Resources*, the CRS also included a survey and evaluation of the 22 built resources at Tucson ANGB constructed prior to 1990 – including 20 buildings, 1 structure, and 1 object – none of which were considered to meet NRHP eligibility criteria (Arizona ANG 2011b). The Arizona SHPO concurred with these status evaluations in a letter dated 11 February 2011 (refer to Table 3-11). The remaining built resources not evaluated in the architectural survey were constructed after 1990. These buildings are less than 50 years old, have no associations with the Cold War-era, and are not eligible for listing on the NRHP. As such, the proposed renovation and expansion of Building 1 and Building 40 and the interior renovation of Building 49 under Alternative 1 would have no impact on historic built resources.

Table 4-5. NRHP Evaluated Buildings Affected by Alternative 1

Building Number	Current Description/Use	Proposed Activity	Status Evaluation	SHPO Concurrence with 2011 Evaluation
1	Wing Headquarters and Communications	Interior Renovation and Addition	Not eligible	✓
40	International Squadron Operations	Interior Renovation and Addition	Not eligible	✓
49	Munitions Load Crew Training	Fire Detection and Suppression Systems Installation	Not eligible	✓

Source: Arizona ANG 2011b.

The three facilities on the 18-acre TAA owned property (i.e., warehouse, support facility, Aerovation Hangar), which would be demolished to provide space for the proposed ECF, were not evaluated as part of the 2011 CRS as they are not located on installation property. However, these structures were included in a separate historic architectural survey conducted in March 2018 (Amec Foster Wheeler 2018;

see Appendix F). The three facilities, which date from 1953 to 1968, were constructed for Hamilton Aviation and were considered secondary structures to a larger facility. As such, these buildings do not hold exceptional significance in relation to Hamilton Aviation, nor is there evidence that suggests that a specific event occurred in association with any of the three facilities. The three facilities are not unique, and represent typical industrial buildings that can be found on a number of airfields throughout the region and across the country, meaning they lack architectural significance. Further, all three facilities have been altered following their original construction and therefore lack material integrity. The three facilities do not yield or have the potential to yield additional information regarding the history of the site (Amec Foster Wheeler 2018b). Consequently, these three facilities have been recommended as not eligible for the NRHP (see Appendix F). The Arizona SHPO was consulted under Section 106 of the NHPA and has concurred that the three historic-age facilities (i.e., warehouse, support facility, Aerovation Hangar) are not eligible for inclusion on the NRHP. Therefore the 162 WG has determined that implementation of the Proposed Action would have *no historic properties affected* in a letter dated 18 May 2018 (see Appendix C for the Arizona SHPO concurrence letter). Based on information currently available, there would be no impacts to historic built structures.

Federally Recognized Native American Tribes

As described in Section 3.7.2.4, *Federally Recognized Native American Tribes*, federally recognized tribes were notified of the Proposed Action as required by Air Force Instruction (AFI) 90-2002, which implements DoD Instruction (DoDI) 4710.02, *DoD Interactions with Federally-Recognized Tribes*, as a part of the tribal coordination process associated with this EA (see Appendix B). A consultation letter has been provided to the tribes requesting information about the Area of Potential Effect (APE) and offering government-to-government consultation. To date only the White Mountain Apache Tribe has responded, by providing a letter on 18 May 2018 which determined that the proposed project would not have an adverse effect on their historic properties and/or traditional cultural properties. The letter also suggested monitoring during ground-disturbing activities if there is reason to believe that there are human remains and/or funerary objects present. However, the 2011 CRS found no tribal cultural resources at Tucson ANGB. The 162 WG have provided the federally recognized tribes with the Draft EA and will

continue to follow-up with the tribes via telephone and e-mail to conclude tribal consultation.

Since no lands held in trust by the U.S. for tribal governments are located in the immediate vicinity of the installation and no tribal trust resources are believed to be located within the proposed project areas, tribal trust resources would not have the potential to be impacted by implementation of Alternative 1. Nevertheless, as previously described, should it be determined that archaeological resources are present during regular inspection of the construction site, project-related construction activities would be suspended until a qualified archaeologist could determine the significance of the resource(s). No impacts to cultural resources would occur beneath the affected airspaces as the total F-16 operations would remain below the number of operations that were previously assessed for these airspaces. Additionally, increases to noise levels within airspace utilized for 162 WG training would increase by no more than 0.64 dB relative to existing conditions. Therefore, implementation of Alternative 1 would have no impact on known Native American cultural resources.

4.7.2.2 Alternative 2: No-Action Alternative

If the No-Action Alternative were selected, the proposed TAF relocation and associated construction, demolition, and interior renovation projects would not be implemented. Consequently, no building demolition or renovations would occur and there would be no impacts to existing built resources on Tucson ANGB or TAA-owned property. Additionally, as there would be no ground disturbance, there would be no potential to uncover previously unknown archaeological resources during minor ground disturbing activities. No impacts to cultural resources would occur under the No-Action Alternative and conditions would remain as described in Section 3.7, *Cultural Resources*.

4.8 HAZARDOUS MATERIALS AND WASTES

4.8.1 Approach to Analysis

Numerous Federal, state, and local laws regulate the storage, handling, disposal, and transportation of hazardous materials and wastes; the primary purpose of these laws is to protect public health and the environment. Certain DoD and USAF recycling requirements and goals also apply to construction/demolition waste that is non-hazardous in nature. The severity of potential impacts associated with hazardous substances is based on their toxicity, ignitability, and corrosivity. Impacts associated with hazardous materials and wastes would be considered significant if the storage, use, transportation, or disposal of hazardous substances substantially increases the human health risk or environmental exposure. Impacts to identified contaminated sites would be considered significant if an action disturbed or created additional contamination resulting in adverse effects to human health or the environment.

