Purpose, Need, and Alternatives Working Paper

TUCSON INTERNATIONAL AIRPORT

PROPOSED AIRFIELD SAFETY ENHANCEMENT PROJECT
ENVIRONMENTAL IMPACT STATEMENT

Tucson, Pima County, Arizona

This Working Paper provides a detailed description of the various components of the proposed Airfield Safety Enhancement project at Tucson International Airport and the various issues it is intended to address. This Working Paper also provides a detailed description of the various alternatives including the Proposed Action. The No Action Alternative is included as an alternative and will be included in the Environmental Impact Statement being prepared for the proposed project as required by Title 40, Code of Federal Regulations (CFR) Section 1502.14(d).

Prepared by:

U.S. Department of Transportation –
Federal Aviation Administration – as the Lead Agency
U.S. Department of the Air Force – as a Cooperating Agency
National Guard Bureau – as a Cooperating Agency

Comments on this Working Paper must be **received** no later than
5:00 p.m. Pacific Daylight Time, **May 15, 2017**

For further information:

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April 2017

TUCSON INTERNATIONAL AIRPORT
DRAFT PURPOSE, NEED, AND ALTERNATIVES WORKING PAPER
REQUEST FOR PUBLIC COMMENTS

This Working Paper has been prepared as part of the Environmental Impact Statement (EIS) process for the Proposed Airfield Safety Enhancement Project (ASEP) including real property transactions at Tucson International Airport (TUS), Pima County, Arizona. The EIS was initiated in response to a proposal by the Tucson Airport Authority (TAA). The Federal Aviation Administration (FAA) is the lead federal agency for preparation of the EIS and will do so in compliance with the National Environmental Policy Act (NEPA) of 1969, as amended (42 U.S.C. § 4321 et seq.) and Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (40 CFR Parts 1500-1508). The preparation of the EIS will follow FAA regulations and policies for complying with NEPA published in FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*, and FAA Order 5050.4B, *NEPA Implementing Instructions for Airport Actions*. The FAA has invited the U.S. Air Force (USAF) and the National Guard Bureau (NGB) to participate as cooperating agencies under 40 CFR § 1501.6(a)(1).

This Purpose, Need, and Alternatives Working Paper provides background information on the TUS, a description of the Proposed Action, and the Purpose and Need to which the FAA, USAF, and NGB are responding in evaluating the Proposed Action and alternatives. This Working Paper also identifies and evaluates all reasonable alternatives that respond to the Purpose and Need. In whole or in summary, this Working Paper will become part of the EIS. **The FAA is not making a decision regarding the Proposed Action or the Preferred Alternative in this Working Paper**.

REQUEST FOR PUBLIC COMMENTS

The FAA is requesting public comments on this Working Paper as part of an additional National Environmental Policy Act public scoping effort for this project. You may submit comments by mail from **April 14 2017** to **May 15 2017**. Please provide any written public comments to the point of contact below:

Before including your name, address and telephone number, email or other personal identifying information in your comment, be advised that your entire comment – including your personal identifying information - may be made publicly available at any time. While you can ask us in your comment to withhold from public review your personal identifying information, we cannot guarantee that we will be able to do so.

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ACRONYMS

The following is a list of acronyms used in this Working Paper.

AANG	Arizona Air National Guard 162nd Wing
AFP 44	Air Force Plant Number 44
AIP	Airport Improvement Program
ALP	Airport Layout Plan
AMARG	Aerospace Maintenance and Regeneration Group
ASE	Airfield Safety Enhancement
ASEP	Airfield Safety Enhancement Project
ATCT	Airport Traffic Control Tower
AVQ	Marana Regional Airport
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
DMA	Davis-Monthan Air Force Base
ECM	Earth Covered Magazine
EIS	Environmental Impact Statement
FAA	Federal Aviation Administration
FY	Fiscal Year
GA	General Aviation
HS-1	Hot Spot-1
HS-2	Hot Spot-2
ICAO	International Civil Aviation Organization
ILS	Instrument Landing System
MALSR	Medium Intensity Approach Lights with Runway Alignment Indicator Lights
MSA	Munitions Storage Areas
NEPA	National Environmental Policy Act of 1969
NGB	National Guard Bureau
PAPI	Precision Approach Path Indicator
REIL	Runway End Identified Lights
RYN	Ryan Airfield
TAA	Tucson Airport Authority
TAF	Terminal Area Forecast
TUS	Tucson International Airport
USAF	United States Air Force
USC	United States Code

SECTION 1 PURPOSE AND NEED

1.1 PURPOSE AND NEED INTRODUCTION

The Federal Aviation Administration (FAA) issued a *Federal Register* Notice on August 19, 2016, announcing its intent to prepare an Environmental Impact Statement (EIS) for the Proposed Airfield Safety Enhancement Project (ASEP) including real property transactions at Tucson International Airport (TUS or Airport) in Pima County, Arizona (the Proposed Action).

The FAA is the lead federal agency for preparation of the EIS and will do so in compliance with National Environmental Policy Act of 1969 (NEPA) and Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations [CFR] Parts 1500-1508), as well as FAA's policies and procedures for complying with NEPA found in FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures* and FAA Order 5050.4B, *NEPA Implementing Instructions for Airport Actions*. The FAA has invited the United States Air Force (USAF) and the National Guard Bureau (NGB) to participate as cooperating agencies as described under 40 CFR § 1501.6 and both have accepted FAA's invitation.

An EIS describes and discusses the significant environmental impacts that would be caused by the Proposed Action, the reasonable alternatives to the Proposed Action, and the no action alternative. As the lead federal agency, the FAA is responsible for preparing the EIS. The FAA selected a third-party contractor to assist in preparing the EIS. As cooperating agencies, the USAF and the NGB will assist the FAA in preparing the EIS. The USAF and the NGB also plan to ultimately adopt the EIS to satisfy their own NEPA requirements for their federal actions in connection with the Proposed Action. The Tucson Airport Authority (TAA), as the Airport Sponsor, will assist the FAA with acquiring data and with the public involvement and outreach components of the EIS. The city of Tucson and Pima County will also provide information in connection with the EIS.

The FAA conducted an agency scoping meeting and a public scoping meeting on September 22, 2016 at the Old Airport Traffic Control Tower at TUS. These meetings were held in order to determine the scope of issues to be addressed and to identify significant issues related to the Proposed Action. The FAA is making this Working Paper available to the public and government agencies for review and comment. Once that review is complete, in whole or in summary, this Working Paper will become part of the EIS. **The FAA is <u>not</u> making a decision regarding the Proposed Action in this Working Paper. That decision would be made as part of a Record of Decision on the Final EIS.**

1.2 BACKGROUND INFORMATION

In October 2007, the FAA changed its accepted definition of the term "*runway incursion*" to adopt the International Civil Aviation Organization (ICAO) definition of runway incursions.[1] Since that time, FAA has defined runway incursion as "*any occurrence at an aerodrome involving the incorrect presence of an aircraft, vehicle, or person on the protected area of a surface designated for the landing and takeoff of an aircraft,*" which is a more expansive definition than FAA's pre-2007 definition.[2] Under the current definition, there are four categories of runway incursions based on the severity of the incident:

- **Category A**: a serious incident in which a collision was narrowly avoided
- **Category B**: an incident in which separation decreases and there is a significant potential for collision, which may result in a time critical corrective/evasive response to avoid a collision.
- **Category C**: an incident characterized by ample time and/or distance to avoid a collision.
- **Category D**: an incident that meets the definition of runway incursion such as incorrect presence of a single vehicle/person/aircraft on the protected area of a surface designated for the landing and take-off of aircraft but with no immediate safety consequences.

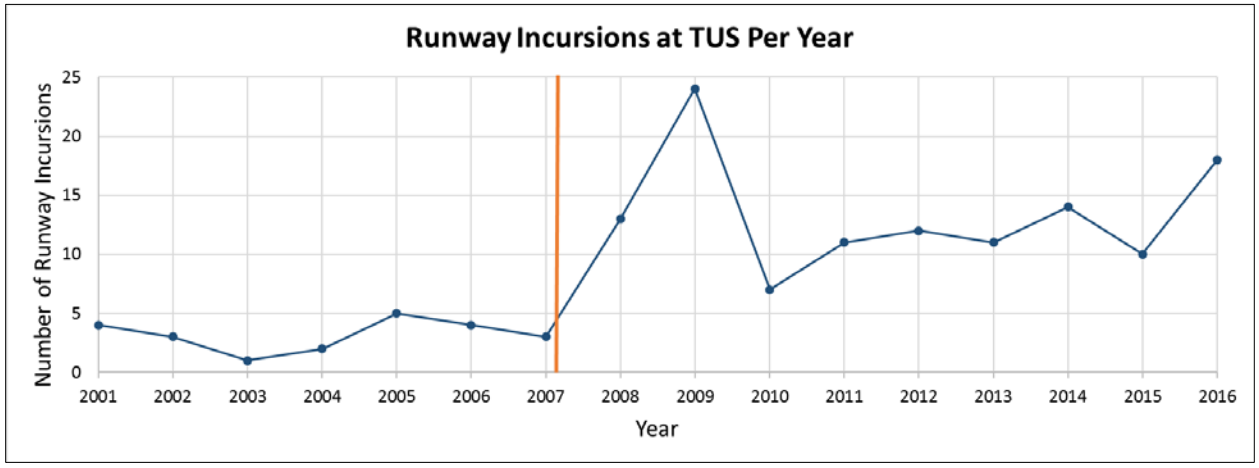
Under these standards, runway incursion severity is measured by the available reaction time, the opportunity for evasive corrective action, environmental conditions, the speed of the aircraft and/or vehicle, and the proximity of aircraft and/or vehicle. The severity of a runway incursion increases from a Category D to a Category A classification.

The 2007 change in definitions caused a greater number of reported surface incidents to become classified as a Category C or D runway incursion. This resulted in a dramatic increase of runway incursions at TUS, as shown in **Exhibit 1** and **Table 1**. TUS reported a total of 22 runway incursions during the years 2001 to 2007—approximately 3 incursions per year. After the runway incursion definition changed, TUS reported a total of 120 runway incursions during the years 2008 to 2016—over 13 per year.

1 ICAO, Manual on the Prevention of Runway Incursions, 2007. ICAO defines "runway incursion" as "Any occurrence at an aerodrome involving the incorrect presence of an aircraft, vehicle or person on the protected area of a surface designated for the landing and take-off of aircraft."

2 FAA, Runway Incursions, April 2015. https://www.faa.gov/airports/runway_safety/news/runway_incursions

Exhibit 1
RUNWAY INCURSIONS AT TUS PER YEAR



Source: FAA Aviation Safety Information Analysis and Sharing (ASIAS) Database, 2017.

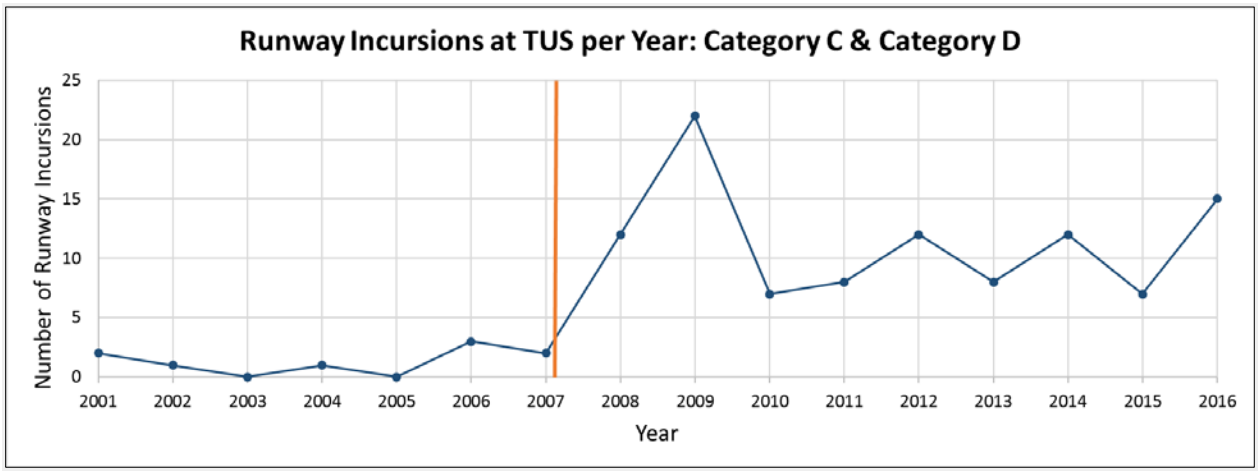
Table 1
RUNWAY INCURSIONS BY CATEGORY

	2001-2007	2008-2016
Category A	1	0
Category B	0	0
Category C	3	32
Category D	6	71
N/A	12	17
TOTAL	**22**	**120**

Source: FAA ASIAS Database, 2017.

Since 2007, no Category A or B incursions have occurred at TUS.[3] However, the number of Category C and Category D incursions per year have increased significantly, as shown in **Exhibit 2**.

Exhibit 2
CATEGORY C AND CATEGORY D RUNWAY INCURSIONS AT TUS PER YEAR



Source: FAA ASIAS Database, 2017.

Category C and Category D incursions include use of the wrong runway and maneuvering to the wrong runway caused by pilot confusion. These incursions are shown in **Table 2**, below.

Table 2
2008-2016 RUNWAY INCURSIONS BY CATEGORY AND INCIDENT

2008-2016 Runway Incursions	Number of incursions
Category C	**32**
Arrival/departure on wrong runway	2
Category D	**71**
Arrival/departure on wrong runway	8
Maneuvered to wrong runway	3
N/A	**17**
TOTAL	**120**

Source: FAA ASIAS Database, 2017.

[3] This data covers through 2016. Since that time, there have been two potential incidents at TUS. It is unknown at this time whether they will be classified as runway incursions. The National Transportation Safety Board is investigating. On January 23, 2017, there was an aircraft accident at TUS which resulted in two fatalities. On February 14, 2017, a small aircraft crashed at TUS, no injuries were reported.

As a result of the increase in the number of incursions, the TAA conducted various planning studies. TAA initially completed an Airfield Safety Enhancement (ASE) Study in 2011 to analyze, categorize, and recommend mitigations to enhance safety. Several of these recommendations were implemented. In 2014, TAA completed the most recent Airport Master Plan Update, which further analyzed enhancements recommended in the ASE Study. This set of improvements included the Proposed ASEP, which recommended relocation of Runway 11R/29L, and construction of a center parallel taxiway, as well as additional safety elements. The TAA depicted the ASEP on the Airport Layout Plan (ALP) for TUS. On June 24, 2014, the FAA accepted TAA's Airport Master Plan Update and approved the ALP depicting the proposed ASEP conditional on TAA obtaining FAA environmental approval for the proposed projects depicted on the ALP. In 2015, TAA prepared an update to the ASE study, which refined the improvements while maintaining the goal of reducing airfield incursions and improving overall safety with the relocation of Runway 11R/29L and construction of a center parallel taxiway.

Pursuant to 49 U.S.C. § 47107(a)(16), FAA must approve the Proposed Action as depicted on the ALP. FAA approval of the ALP is a federal action that must comply with NEPA.

1.2.1 DESCRIPTION OF EXISTING AIRPORT

The TAA is the operator of the TUS. TAA developed a set of improvements to TUS, which includes the ASEP as depicted on the ALP for TUS.

TUS is located on 8,343 acres in Tucson, Arizona in Pima County south of the city of Tucson central business district. The Airport is near both Interstate 10 and Interstate 19 as shown on **Exhibit 3**. Davis-Monthan Air Force Base (DMA) is located in Pima County approximately four miles northeast of TUS. DMA is a military installation that is not open to civilian aviation use. Special permissions are needed prior to landing non-military aircraft at the base. The USAF owned land, known as Air Force Plant 44 (AFP 44), is located along the southwest border of the Airport.

The domestic passenger facilities at TUS are comprised of a terminal building with two concourses, referred to as the east and west concourses. The International Terminal building is separate from the Domestic Terminal building. The two domestic concourses have a total of 20 gate positions and the International Terminal building has two gates. Tucson Air National Guard Base, which hosts the Arizona Air National Guard 162nd Wing (AANG), occupies 94 acres on the north side of the Airport along Valencia Road. The AANG has trained tactical fighter pilots since 1958. Today, the facility is used to train F-16 Fighting Falcon pilots.

As a result of TAA's planning studies, various airfield safety issues were identified at the Airport that may affect its ability to efficiently maintain critical transportation function, now and in the near future. These issues must be addressed for TUS to continue to be a safe, efficient, and effective commercial, GA, cargo, and military aviation service provider.

1.2.2 EXISTING RUNWAYS AND TAXIWAYS

Existing Runways

As shown on **Exhibit 4**, the TUS airfield is comprised of three runways; one set of close parallel runways separated by a distance of 706 feet (oriented in a northwest/southeast direction) and one crosswind runway (oriented in a northeast/southwest direction).

Parallel Runways 11L/29R and 11R/29L measure 10,996 feet long by 150 feet wide and 8,408-feet long by 75-feet wide, respectively. The crosswind runway, Runway 3/21, measures 7,000 feet long by 150-feet wide. Runway threshold 11R is displaced 1,410 feet; this results in an available landing length of 6,998 feet. Runway threshold 3 is displaced 850 feet, resulting in an available landing length of 6,150 feet.

Runway 11L/29R is the primary runway at TUS and is the runway generally used by air carrier and military aircraft. During adverse wind conditions, air carrier and military aircraft occasionally use crosswind Runway 3/21. The crosswind runway is also used for convenience by General Aviation (GA) aircraft when conditions allow. Runway 11R/29L, originally built as a taxiway, has been converted to a runway primarily used by GA aircraft, due to its length and width.