4.8.2 Impacts

4.8.2.1 Alternative 1: TAF F-16 FTU Relocation to Tucson International Airport

Construction-Related Impacts

Hazardous Materials and Wastes

Upon implementation of Alternative 1, a temporary increase in the storage of hazardous materials and wastes would occur throughout the duration of construction and demolition activities as well as during interior renovations of the existing facilities. However, the increase in construction-related hazardous materials and wastes would be temporary and would not comprise a significant impact or exceed the Tucson ANGB's permitted allowance. Further, the 162 WG Environmental Manager would be consulted prior to any increase in hazardous materials and/or waste. The safe handling, storage, and use procedures are currently managed under the installation's Hazardous Waste Management Plan (HWMP) (Arizona ANG 2013), in accordance with all Federal, state, and local regulations, and would continue to be implemented with regard to additional

hazardous materials and petroleum products. This includes the appropriate identification and characterization of lead-based paint (LBP), polychlorinated biphenyls (PCBs), mercury, and other potentially hazardous materials prior to and during construction.

Environmental Restoration Program and Site Contamination

As described in Section 3.8.2.3, *Environmental Restoration Program and Site Contamination,* Tucson ANGB overlies the boundaries of the TUS Area Superfund Site, a designated National Priorities List (NPL) site. In addition to the Superfund Site at Tucson ANGB, the installation has eight ERP sites, as identified by the 2006 Environmental Baseline Survey (EBS) (Arizona ANG 2006). ERP Site 5 has been approved as closed by the Arizona Department of Environmental Quality (ADEQ) and USEPA, and the remaining sites have been recommended for No Further Action (NFA). ERP Sites 5 and 7 have been recommended NFA for soils; however, groundwater contamination from the TUS Area Superfund Site has been detected at these sites and is currently being addressed on an installation-wide basis by Groundwater Extraction, Treatment, and Recharge Systems (GWETRS) (Arizona ANG 2006). A summary of the ERP sites and their status is provided in Table 3-12.

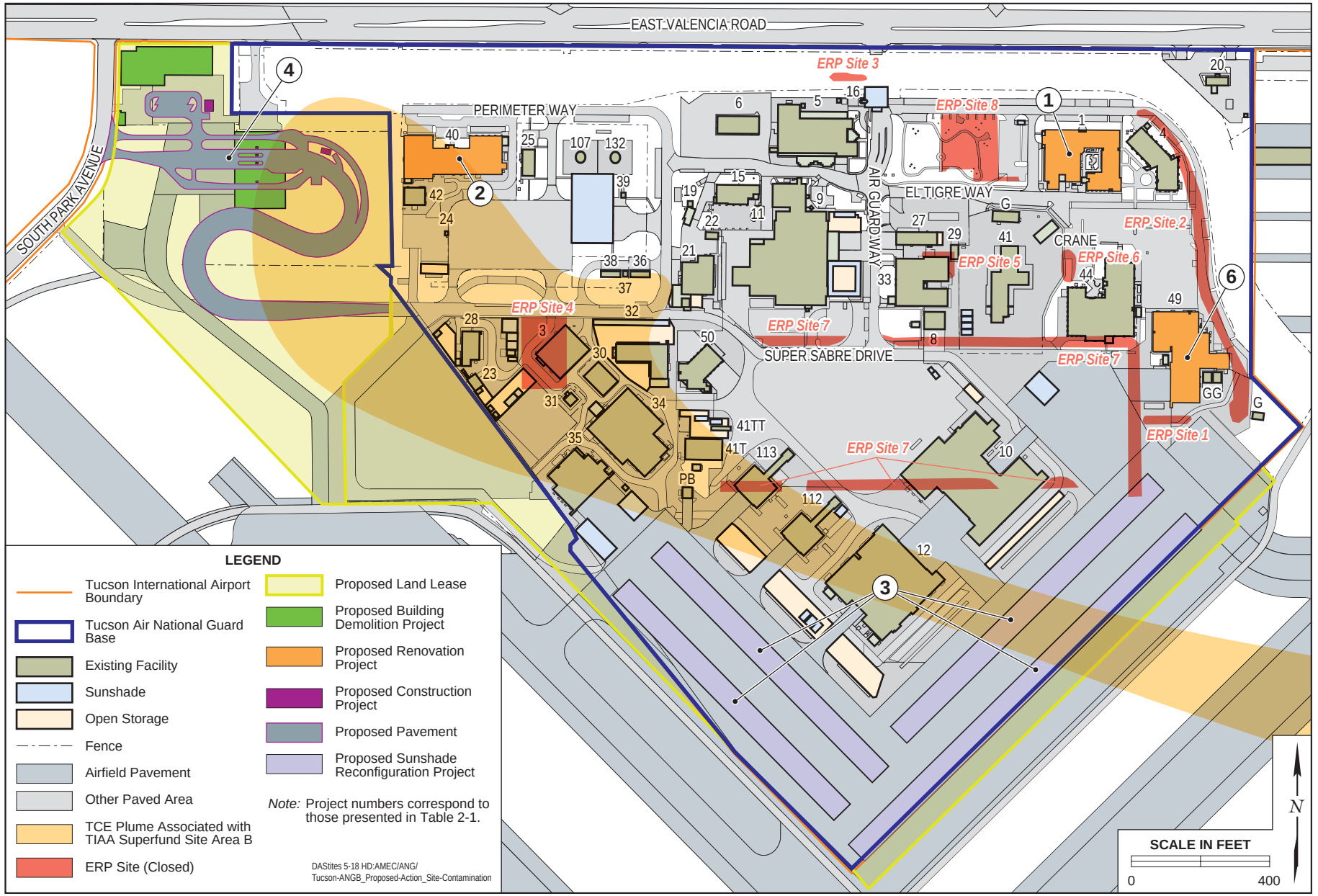
As shown in Figure 4-3, none of the proposed construction, demolition, and interior renovation projects included in Alternative 1 would affect or be affected by any of the ERP sites at Tucson ANGB. However, implementation of Alternative 1 would include the demolition of the existing hangar buildings west of the installation to support construction of the proposed ECF; this parcel is located over a portion of the TUS Area Superfund Site. As discussed in Section 3.8.2.3, *Environmental Restoration Program and Site Contamination*, groundwater remediation on the installation property is ongoing. Implementation of the proposed construction projects included in Alternative 1 would not expose contaminated groundwater and ongoing remediation would not be affected.