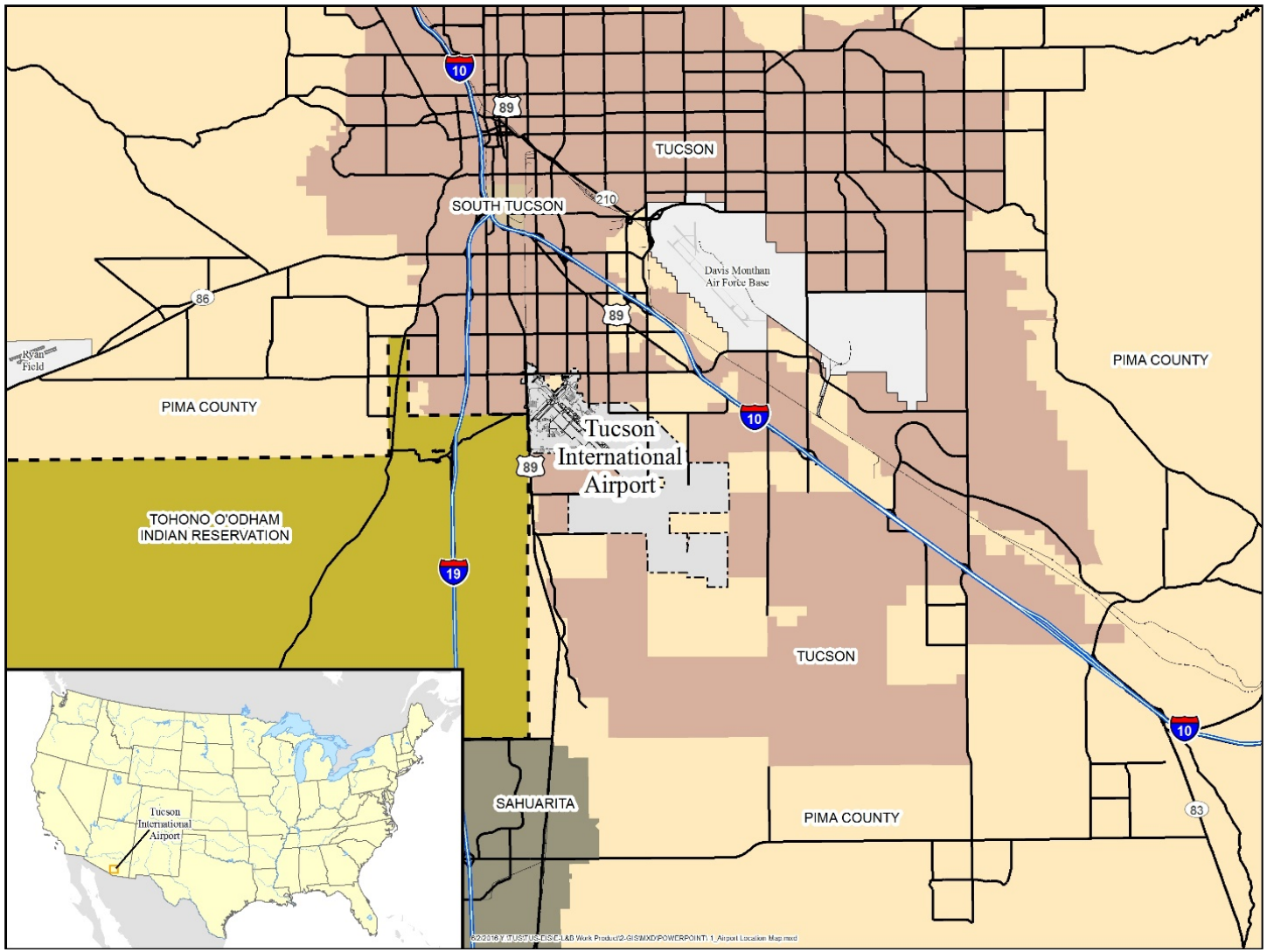
The Airport has an Instrument Landing System (ILS) (Category I) available for precision approaches to Runway 11L. To supplement the ILS approach, Runway 11L is also equipped with a Medium-intensity Approach Light System with Runway alignment indicator lights (MALSR). All runways have Area Navigation Global Positioning System.

The Airport's runway ends are also equipped with the following landing aids:

- Runway 11L – ILS, MALSR, and Precision Approach Path Indicator (PAPI)
- Runway 29R – PAPI and Runway End Identifier Lights (REILs)
- Runway 11R – PAPI
- Runway 29L – REILs
- Runway 21 – PAPI and REILs

Photos of an existing PAPI, REILs, and localizer at TUS are shown in **Exhibit 5**.

Exhibit 3
AIRPORT LOCATION



Source: Landrum & Brown, 2016.

Exhibit 4
EXISTING AIRFIELD

Source: Arizona Air National Guard and USAF Plant 44 property boundaries from Pima County GIS data, 2016.

Exhibit 5
LANDING AIDS

Source: Photos courtesy of Tucson Airport Authority, 2016.

Taxiways

The taxiway system provides aircraft access between the runways and the passenger terminal complex, general and corporate aviation areas, military facilities, airfreight terminals, and other aircraft parking areas.

Runway 11L/29R has a full-length parallel taxiway, identified as Taxiway A. Taxiway A is 75-feet wide and is located to the northeast of Runway 11L/29R at a separation of 537 feet from the runway centerline to the taxiway centerline. Runway 11L/29R is connected to Taxiway A at the thresholds, as well as at multiple intermediate points between the thresholds via 45-degree, 60-degree, and 90-degree connector taxiways.

Runway 3/21 has a parallel taxiway, identified as Taxiway D. Taxiway D is 75-feet wide and is located to the southeast of Runway 3/21 at a separation of 537.5 feet from the centerline of the runway to the centerline of the taxiway.

Runway 11R/29L does not have a parallel taxiway. Aircraft taxiing from Runway 11R/29L to the terminal and cargo areas must cross Runway 11L/29R. There is a separation of 706 feet from the Runway 11R/29L centerline to the Runway 11L/29R centerline. Runway 11R/29L is connected to Runway 11L/29R at the thresholds, as well as at five intermediate points between the thresholds via 90-degree connector taxiways.

1.2.3 AVIATION ACTIVITY

The FAA publishes its forecast annually for each U.S. airport, including TUS. The Terminal Area Forecast (TAF) is "*prepared to assist the FAA in meeting its planning, budgeting, and staffing requirements. In addition, state aviation authorities and other aviation planners use the TAF as a basis for planning airport improvements.*"[4] The most recent release is the 2016 TAF, which was issued in January 2017. All data in the TAF is provided on a U.S. Government fiscal year (FY) basis (October 1st through September 30th).

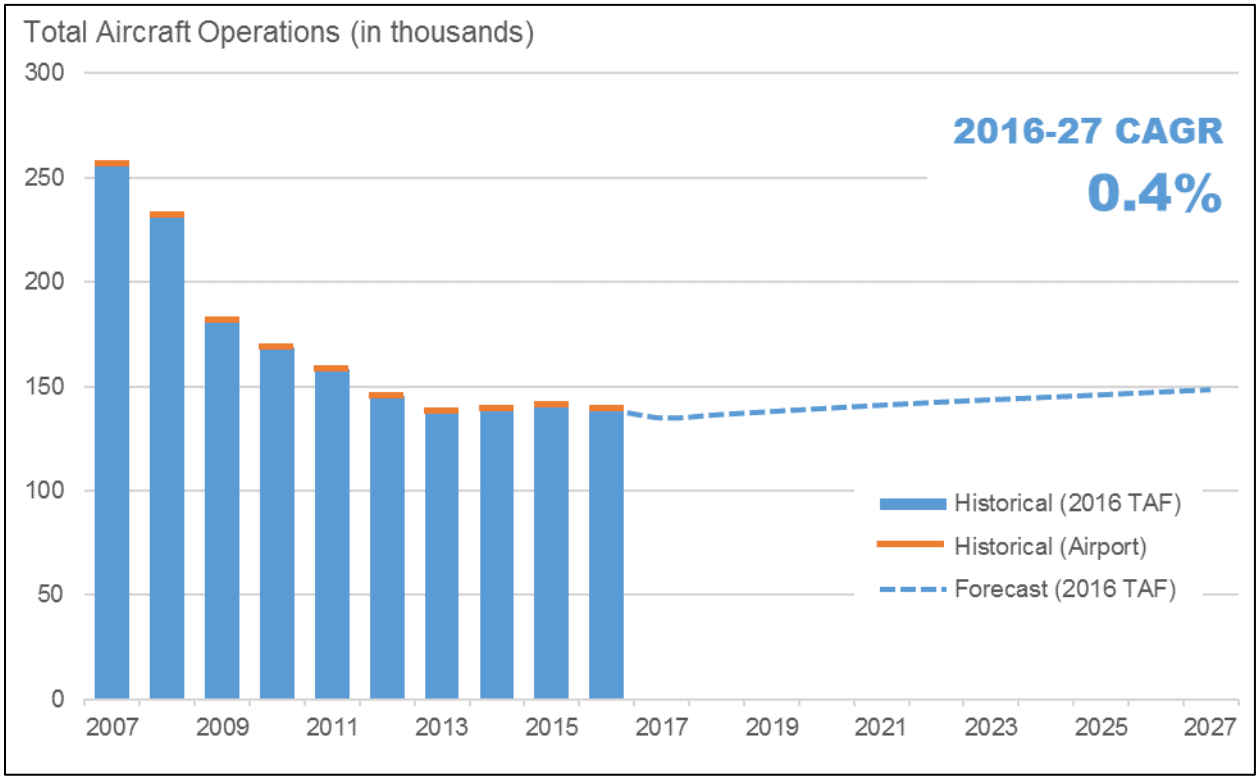
The 2016 TAF includes historical information on aircraft operations from FY1990 through FY2015 and forecasts for FY2016[5] to FY2040. At airports with FAA Airport Traffic Control Towers (ATCT) like TUS, FAA air traffic controllers provide historical aircraft operations data for the TAF, which count landings and takeoffs. These aircraft operations are recorded as either air carrier, commuter & air taxi, GA, or military. Air carrier is defined as an aircraft with seating capacity of more than 60 seats or a maximum payload capacity of more than 18,000 pounds carrying passengers or cargo for hire or compensation. Commuter and air taxi aircraft are designed to have a maximum seating capacity of 60 seats or a maximum payload capacity of 18,000 pounds carrying passengers or cargo for hire or compensation.

4 FAA, TAF Summary: Fiscal Years 2015-2040, January 2016.
5 Operations data for 2016 are actual.

According to the 2016 TAF, aircraft operations at TUS have declined from 257,527 in FY2007 to 139,555 in FY2016, representing an average annual rate of decline of 6.6 percent. The national economic downturn of 2008 to 2013/2014 is believed to be the primary cause for the decline in commercial and GA aircraft operations at TUS during this period.

Exhibit 6 graphically depicts the historical and forecast aircraft operations from the 2016 TAF as well as the historical values provided by the Airport records. The 2016 TAF projects that aircraft operations at TUS will increase from 139,555 in FY2016 to 148,465 in FY2027, representing an average annual growth rate of 0.4 percent.

Exhibit 6
FAA 2015 TAF AIRCRAFT OPERATIONS FORECAST

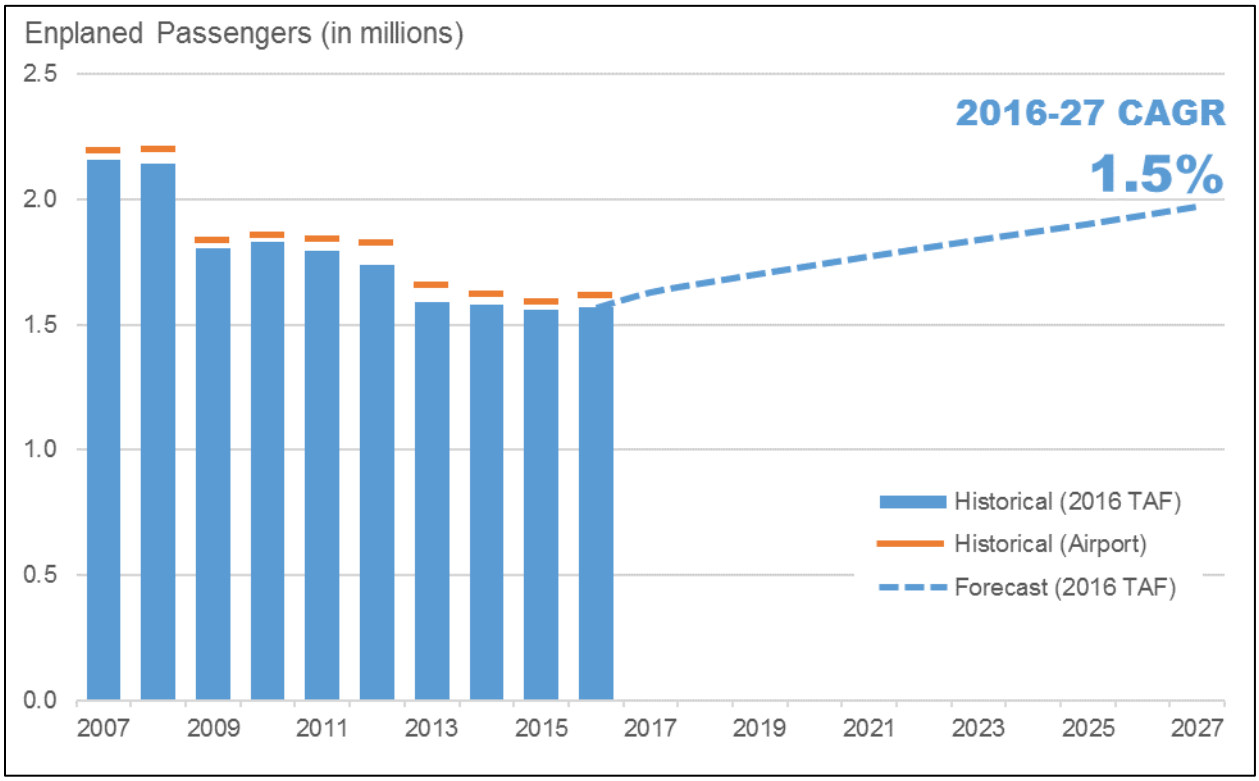


Source: Tucson Airport Authority, Monthly Activity Overview; Federal Aviation Administration, Terminal Area Forecast: Fiscal Years 2016-2045, January 2017.

The enplanement information in the 2016 TAF includes historical values from FY1976 through FY2015, estimated enplanement figures for FY2016, and forecasts from FY2017 to FY2040. Historical enplanement data is obtained through the U.S. Department of Transportation T-100 Reports.

According to the 2016 TAF, enplanements at TUS have declined from a high of 2.16 million in FY2007 to an estimated 1.57 million in FY2016, representing an average annual rate of decline of 3.5 percent. During this span, enplanements provided in the 2016 TAF have on average been within 2.6 percent of the Airport's records. A difference is common when comparing the TAF to airport records because the enplanements provided in the TAF exclude non-revenue passengers and military charter passengers. In FY2016, the Airport reported 1.62 million enplanements which is 3.1 percent higher than the 1.57 million estimated for FY2016 in the 2016 TAF. The 2016 TAF projects that enplanements will increase from an estimated 1.57 million in FY2016 to 1.97 million in FY2027, representing an average annual growth rate of 1.5 percent. **Exhibit 7** graphically depicts the historical and forecast enplanements from the 2016 TAF as well as the historical values provided by the Airport records.

Exhibit 7
FAA 2015 TAF ENPLANED PASSENGERS FORECAST



Source: Tucson Airport Authority, 10 Year Passenger Statistics; Federal Aviation Administration, Terminal Area Forecast: Fiscal Years 2016-2045, January 2017.

1.3 PROJECT PURPOSE AND NEED

FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*, states that the purpose and need of an EIS "*briefly describes the underlying purpose and need for the Federal action. It presents the problem being addressed and describes what the FAA is trying to achieve with the Proposed Action. It provides the parameters for defining a reasonable range of alternatives to be considered. The purpose and need for the Proposed Action must be clearly explained and stated in terms that are understandable to individuals who are not familiar with aviation or commercial aerospace activities. Where appropriate, the responsible FAA official should initiate early coordination with cooperating agencies in developing purpose and need."*

Here, the purpose and need for the Proposed Action serves as the foundation for identifying reasonable alternatives to the Proposed Action and comparing the impacts of developing the various alternatives. In order for a potential alternative to be considered viable and carried forward for detailed evaluation within the NEPA process and the EIS, that alternative must address the purpose and need.

1.3.1 FAA PURPOSE AND NEED

The purpose of the Proposed Action is to fulfill FAA's statutory mission to ensure the safe and efficient use of navigable airspace in the U.S. as set forth under 49 United States Code (USC) § 47101 (a)(1). The FAA must ensure that the Proposed Action does not derogate the safety of aircraft and airport operations at TUS. Moreover, it is the policy of the FAA under 49 USC § 47101(a)(6) that airport development projects provide for the protection and enhancement of natural resources and the quality of the environment of the United States.

Additionally, the purpose of the Proposed Action in connection with TAA's request to modify the existing ALP is to ensure the proposed improvements to the airport do not adversely affect the safety, utility and efficiency of the airport. Pursuant to 49 U.S.C. § 47107(a)(16), the FAA Administrator (under authority delegated from the Secretary of Transportation) must approve any revision or modification to an ALP before the revision or modification takes effect. The Administrator's approval reflects a determination that the proposed alterations to the airport, reflected in the ALP revision or modification, do not adversely affect the safety, utility, or efficiency of the airport.