Nevertheless, in order to reduce overall worker exposure potential, a Site-Specific Health and Safety Plan would be implemented for projects located within or adjacent to contamination sites. The Health and Safety Plan would be designed to evaluate each of the chemicals present in the work area and the potential exposure scenarios/paths. Based on this evaluation, the Health and Safety Plan would

identify levels of necessary personal protection through best management practices (BMPs) (e.g., use of personal protective equipment [PPE], engineering mechanisms, or worker practices). The Health and Safety Plan would typically require monitoring of chemicals if available information indicates the chemicals may be present. Further review of TUS Area Superfund Site documentation would be conducted to identify any need for chemical monitoring. Even if monitoring is not implemented as part of the initial project, the Health and Safety Plan mandates reassessment of the safeguards (i.e., PPE and engineered mechanisms) if changes at the site occur that are suspected to be related to hazardous substances. This may involve the complete cessation of work and notification of the 162 WG Environmental Manager.

Asbestos and Lead-based Paint

Alternative 1 includes the demolition of the three facilities (i.e., warehouse, support facility, Aerovation Hangar) located in the 18-acre TAA owned property located to the west of the installation to be acquired (via lease and/or purchase) by the 162 WG. Interior renovations including space reconfiguration and relocation of some existing interior walls is proposed for Building 1 and Building 40. Additionally, Alternative 1 includes installation of a fire detection and suppression system in Building 49. Currently, only Building 1 on Tucson ANGB as well as the warehouse and associated support facility on the 18-acre TAA owned property have been identified as having building materials with asbestos-containing material (ACM). Prior to demolition, all facilities would be examined for ACM and all potential ACM in the buildings proposed for demolition or renovation under Alternative 1 would be handled and disposed of according to the installation's Asbestos Management Plan as well as in compliance with all applicable Federal, state, and local regulations (Arizona ANG 2013). Additionally, appropriate BMPs would be followed during all demolition activities (e.g., worker training, PPE, medical surveillance, recordkeeping, etc.). Therefore, impacts associated with asbestos would not be significant under implementation of Alternative 1.



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Contamination Sites Project Impacts

FIGURE 4-3

While there have been no LBP surveys conducted at Tucson ANGB, all of the buildings on the installation constructed prior to 1978 are presumed to contain LBP and will be tested prior to demolition or renovation in accordance with the installation's HWMP (Arizona ANG 2013). Of the three installation buildings that would be affected by Alternative 1, only Building 1 and Building 40 were constructed prior to 1978 (refer to Table 3-11). Samples collected from the TAA property for the proposed ECF during the 2014 Phase II EBS did not contain concentrations above 5 milligrams per liter (mg/L). Consequently, the EBS concluded that hazardous levels of lead would not be anticipated to leach from building materials in a landfill setting and these materials would not need to be handled or disposed of as hazardous waste (Arizona ANG 2014).

Operational Impacts

Alternative 1 would involve the beddown of 14 F-16 aircraft at Tucson ANGB. The safe handling, storage, and use procedures currently managed under the installation's HWMP (Arizona ANG 2013), in accordance with all Federal, state, and local regulations, would continue to be implemented with regard to additional hazardous materials and petroleum products. Any changes associated with hazardous materials and waste generation at the Tucson ANGB would be handled in accordance with updates to the installation's hazardous materials plans, policies, and procedures upon implementation of Alternative 1. Upon completion of construction activities, the potential for exposure to, or ingestion of, contaminated groundwater is considered highly unlikely. Therefore, with implementation of standard BMPs during construction, it is not anticipated that construction workers, ANG personnel, the public, or the environment would be exposed to hazardous contaminants as a result of Alternative 1. Further, Alternative 1 would not interfere with or prohibit any currently approved or ongoing remediation efforts for identified contaminated sites. Therefore, impacts associated with ERP and contaminated sites would be less than significant.

4.8.2.2 Alternative 2: No-Action Alternative

If the No-Action Alternative were selected, the proposed TAF relocation and associated construction, demolition, and interior renovation projects would not occur. Further, the existing installation's HWMP would remain in effect and

handling and treatment of hazardous materials at the Tucson ANGB would continue. Therefore, no impacts with regard to hazardous materials or wastes would occur and conditions would remain as described in Section 3.8, *Hazardous Materials and Wastes*.

4.9 SAFETY

4.9.1 Approach to Analysis

If implementation of an action would substantially increase risks associated with aircraft mishap potential or flight safety relevant to the public or the environment, it would represent a significant impact. For example, if an action involved an increase in aircraft operations such that mishap potential would increase significantly, air safety would be compromised.

Changes in flight tracks or missions can also result in impacts to safety if the action would increase the risk of bird strikes. The Bird/Wildlife Aircraft Strike Hazard (BASH) risk is determined by comparing BASH data for the routes previously flown to data projected to occur based on conditions following implementation of an action.

Further, if implementation of Alterative 1 would result in incompatible land use with regard to safety criteria such as Runway Protection Zones (RPZs), Explosives Safety Quantity-Distance (ESQD) arcs, or Clear Zones (CZs) impacts would be considered to be significant.

4.9.2 Impacts

4.9.2.1 Alternative 1: TAF F-16 FTU Relocation to Tucson International Airport

Mishap Potential and Bird-Aircraft Strike Hazard

Under Alternative 1, the 162 WG would beddown 14 F-16 aircraft at Tucson ANGB for TAF use. Similar to existing flying operations at Tucson ANGB, proposed F-16 operations would adhere to all established flight safety guidelines and protocol. Implementation of Alternative 1 would result in a net increase to the frequency of aircraft operations performed by the 162 WG. However, as previously described, the anticipated increase in aircraft operations would remain below the number of operations previously assessed in the *EA for Proposed Aircraft Conversion and Construction Activities at the 162nd Fighter Wing (2003)*. Historic mishap and BASH data relevant to the unit and its operations at Tucson ANGB indicate that neither

aircraft mishaps or bird-aircraft strikes presents substantial operational constraints to the 162 WG. Further, conflicts with the unit's BASH plan would not be not anticipated under the implementation of the F-16 beddown. Therefore, with regard to aircraft mishaps and bird-aircraft strikes, no significant impact would result from implementation of Alternative 1.