The need for the Proposed Action is to ensure that TUS operates in the safest manner possible pursuant to 49 U.S.C. § 47101(a)(1) and to reduce the potential risk of runway incursions to the extent practicable. The following sections present the FAA's specific needs.

THE NEED TO ENHANCE THE SAFETY OF THE AIRFIELD AND ELIMINATE EXISTING "HOT SPOTS".

The FAA defines a "hot spot" as a location on an airport movement area with a history of potential risk of collision or runway incursion, and where heightened attention by pilots and drivers is necessary.[6] Typically, hot spots are located in areas with complex or confusing airfield geometry or in areas that have a history of incursions or the potential for incursions. A confusing condition may be compounded by a miscommunication between ATCT and a pilot, and may cause an aircraft separation standard to be compromised.[7] The FAA has identified two existing hot spots at the Airport, labeled as Hot Spot-1 (HS-1) and Hot Spot-2 (HS-2) on **Exhibit 8**.

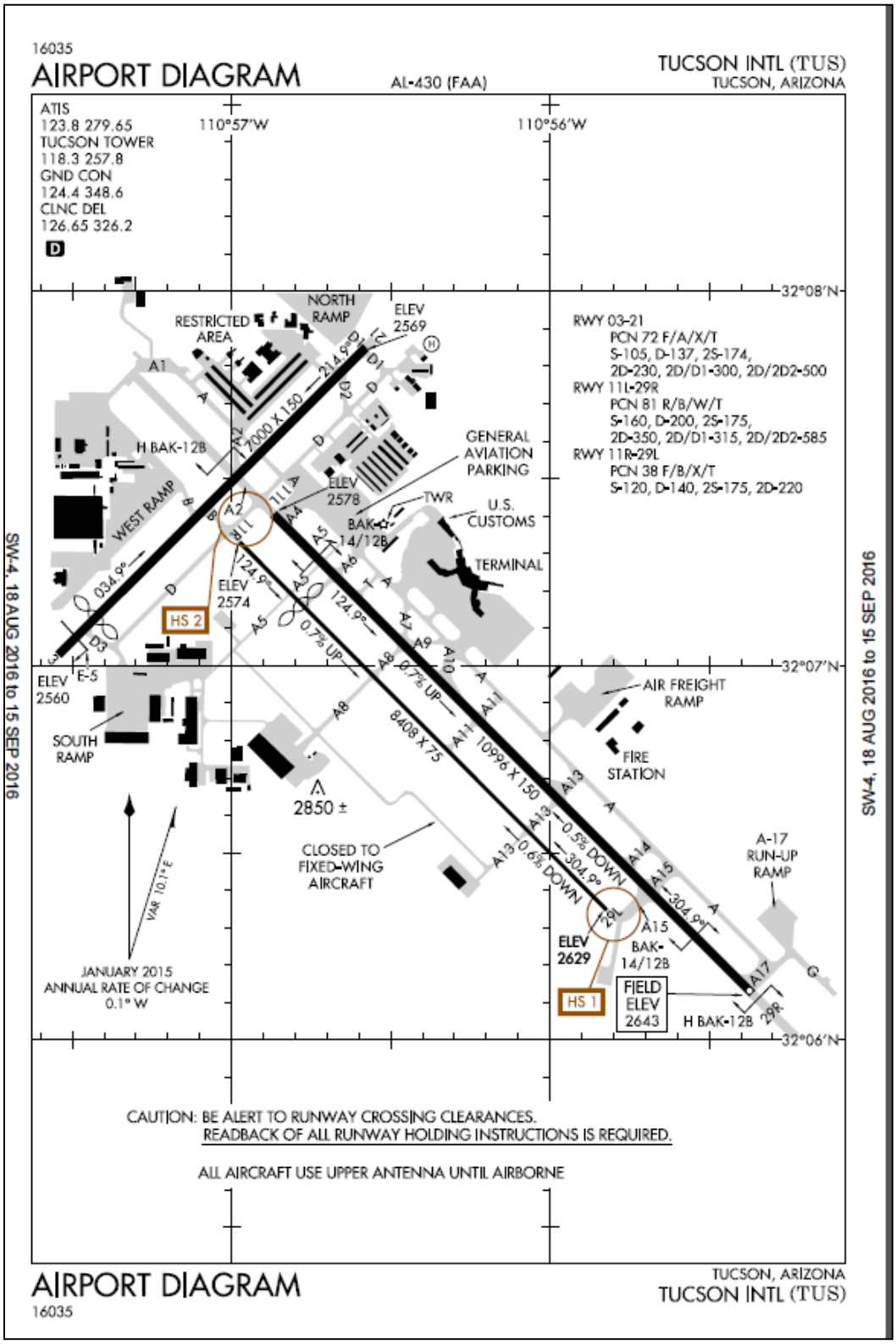
HS-1, an aerial view of which is shown on **Exhibit 9**, is located at the end of Runway 29L. HS-1 has been a historical point of confusion between Runways 29L and 29R and Runway 29R and Taxiway A. On several occasions pilots on approach from the south have mistaken Runway 29R for Runway 29L and Taxiway A for Runway 29R, landing on the wrong runway or on Taxiway A.

HS-2, an aerial view of which is shown on **Exhibit 10**, is located along Taxiway D between Runway 11L/29R and Runway 11R/29L. At this location pilots taxiing along Taxiway D have crossed the approach path for Runway 11L/29R or Runway 11R/29L without proper clearance.

6 https://www.faa.gov/airports/runway_safety/hotspots/hotspots_list/

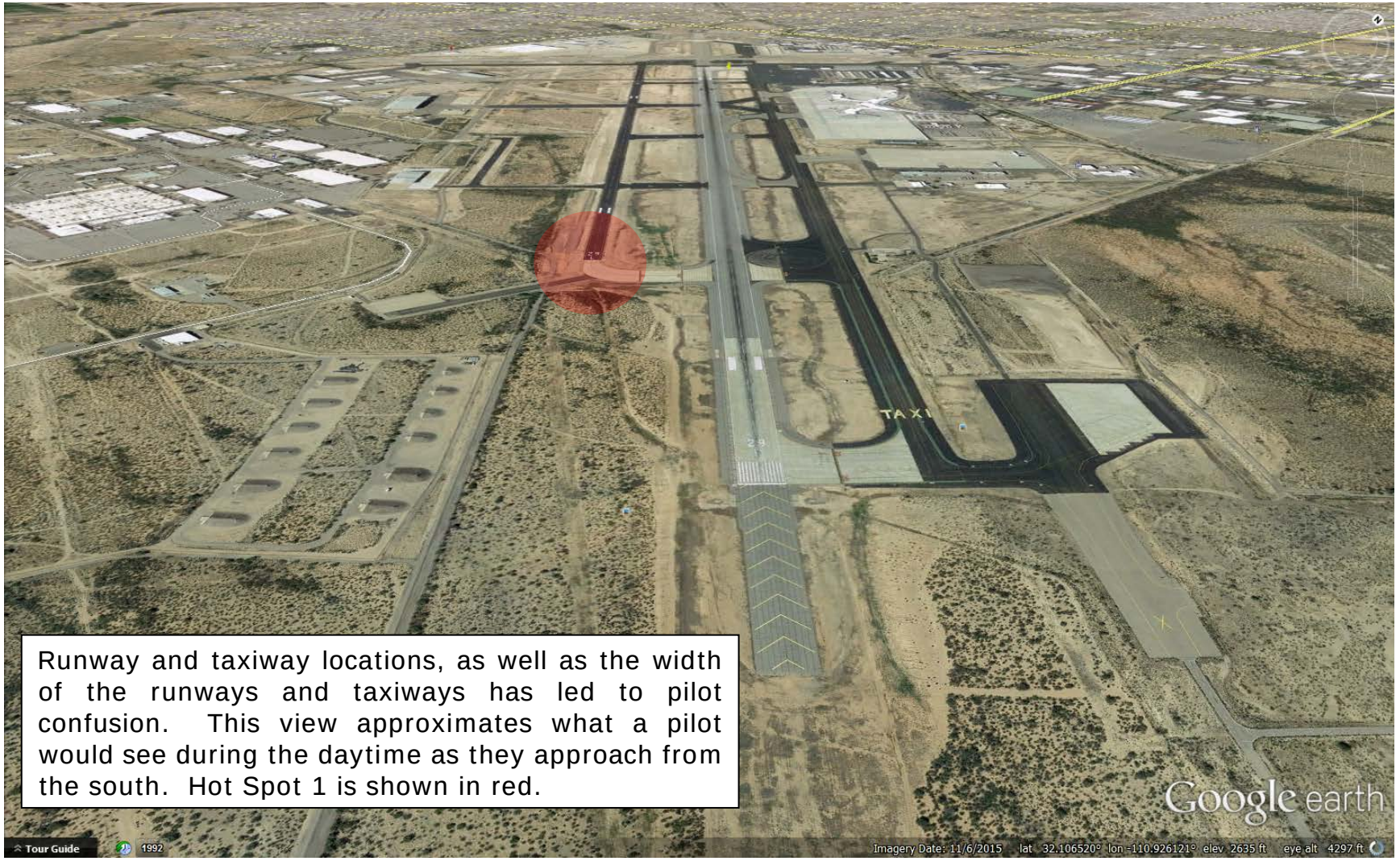
7 FAA Air Traffic Organization Office of Runway Safety. Focus on Hotspots- Prevent Runway Incursions Brochure. www.faa.gov/airports/runway_safety/publications