Clearance Areas and Runway Protection Zones

The construction projects included in Alternative 1 were developed as a part of a comprehensive land use planning process described in the 162 WG's IDP. The IDP process evaluated the location of existing and proposed development in relation to the airfield at TUS and compliance with the IDP would ensure that the proposed facilities are sited in compatible land use areas that do not encroach on any of the Clearance Areas or RPZs. While a portion of the new pavements associated with the proposed ECF would be located within the Extended RPZ at TUS, any manned buildings (e.g., recruitment facility) that are included in the proposed ECF would be located outside of the clearance areas (see Figure 4-4). Additionally, as described in Section 3.9, *Safety*, RPZs limit the types of land uses allowed in these areas, rather than prohibiting development altogether. Further, proposed construction and renovation activities have been designed and sited to meet all applicable airfield safety criteria (e.g., Unified Facilities Criteria [UFC] 3-260-01, *Airfield and Heliport Planning and Design Criteria*, which limits the locations and heights of objects and facilities around and in the immediate vicinity of an airfield to minimize hazards to airfield and flight operations). Therefore, implementation of Alternative 1 would have no adverse impacts on airfield safety.

Explosives Safety

As described in Section 3.9, *Safety*, Building 41, the only building used to store munitions at Tucson ANGB, is surrounded by an ESQD arc with a radius of 100 feet, centered on the building. Under Alternative 1, no changes to or development in the vicinity of the MSA would be included in any of the proposed construction, demolition, and interior renovation projects. Additionally, none of the projects included in Alternative 1 would result in the construction of any new buildings within the ESQD arc associated with the MSA. Therefore, there would be no impacts to explosives safety under Alternative 1.

Fire Safety

As described in Section 2.4.1, *Alternative 1: TAF F-16 FTU Relocation to Tucson International Airport*, Building 49 is currently being used for weapons load training and does not have a fire suppression system. Consequently, current operations have been assessed as Fire Safety Deficiency 1 and Risk Assessment Code 3 requiring portable fire extinguishers to be present and hangars doors to remain open during maintenance operations. Following the proposed TAF relocation, the 21 FS would use Building 49 as a maintenance facility for F-16 aircraft. The proposed installation of a new fire suppression and fire detection system in Building 49 would reduce the risk of fire hazard to personnel and aircraft. Therefore, implementation of Alternative 1 would result in beneficial impacts with regards to fire safety at Tucson ANGB.

Anti-Terrorism/Force Protection

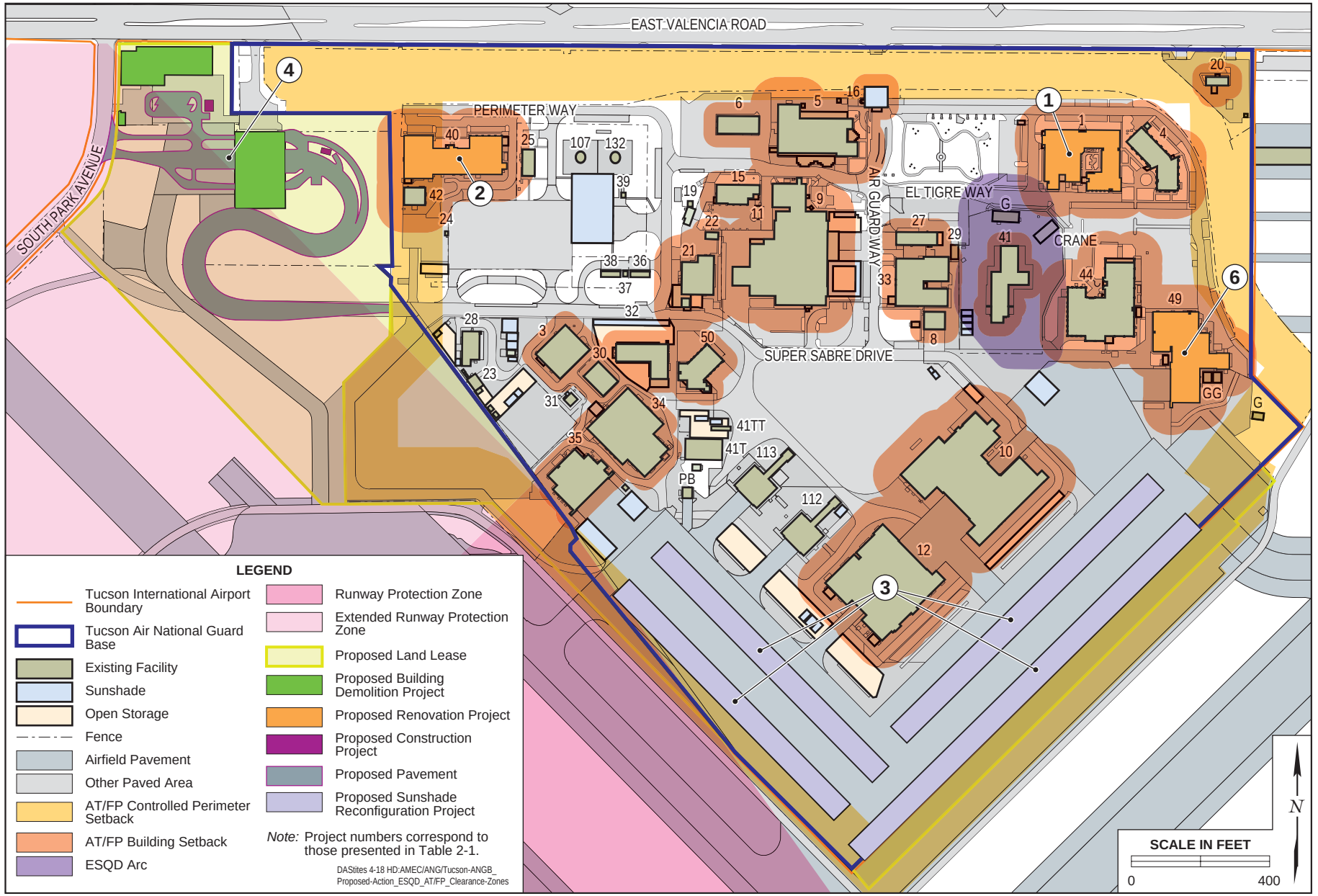
As described in Section 3.9, *Safety*, current parking conditions and building setbacks at Tucson ANGB are noncompliant with AT/FP standards (UFC Series 4-000, *DoD AT/FP Standards & Security Engineering*; UFC 4-022-01 *Security Engineering, Entry Control Facility (ECF)/Access Control Point [ACP] 2005*). Additional parking is required to accommodate POVs throughout the installation in which approximately 365 parking spaces are not AT/FP compliant. However, renovations and additions to Building 1 and Building 40 would include reconfiguration and realignment of the nearby POV parking to accommodate fire and emergency vehicles and comply with AT/FP standoff setbacks.

Further, there are several AT/FP concerns associated with the existing ECF at Tucson ANGB. The existing ECF currently lacks a vehicle search area, a serpentine (i.e., S-shaped) roadway configuration necessary for vehicle denial, and a containment area as required by UFC 4-022-01, *DoD Minimum Anti-Terrorism Standards for Buildings*. Implementation of Alternative 1 would provide these facilities at the proposed ECF, including a new check house and lighting improvements. With the addition of these facilities at the proposed ECF, entering vehicles would be required to wait in a vehicle queuing space while the vehicle is inspected prior to entering the installation. The serpentine roadway configuration would provide final denial capabilities to improve safety and security at the

installation. Therefore, Alternative 1 would result in beneficial impacts associated with AT/FP issues at Tucson ANGB.

4.9.2.2 Alternative 2: No-Action Alternative

If the No-Action Alternative were selected, the proposed TAF relocation and associated construction, demolition, and interior renovation projects would not occur. Over the long-term under the No-Action Alternative, the AETC's mandate to eventually remove all F-16s from Luke AFB (i.e., via either relocation or retirement) by 2023 would not be met. With regard to aircraft safety, the total number of F-16 operations would be reduced at Tucson ANGB with the departure of 125 FS Det 1. However, overall safety conditions would remain as described in Section 3.9, *Safety*. Consequently, implementation of the No-Action Alternative would result in no impacts to safety.



EA

ESQD Arcs, AT/FP Setbacks, and Clearance Zones
Project Impacts

FIGURE 4-4

SECTION 5
CUMULATIVE IMPACTS

Potential cumulative impacts can result from incremental impacts of an action combined with other past, present, and reasonably foreseeable future actions in an affected area. Cumulative impacts may result from minor, but collectively substantial, actions undertaken over a period of time by various Federal, state, or local agencies or persons. In accordance with the National Environmental Policy Act (NEPA), a discussion of cumulative impacts resulting from projects proposed, under construction, recently completed, or anticipated to be implemented in the near future is required.

5.1 APPROACH TO CUMULATIVE IMPACTS ANALYSIS

Per Council on Environmental Quality (CEQ) guidelines for considering cumulative effects under NEPA (CEQ 1997), this cumulative impact analysis includes three major considerations to:

1. Determine the scope of the cumulative analysis, including relevant resources, geographic extent, and timeframe;
2. Conduct the cumulative effects analysis; and
3. Determine the cumulative impacts to relevant resources.

CEQ guidelines require that potential cumulative impacts be considered over a specified time period (i.e., from past through future). The appropriate time for considering past, present, and reasonably foreseeable future projects may be the design life of a proposed project, or future timeframes used in local master plans and other available predictive data. Determining the timeframe for the cumulative impacts analysis requires estimating the length of time the impacts of an action would last and considering the specific resource in terms of its history of degradation (CEQ 1997).

5.2 CUMULATIVE PROJECTS IN THE VICINITY OF TUCSON ANGB

For the purposes of this Environmental Assessment (EA), planned projects at Tucson ANGB or other projects that are within 1 mile of Tucson Airport Authority (TAA) property are considered to be within the overall Cumulative Impact Study

Impact Study Area. The projects to be included in the cumulative impact analysis are located at Tucson ANGB, within Tucson International Airport (TUS), in unincorporated Pima County, or in the City of Tucson, and were also identified in the *Draft Environmental Impact Statement (EIS) for the Proposed Airfield Safety Enhancement Project at TUS* (Federal Aviation Administration [FAA] 2018). The past actions are defined as those that were completed between 2012 to 2016. Present actions are any other actions that are occurring in the same general timeframe as the Proposed Action and are defined for this EA as those completed in 2017 or where construction is currently ongoing. Reasonably foreseeable future actions are defined as those actions planned to be completed between 2018 and 2023. Potential projects beyond 2023 would be considered speculative. This section identifies those past, present, and reasonably foreseeable future projects in Tables 5-1, 5-2, and 5-3, respectively.

Table 5-1. Past Actions in the Vicinity of Tucson ANGB

Project Name	Location	Description	Status
Aerospace Parkway (East Hughes Access Road Relocation)	South of East Hughes Access Road	The project realigned East Hughes Access Road approximately 2,500 feet south of its alignment and renamed it Aerospace Parkway.	Completed 2015
Nogales-Old South Nogales Intersection Improvement Project	Intersection of South Nogales Highway and Old South Nogales Highway	The project consisted of an intersection improvement and a drainage improvement at Nogales Highway and Old South Nogales Highway.	Completed 2016
Circle K Development	350 East Valencia	The project constructed a convenience store and gas station.	Completed 2016
Airport Traffic Control Tower	TAA Property	The project constructed a new Airport Traffic Control (ATC) tower.	Completed 2016
Walmart Neighborhood Market & Gas Station	2565 East Commerce Center	The project constructed a grocery store and gas station.	Completed 2016
Ascent Aviation Maintenance Hangar	TAA Property	The project constructed a new aircraft hangar to support Ascent Aviation.	Completed 2015
Non-Movement Apron Reconstruction	TAA Property	The project reconstructed a non-movement apron for TUS.	Completed 2015
FedEx Distribution Center	3350 East Westco	The project constructed a FedEx distribution center.	Completed 2015
Solar Photovoltaic Project - Phase I	TAA Property	The project installed the Phase I solar panels in front of the TUS in the terminal parking lot.	Completed 2014

Source: FAA 2018.