Exhibit 8
EXISTING HOT SPOTS



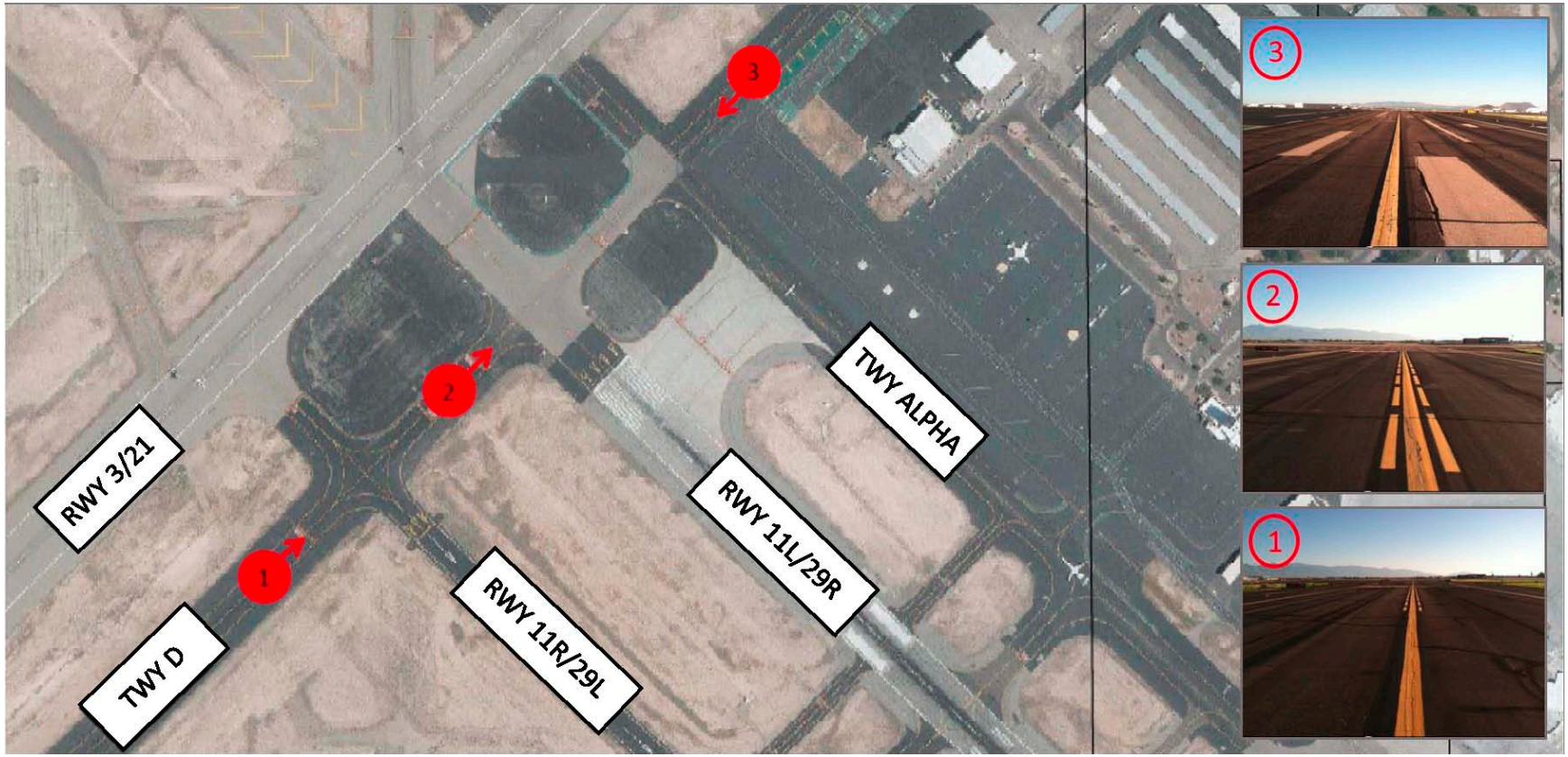
Source: Federal Aviation Administration, 2017. Available at: http://aeronav.faa.gov/d-tpp/1701/00430ad.pdf#search=KTUS

Exhibit 9
RUNWAY 29L HOT SPOT



Source: FAA, 2016.

Exhibit 10
TAXIWAY D HOT SPOT



Source: Photos courtesy of Tucson Airport Authority, 2016.

THE NEED TO PREVENT AIRCRAFT FROM CROSSING DIRECTLY BETWEEN TWO PARALLEL RUNWAYS[8].

The FAA recommends Airport Sponsors find ways to reduce the probability of potential runway incursions. One way to do that is preventing direct runway to runway crossings. A so-called "centerline" parallel taxiway between parallel runways minimizes the potential for pilots to cross an active runway by forcing them to first turn onto the centerline taxiway and wait for ATCT clearance to cross the other runway. A centerline parallel taxiway increases the margin of safety by providing opportunity to move aircraft runway crossings to lower risk areas and also provides space for aircraft to queue prior to crossing runways.

THE NEED TO MAINTAIN OPERATIONAL CAPABILITIES WHEN THERE IS A TEMPORARY CLOSURE OF RUNWAY 11L/29R.

TUS is a primary commercial airport, and any closure to Runway 11L/29R would have an adverse effect on the National Airspace System. In the past, the Airport has experienced maintenance, disabled aircraft and military aircraft operations that have caused Runway 11L/29R to be closed to commercial service. The use of Runway 3/21 or existing 11R/29L reduces the takeoff runway length available to aircraft, which effectively limits the airport's capabilities to serve commercial aircraft. Therefore, one purpose of the Proposed Action is to maintain airport operational capabilities during times when Runway 11L/29R is not available by providing additional runway capabilities that can handle the diverse aircraft operating at TUS.

1.3.2 USAF PURPOSE AND NEED

THE NEED TO MAINTAIN UNITED STATES AIR FORCE (USAF) PLANT 44 OPERATIONAL CAPABILITIES.

The USAF owns and operates multiple installations in southern Arizona, including DMA, located about four miles northeast of TUS. None of these facilities and their respective missions duplicate any other USAF facilities in southern Arizona. Thus, each USAF facility performs a different mission.

The USAF owns land, known as Air Force Plant 44 (AFP 44), adjacent to the Airport. The USAF currently leases this land to Raytheon Missile Systems, which operates AFP 44 for the manufacture of various munitions. The boundaries of AFP 44 have not changed since 1986 when the USAF deeded about 940 acres of land east/northeast of the current plant to the city of Tucson. In addition to the manufacturing of various munitions, the operations at AFP 44 include the safe storage of explosives/munitions, providing overall plant security, and providing safety areas to make sure the public is not in close proximity to any munitions. AFP 44 does not accommodate any aviation activity and has no runways or helipads.

8 See FAA Engineering Brief 75, *Incorporation of Runway Incursion Prevention into Taxiway and Apron Design.*

Under the Proposed Action, Earth Covered Magazines (ECMs) located on AFP 44 would have to be demolished to protect airport safety areas. An ECM is a specific structure that is used to store munitions. Land identified as Parcel "F" would be transferred from AFP 44 to TAA in order to demolish the ECMs. TAA would also transfer a parcel of land identified as Parcel "G" and Parcel "H" ultimately to the USAF for AFP 44. These parcels would incorporate the various USAF safety arcs onto USAF property. Incorporation of USAF safety arcs onto USAF property would help to ensure continued operational capabilities of AFP 44 while accommodating the proposed safety enhancement project at TUS. Therefore, the purpose of the Proposed Action is to maintain AFP 44 operational capabilities while removing 6 ECMs from Parcel "F" and 6 ECMs directly adjacent to Parcel "F".

1.3.3 NGB PURPOSE AND NEED

THE NEED TO MAINTAIN NATIONAL GUARD BUREAU (NGB) SAFETY STANDARDS AND OPERATIONAL CAPABILITIES.