Table 5-2. Present Actions in the Vicinity of Tucson ANGB

Project Name	Location	Description	Status
Terminal Optimization Program	TAA Property	Terminal optimization project.	Completed 2017
Worldview	1805 E Aerospace Parkway	World View Enterprises' new headquarters.	Completed 2017
Reconstruct Runway 11L/29R and Connector Taxiways	TAA Property	Rehabilitation of Runway 11L/29R.	Completed 2017
Solar Photovoltaic Project - Phase 2	TAA Property	Installation of solar photovoltaic units within an existing parking lot.	Completed 2017
Alvernon and Hughes Access Bike Lanes	Valencia Road to Old South Nogales Highway	Addition of Alvernon and Hughes Access bike lanes.	Construction Ongoing
Summit View Elementary Safe Routes to School Project	1300-1900 East Summit View	Connectivity improvements to and from the school and subdivisions. The entire project will be compliant with the Americans with Disabilities Act.	Construction Ongoing
Faculty Resource Center Expansion	5901 South Calle Santa Cruz	Renovation and expansion of the existing Pima Community College Faculty Resource Center.	Construction Ongoing
Community Room Storage	5901 South Calle Santa Cruz	Construction of a storage room addition adjacent to the Plaza (F) Building of Pima Community College.	Construction Ongoing
U.S. Air Force Plant (AFP) 44/ Aerospace Parkway Intersection and Southern AFP 44 roadway extension	Aerospace Parkway and Raytheon Way	Construction of an intersection and at Aerospace Parkway and AFP 44.	Construction Ongoing

Source: FAA 2018.

Table 5-3. Reasonably Foreseeable Actions in the Vicinity of Tucson ANGB

Project Name	Location	Description	Current Status
Airfield Safety Enhancement Project	TAA Property	Improvements to enhance aircraft safety at TUS including construction of a new center parallel taxiway and connecting taxiway system, a replacement Runway 11R/29L, and acquisition of land from AFP 44 to facilitate establishment of new and expanded runway safety areas. This land acquisition also includes relocation of various military installation assets to locations elsewhere on AFP 44 and installation of navigational aids and development and/or modification of associated arrival and departure procedures.	Draft EIS release in May 2018 and anticipated in 2023
Arizona Department of Public Safety Facility	TAA Property	Construction of a facility, which includes on-site parking, living quarters, hangar, and storage tank for Jet A fuel.	Anticipated in 2018
Iraqi Air Force Training Leaving Tucson ANGB	Tucson ANGB	Iraqi F-16 aircraft will depart and training operations for these aircraft will no longer take place at Tucson ANGB.	Anticipated in 2019
Industrial Buildings	TAA Property leased by Raytheon Missile Systems	Construction of three industrial buildings to support operations.	Anticipated in 2018
Addition to Building 845	TAA Property leased by Raytheon Missile Systems	Construction of additional hangar space to support operations	Anticipated in 2018
Aerospace Parkway Widening	Aerospace Parkway south of Airport	Widening from two lanes to four lanes from Nogales Highway to Alvernon Way.	Earliest completion estimated 2019
University of Arizona Environmental Research Lab	TAA Property	Demolish environmental research facility, east of Tucson Blvd and Airport Drive at 2601 E Airport Drive.	Anticipated in next 5 years
Aerospace Parkway Widening	Aerospace Parkway	Widening of Aerospace Parkway.	Anticipated in next 5 years
University of Arizona Environmental Research Lab	TAA Property	Demolish environmental research facility, east of Tucson Blvd and Airport Drive at 2601 E Airport Drive.	Anticipated in next 5 years
Aerospace Parkway Widening	Aerospace Parkway	Widening of Aerospace Parkway.	Anticipated in next 5 years

Table 5-3. Reasonably Foreseeable Actions in the Vicinity of Tucson ANGB (Continued)

Project Name	Location	Description	Current Status
Combat Air Forces Adversary Air (CAF ADAIR)	TAA Property	The U.S. Air Force (USAF) has identified Tucson ANGB as a potential site among many being discussed for the CAF ADAIR Program at some point in the future. However, at this time, TUS has not been identified as an alternative CAF ADAIR site location. CAF ADAIR aircraft type and operational numbers have not yet been determined, the CAF ADAIR project has not yet been fully funded, and a CAF ADAIR contractor has not yet been selected. Further, Tucson ANGB may never be seriously considered as an alternative for CAF ADAIR, therefore, it is too speculative to analyze cumulative impacts as part of this EA based on a hypothetical possibility without the necessary facts to support analysis. If Tucson ANGB is ever considered for some form of CAF ADAIR in the future, the USAF would conduct appropriate environmental analysis.	Planning on-going, but anticipated in next 5 years
Vector Space Systems	Pima County Property	Construction of a rocket manufacturing facility.	Anticipated in 2019
Pima Community College Aviation Technology Center Expansion	TAA Property	Expansion of offices and construction of a warehouse on TAA property. The project site is north of the southwest end of Runway 21 and is immediately east of Old South Nogales Highway.	Anticipated in next 5 years
TEP Relocation	TAA Property	TEP relocation of overhead power poles east of the end of Runway 11L.	Anticipated in next 5 years
AFP 44 Entry Control Point	AFP 44	Construction of USAF Entry Control Point into AFP 44.	Anticipated in next 5 years
Redevelopment of Hangar	TAA Property	Redevelopment of an existing hangar on 1000 East Valencia Road.	Anticipated in next 5 years
GA Hangar Area B1 - Pavement Replacement	TAA Property	Redevelopment of general aviation hangars and expansion of	Bid awarded in 2016

Table 5-3. Reasonably Foreseeable Actions in the Vicinity of Tucson ANGB (Continued)

Project Name	Location	Description	Current Status
		supporting offices located west of East Airport Drive.	
Development of Aerospace/Defense/ Research Business Park & Corridor	Aerospace Parkway	Development of the Aerospace/Defense/ Research Business Park & Corridor south of Raytheon, along Aerospace Parkway from Nogales Highway to Alvernon Way.	Anticipated in next 5 years
Maintenance Repair and Overhaul Operations Site	TAA Property	Development of Maintenance Repair and Overhaul Operations site south of new ATC tower on Aero Park Boulevard.	Anticipated in next 5 years
Maintenance Repair and Overhaul Operations Site	TAA Property	Development of Maintenance Repair and Overhaul Operations site east of Runway 11L end.	Anticipated in next five years
New GA Hangar	TAA Property	Potential new general aviation hangar constructed north of the northeast end of Runway 3.	Anticipated in next 5 years
Relocation of Service Road; Extension of Drainage Culvert	Airport Property	Relocation of service road and extension of drainage culver which is parallel to Taxiway D.	Anticipated in next 5 years
New Airport Plaza	Airport Property	Construction of Airport Plaza northeast of the corner of Plumer Ave and East Airport Drive.	Anticipated in next 5 years
Residential Development Project	6th and Medina	Potential residential project with 30 new residential homes located to the northeast of the intersection of East Medina Road and South 6th Avenue. The property is currently undeveloped/vacant.	Anticipated in next 5 years
Old Vail Road Right-of-Way Expansion	Old Vail Road east of Old South Nogales Highway to Wilmot Road (South of Aerospace Parkway)	Expansion of the Old Vail Road right of way and construction of a two-lane road.	Anticipated in next 5 years
Santa Cruz Water Production Facility	Southeast of the intersection of Old South Nogales Highway and E. Hughes Access Road	Construction of the new Santa Cruz Water Production Facility that will treat potable water from the Tucson Water's "Santa Cruz Well Field".	In bidding process

1 Source: FAA 2018.

5.3 CUMULATIVE PROJECTS AT DAVIS-MONTHAN AIR FORCE BASE

There are currently no programmed or funded projects at Davis-Monthan Air Force Base (AFB) that have the potential to result in cumulative impacts at Tucson ANGB. However, the USAF has issued a Notice of Intent (NOI) to prepare an EIS for the Air Force Reserve Command F-35A Operational Beddown (Federal Register [FR] 12568 Vol. 83 No. 56). This EIS will assess the potential environmental impacts that could result from the beddown and operation of 24 Primary Authorized Aircraft (PAA) and 2 Backup Aircraft Inventory (BAI), facility and infrastructure development, and personnel changes. The USAF has identified Naval Air Station (NAS) Forth Worth Joint Reserve Base (JRB) in Texas as the preferred alternative; however, Davis-Monthan AFB has been identified – along with Homestead ARB in Florida and Whitemann AFB in Missouri – as a reasonable alternative. While Davis-Monthan is not the USAF's preferred alternative, if this location were selected for the proposed beddown, F-35A operations at this location could result in potential impacts to air quality and noise levels in the communities immediately surrounding the base and beneath the airspaces that would be utilized for training. These impacts could incrementally contribute to cumulative impacts within the vicinity of Tucson ANGB, which is located approximately 5 miles to the southwest of Davis-Monthan AFB. The potential for cumulative impacts will be considered in further detail during the development of the EIS for the Air Force Reserve Command F-35A Operational Beddown.

5.4 CUMULATIVE IMPACTS

The proposed relocation of the TAF F-16 FTU would affect aircraft operations at TUS as described in Section 4, *Environmental Consequences*. However, there are currently no planned, funded, or programmed changes aircraft operations at local airports or airspaces in the vicinity of TUS. Therefore, implementation of the Proposed Action would not result in cumulative impacts with regards to aircraft operations or airspace utilization.

Construction, demolition, and interior renovation projects associated with the Proposed Action would be temporary and confined to areas within or immediately adjacent to the installation boundary. Similarly, construction projects at TUS would be confined to the boundaries of the airport. Although the exact

timing of the development projects described above are not yet known, the potential exists for cumulative environmental impacts to occur with regard to airspace management, air quality, noise, transportation and traffic, and safety. Additionally, the proposed 2018 Airfield Safety Enhancement Project would have the potential to affect noise contours located outside of TAA property boundaries.

5.4.1 Airspace Management

The proposed Airfield Safety Enhancement Project at TUS would include the replacement of Runway 11R/29L with a full-length parallel runway. An 800-foot separation between the two runways would be established, which would allow for a parallel taxiway to be constructed between the two runways. Various other taxiway improvements would also enhance airfield safety at TUS. The addition of several taxiway segments would replace removed taxiways and would comply with FAA design standards. With the implementation of these improvements at TUS, anticipated to be operational by FY 2023, the FAA-controlled ATC tower would split Arizona Air National Guard (ANG) departures and landings approximately evenly between the two runways. As a result, approximately 50 percent of military aircraft operations would be required to taxi a greater distance than they would without the new runway, as the replacement runway would be constructed approximately 94 feet further from the existing Tucson ANGB facilities. However, the runway improvements at TUS are proposed for safety enhancement, and are not intended to increase airfield capacity. Therefore, the total number of aircraft operations at TUS in 2023 would remain the same and cumulative impacts to the airfield would be less than significant.

5.4.2 Air Quality

The Tucson area of Pima County is in *maintenance* for carbon monoxide (CO); however, Pima County is in *attainment* for all other criteria pollutants. Cumulative construction-related air quality impacts are expected to be minor since all individual projects Tucson ANGB and TUS include standard best management practices (BMPs) that would ensure that air emissions would remain well below significance (i.e., *de minimis*) thresholds. Similarly, development projects within Pima County and the City of Tucson would be required to comply with all appropriate state and local air quality regulations, including Arizona Department

of Environmental Quality (AEDQ) rules and Pima County Code. Long-term cumulative operational impacts related to air quality would also be less than significant as annual operational emissions of both the proposed Taiwan Air Force (TAF) and aircraft operations associated with the proposed Airfield Safety Enhancement Project at TUS would not create any new violation of the National Ambient Air Quality Standards (NAAQS), delay the attainment of any NAAQS, nor increase the frequency or severity of any existing violations of the NAAQS (FAA 2018).

Table 5-4. Potential Annual Cumulative Operational Emissions at TUS

	CO	VOC	NO_x	SO_x	PM_{10}	$PM_{2.5}$
Approximate Net Aircraft Emissions Increase at TUS (*Inclusive of the proposed F-16 operations associated with the relocation of the TAF from Luke AFB to Tucson ANGB.*)	23.6	4.9	3.7	1.0	0.1	0.1
de minimis Thresholds	100	100	100	100	100	100
Significant?	No	No	No	No	No	No

Notes: The net emissions increase has been take from Table 4-11 (2018 Proposed Action – Aircraft) provided in the *Draft EIS for the Proposed Airfield Safety Enhancement Project*. This scenario includes F-16 emissions associated with proposed relocation of the TAF from Luke AFB to Tucson ANGB.

5.4.3 Noise

Depending on their individual timing, cumulative construction activities associated with capital improvements at Tucson ANGB and TUS and private development within the surrounding community could result in additional short-term temporary noise impacts in the vicinity. Nevertheless, as with construction activities associated with the proposed relocation of the TAF to Tucson ANGB, short-term temporary noise would be compatible with existing land use at Tucson ANGB and TUS. There would be no cumulative impacts to noise-sensitive facilities or uses in the immediate vicinity of development at Tucson ANGB and TUS.