Since its activation, the AANG has fulfilled a Federal and state mission. The dual mission, a provision of the U.S. Constitution, results in each Guardsman holding membership in the National Guard of Arizona and in the National Guard of the United States. Specifically, the AANG serves the United States and allied nations by providing fighter aircraft training programs while partnering with the U.S. Air Force in overseas contingencies and Aerospace Control Alert.

The AANG's Federal mission is to maintain well-trained, well-equipped units available for prompt mobilization during war and provide assistance during national emergencies such as natural disasters or civil disturbances. Currently, the AANG deploys its members as part of the Air and Space Expeditionary Force to provide combat forces in support of Operations in Southwest Asia.

When Guardsmen are not mobilized or under Federal control, they report to the Governor of Arizona and are led by the adjutant general of the state. Under state law, the wing provides protection of life, property and preserves peace, order and public safety. These missions are accomplished through emergency relief support during natural disasters such as floods, earthquakes and forest fires; search and rescue operations; support to civil defense authorities; maintenance of vital public services and counterdrug operations.

The AANG currently maintains Munitions Storage Areas (MSAs) as part of their operational capability. Munitions storage areas may include ECMs but also includes other facilities to support munitions-related operations such as inspection areas, secured roadways, loading docks, and maintenance areas. Not all the munitions used by the AANG can be stored at the existing facilities. Some munitions must be stored at DMA. The AANG needs additional areas to maintain the safe storage of munitions and provide safety areas consistent with USAF standards to ensure the public is not in close proximity to any munitions in the event of a mishap.

TUS is home to the AANG F-16 fighter pilot training unit. It is the largest AANG fighter wing in the country and resides on 94 acres as Tucson Air National Guard Base. The AANG shares use of the runways, security and fire suppression with the Airport. Approximately 1,450 people work at the Tucson Air National Guard Base. About 900 are full-time employees and the balance are drill status Guardsmen providing forces in support of wartime operations.

The NGB's purpose and need is to maintain NGB safety standards and operational capabilities at the Tucson Air National Guard Base. More specifically, NGB needs to meet required separation distances for its MSA. The existing MSA at the Tucson Air National Guard Base does not meet the USAF separation distances required for explosive operations and exposes non-munitions personnel to explosive hazards. Relocating the MSA would accommodate the required Quantity-Distance clear zone arcs that are required in accordance with USAF Manual 91-201, *Explosive Safety Standards*.

1.3.4 TAA PURPOSE AND NEED

THE NEED TO ENSURE LAND USE COMPATIBILITY AMONG USERS OF TUS.

TUS is an essential transportation resource for the Tucson metropolitan area, Pima County, and southern Arizona. The primary objective of the TAA is the promotion and development of the most effective and efficient airport system to meet the needs of users and encourage economic growth in Tucson and southern Arizona. One of TAA's goals is to promote compatible land uses to preserve and grow major employment centers and leverage reasonable revenue enhancement opportunities. TAA does not receive any local tax dollars.

The Proposed Action would require relocation of the ECMs currently on AFP 44 property. The removal of 6 ECMs from Parcel "F" and 6 ECMs directly adjacent to Parcel "F" is necessary to protect the relocated runway object free area, taxiway object free area, runway safety area, and runway protection zone. TAA would need to acquire land, possibly through an exchange of land parcels with USAF. The location of the replacement magazines and operations at AFP 44 requires land for safety area buffer in case of incident. The purpose of a land exchange would be to provide the safety buffer, to ensure compatibility of adjacent land uses, and to offer USAF the ability to control neighboring uses to ensure compatibility with current and future uses at AFP 44. The exchange of land parcels would provide for future economic growth and safety area protections for one of the region's major employers, and would help to ensure continued operational capabilities and safety buffers for AFP 44.

1.4 DESCRIPTION OF PROPOSED ACTION

The Proposed Action as shown on **Exhibit 11** includes the following elements:

1.4.1 PROPOSED RELOCATION OF RUNWAY 11R/29L

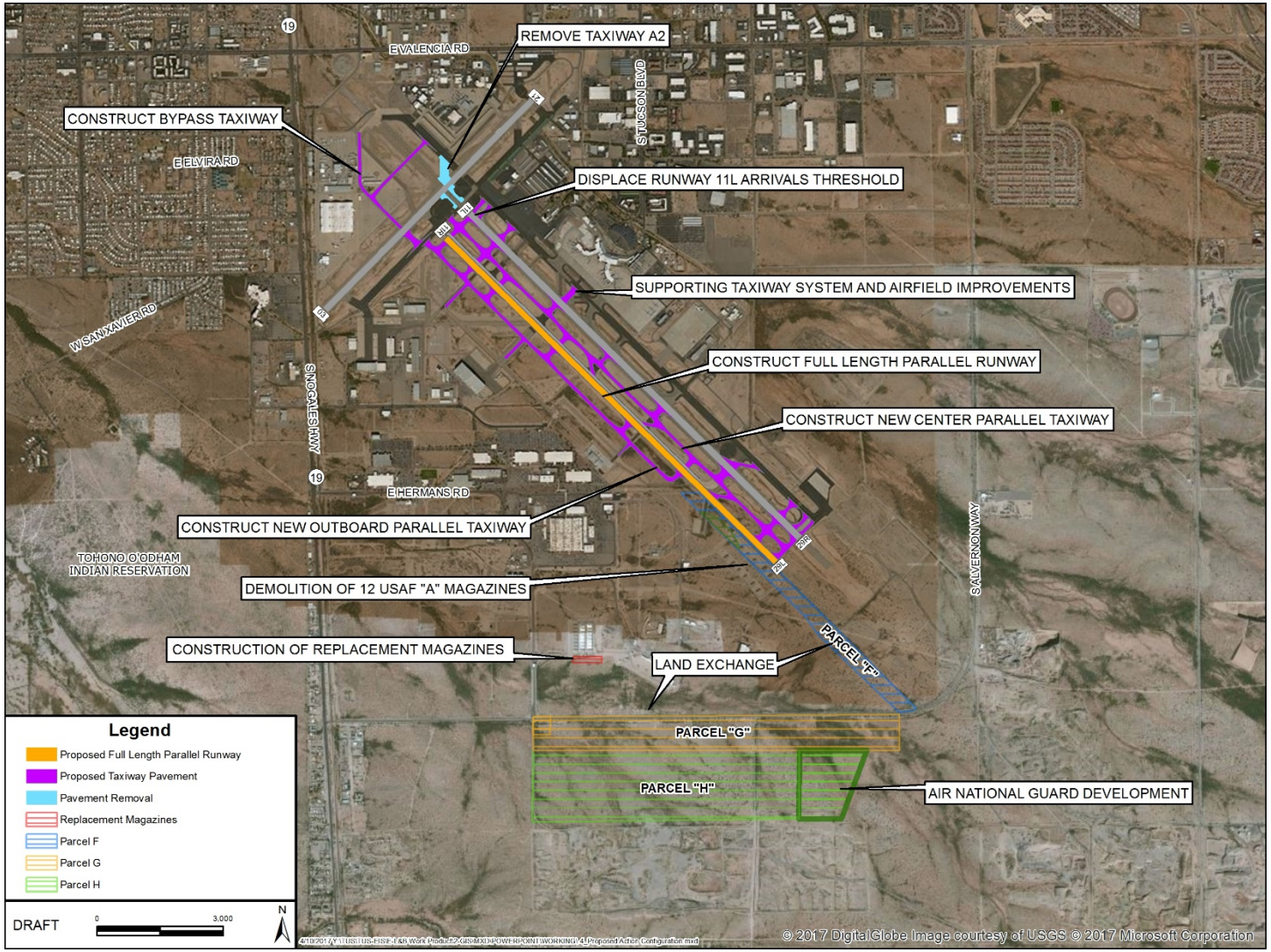
Construct Full Length Parallel Runway: This element includes the relocation and reconstruction of Runway 11R/29L as a 10,996-foot long, 150-foot wide runway. The relocation of Runway 11R/29L would require development and/or modification of associated arrival and departure procedures. Currently the narrow width and shorter length of Runway 11R/29L causes some pilots to confuse it with a taxiway when approaching from the south. On several occasions pilots on approach from the south have mistaken Runway 29R for Runway 29L and Taxiway A for Runway 29R, landing on the wrong runway or on Taxiway A.

The construction of a full-length parallel runway would eliminate HS-1 because it would clearly differentiate Runway 29L, Runway 29R, and Taxiway A. The proposed relocated Runway 11R/29L would have its threshold aligned with Runway 11L/29R and have the same width, which would clearly differentiate it from a parallel taxiway. Having the length, width, and threshold locations of Runway 11R/29L and Runway 11L/29R the same, would increase safety and pilot situational awareness. Pilots on approach from the south would be better able to visually acquire the end of the runways if they have non-staggered landing thresholds. This would eliminate the potential to mistake Runway 29R for Runway 29L and Taxiway A for Runway 29R. The existing Runway 11R/29L would be demolished and the pavement materials recycled for use during construction of the relocated runway pavement.