The noise contours at TUS would change under implementation of the TAA's planned new runway as described within the *Draft EIS for the Proposed Airfield Safety Enhancement Project* (FAA 2018). There would be a reduction in the acreage beyond the airport property associated with the 65 Day-Night Average A-weighted Sound Level (DNL) noise contour to the northwest but there would be an increase in acreage associated with the same contour to the southwest. Further,

74 housing units would experience a 1.5-decibel (dB) increase in noise at or above the existing 65 DNL noise contour. The FAA plans to mitigate 69 housing units either through sound insulation or in the case of manufactured/mobile homes, an offer for acquisition (to include relocation assistance for any displaced residents). According to the EIS, this mitigation would bring noise impacts associated with new runway development to a less than significant level. Further, as described in Section 4.3, *Noise*, operational noise impacts at TUS would be less than significant with the proposed relocation of the TAF; therefore, implementation of cumulative projects would not have adverse operational impacts to noise with implementation of mitigation measures identified in the EIS. Figure 5-1 depicts the cumulative noise impacts from implementation of the Proposed Action at Tucson ANGB and the proposed Airfield Safety Enhancement Project at TUS.

5.4.4 Transportation and Circulation

With regard to transportation and circulation, if additional construction projects occur concurrently with the Proposed Action, short-term impacts to traffic caused by additional construction equipment and construction workers traveling along surrounding roadways could potentially cause a short-term adverse cumulative impact during peak traffic hours. However, future capital improvement projects at Tucson ANGB are not currently funded or programmed. As such, it is unlikely that additional construction at Tucson ANGB would overlap with the construction associated with the proposed TAF relocation. The construction of the proposed airfield safety improvements at TUS could overlap with construction activities at Tucson ANGB. Depending on the origin and destination of the vehicles, roadways likely to be used would include South Nogales Highway north and south, Aerospace Parkway east and west, and Alvernon Way north and south. Given the capacity of these roads, the FAA has concluded that they are sufficient to handle this temporary increase during construction (FAA 2018). Therefore, there would be no significant cumulative disruption of local traffic patterns as a result of these overlapping construction activities.

EA

Cumulative Noise Impacts at Tucson International Airport

FIGURE 5-1

5.4.5 Safety

The proposed construction at Tucson ANGB and the proposed runway relocation and centerfield taxiway would result in cumulatively beneficial impacts to safety at Tucson ANGB and TUS. Improvements to Building 1 and Building 40 as well as construction of a new ECF would address existing AT/FP deficiencies at Tucson ANGB associated with standoff requirements and vehicle denial capabilities. In addition, the proposed installation of a fire suppression and fire detection system in Building 49 would reduce the risk of fire hazards to personnel and F-16 aircraft during maintenance activities. Further, the proposed runway relocation project at TUS would reduce the potential for runway incursions. Therefore, the proposed projects at Tucson ANGB and TUS would result in cumulatively beneficial impacts to safety.

SECTION 6
SPECIAL PROCEDURES

Impact evaluations conducted during preparation of this Environmental Assessment (EA) have determined that no significant environmental impacts would result from implementation of the proposed Taiwan Air Force (TAF) F-16 Formal Training Unit (FTU) and associated construction. This determination is based on a thorough review and analysis of existing resource information, the application of accepted modeling methodologies (e.g., air quality and noise), and coordination with knowledgeable, responsible personnel from the Air Education and Training Command (AETC), Air Force Civil Engineer Center, National Environmental Policy Act Division (AFCEC/CZN), 21st Fighter Squadron (21 FS), National Guard Bureau Plans and Requirements Branch (NGB/A4AM), 162d Wing (162 WG), Federal Aviation Administration (FAA), Tucson Airport Authority (TAA), and relevant Federal, state, and local agencies.

Surface Water. Construction of the proposed ECF would include the implementation of standard best management practices (BMPs) described in *Arizona Department of Transportation Maintenance and Facilities Best Management Practices Manual (2010)*. Further, the extension of the existing culvert associated with the proposed construction of the in-kind replacement hangar would require a Clean Water Act (CWA) Section 404 Nationwide Permit No. 14 issued by U.S. Army Corps of Engineers (USACE) and CWA Section 402 Arizona Pollutant Discharge Elimination System (AZPDES) permit issued by the Arizona Department of Environmental Quality (ADEQ) prior to the initiation of construction activities.

Air Quality. Construction and demolition projects required for the proposed TAF F-16 FTU relocation involving ground disturbing activities would implement standard control measures for reducing fugitive dust emissions, including regularly watering exposed soils, and soil stockpiling. Additionally, heavy construction equipment idling would be limited to the maximum extent feasible to reduce construction-related combustion emissions.

Noise. Construction-related activities would be limited to standard working hours between 7:00 A.M. and 5:00 P.M. Additionally, construction noise would be reduced through the use of equipment sound mufflers.

Cultural Resources. Should any previously unknown buried archaeological resources or Native American cultural resources be disturbed during the proposed construction or demolition activities, all grading activities in the immediate vicinity would be suspended until a qualified archaeologist had documented and evaluated the resource for National Register of Historic Places (NRHP) eligibility, in compliance with Section 106 of the National Historic Preservation Act (NHPA).

Hazardous Materials and Wastes. A Site-Specific Health and Safety Plan would be implemented for projects located within or adjacent to the Tucson International Airport (TUS) Area Superfund Site. The Health and Safety Plan would be designed to evaluate each of the chemicals present in the work area and the potential exposure scenarios/paths. Based on this evaluation, the Health and Safety Plan identifies levels of personal protection through personal protective equipment (PPE), engineering mechanisms or worker practices. The Health and Safety Plan typically requires monitoring of chemicals if available information indicates the chemicals may be present. Even if monitoring is not implemented as part of the initial project, the Health and Safety Plan mandates reassessment of the safeguards (i.e., PPE, engineered mechanisms) if changes at the site suspected to be related to hazardous substances occur. This may involve the complete cessation of work and notification of the 162 WG Environmental Manager.

SECTION 7
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SECTION 8
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