Displace Runway 11L Arrivals Threshold: As part of the Runway 11R/29L relocation, the arrival threshold on Runway 11L would be shifted 921 feet to match Runway 11R and allow aircraft to taxi along Taxiway D independent of runway arrival operations. Currently at HS-2, the existing Runway 11L arrival threshold begins at the physical end of the runway near Taxiway D. Occasionally pilots taxiing along Taxiway D have crossed the approach path for Runway 11L/29R or Runway 11R/29L without clearance. With the existing Runway 11L arrival threshold, the potential for runway incursion is high when a pilot taxis across the approach path without clearance while an aircraft is on approach.

Displacing the Runway 11L arrivals threshold to match the new Runway 11R arrivals threshold would eliminate HS-2 by enabling aircraft classified as B-II or smaller to be out of the runway safety areas, thereby decreasing the risk of a runway incursion.

Exhibit 11
PROPOSED ACTION



Source: Tucson Airport Authority and Landrum & Brown, 2016.

This element also includes reconfiguring the Runway 11L MALSR by shifting stations and installing in-pavement approach lights in the displaced threshold. The existing PAPI and glideslope antenna would also be relocated to accommodate the Runway 11L arrival threshold shift. The existing MALSR and glide slope are shown in **Exhibit 12**.

Exhibit 12
EXISTING MALSR AND GLIDE SLOPE ANTENNA

Source: Photos courtesy of Tucson Airport Authority, 2016.

1.4.2 PROPOSED NEW AIRFIELD IMPROVEMENTS

Construct New Centerline Parallel Taxiway: This element proposes construction of a full-length parallel taxiway between Runway 11L/29R and Runway11R/29L.

Construct New Outboard Parallel Taxiway: This element includes the construction of a parallel taxiway 400 feet southwest of the new relocated Runway 11R/29L. This parallel taxiway would provide additional access to Runway 11R/29L.

Construct Supporting Connector Taxiways: This element includes construction of connector taxiways between Runway 11R/29L and both outboard and centerline parallel taxiway. It also includes construction of connector taxiways between Runway 11L/29R and the centerline parallel taxiway and connector taxiways between Runway 11L/29R and Taxiway A accommodate the new displaced threshold.

Construct Bypass Taxiway: This element includes construction of a new bypass taxiway northwest of the Runway Protection Zones for Runways 11L and 11R. The displaced arrivals thresholds would allow unrestricted taxiing of aircraft (regardless of size) accessing Runway 11R. This element would include removal of the existing concrete apron from the surrounding area and demolition of four existing buildings/hangars within the area. The Triple hangars would not be demolished as part of this element.

Close Taxiway A2: This element includes the closure of Taxiway A2 segment between Taxiway A and Runway 3/21 and the Taxiway A2 segments between Runway 3/21 and Taxiway D.

Construct/Maintain AANG Extended Blast Pad: This element would construct/maintain the AANG blast pads for Runways 11L/29R and 11R/29L and paint/mark as non-runway/taxiway pavement.

Associated Drainage Improvements: This element provides for additional drainage detention areas to provide for the additional impervious pavement areas.

1.4.3 CONNECTED AND SIMILAR ACTIONS

Land Transactions/Conveyance of Parcel "F" (approximately 58 acres) from AFP 44 to TAA, Parcel "G" (160 acres) from TAA to USAF, and Conveyance of Parcel "H" (up to 291 acres) from TAA ultimately to USAF: This element of the Proposed Action includes the TAA acquiring land from AFP 44 from USAF known as Parcel "F." This land is needed by TAA for the relocated runway object free area, taxiway object free area, runway safety area, and runway protection zone for the relocated runway. This Parcel "F" area is currently used by USAF to store explosives in ECMs.

In exchange for Parcel "F," this element also includes FAA releasing TAA from its Federal obligations for the Airport land located between the former East Hughes Access Road and the new Aerospace Parkway, south of AFP 44 from TAA to USAF, and the release of that land from Federal obligations. A portion of this land has been proposed for construction of a Munitions Storage Area, to include ECMs, and access road, for the AANG at the Tucson Air National Guard Base located adjacent to TUS.

Demolition of twelve USAF ECMs identified at AFP 44 as "A" Magazines: This element includes the demolition of the twelve ECMs on Parcel "F" and adjacent to Parcel "F" to maintain the necessary FAA required safety areas for the relocated runway. An ECM is depicted in **Exhibit 13.**

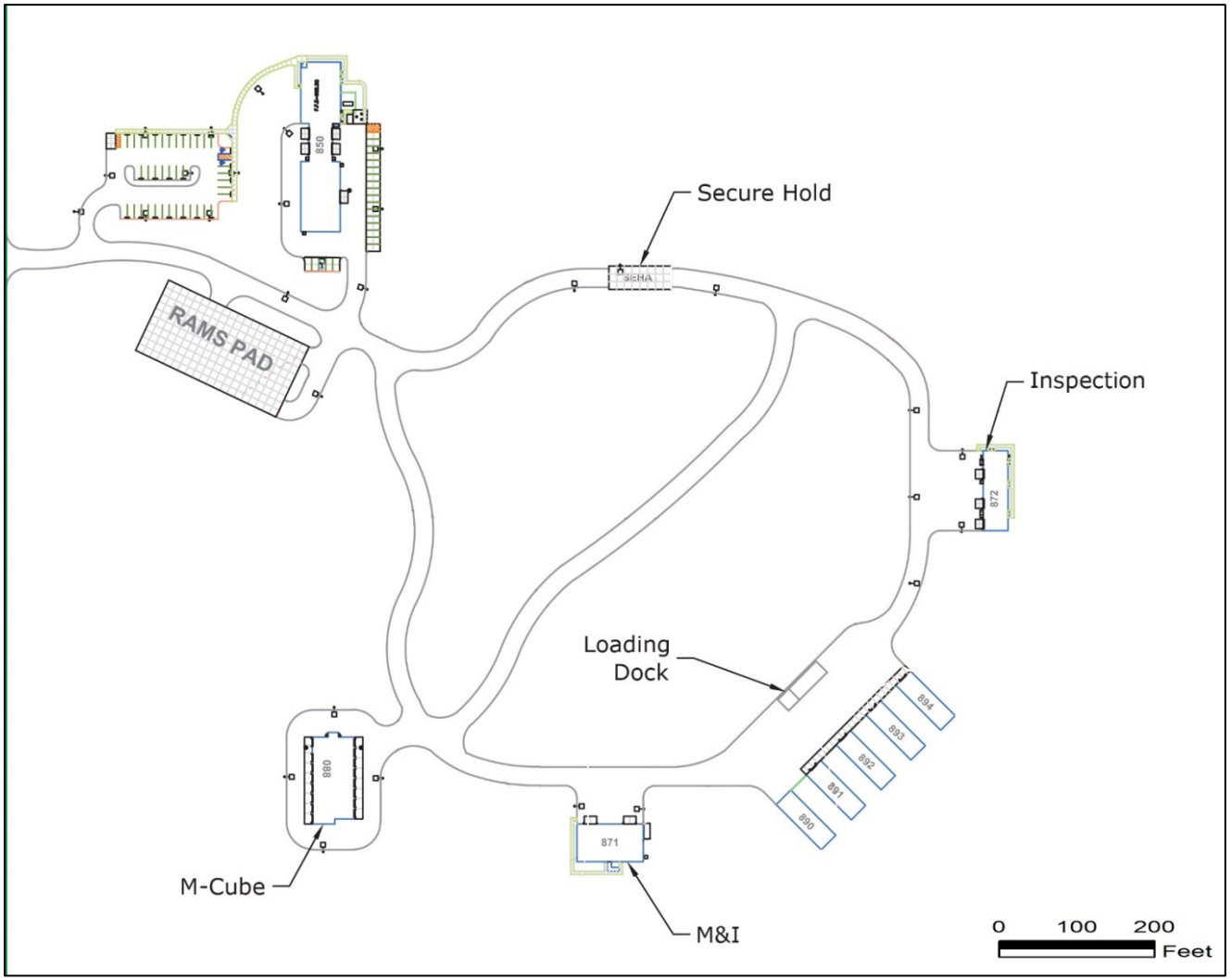
Exhibit 13
EARTH COVERED MAGAZINE

Source: Photos courtesy of USAF and Raytheon Missile Systems, 2016.

Construction of replacement magazines elsewhere on AFP 44: In order to maintain the existing munitions storage capacity of AFP 44, replacement storage facilities would be constructed elsewhere on AFP 44 that would provide the same volume of storage provided in the "A" Magazines. These new ECMs would replace the twelve "A" Magazines to be demolished on Parcel "F" and adjacent to Parcel "F".

Construction of Munitions Storage Area for the AANG. This element of the Proposed Action includes transfer of land from Parcel "H" to the USAF on behalf of the NGB for construction of a MSA and access road to support the AANG at Tucson Air National Guard Base. A conceptual layout of the MSA is shown on **Exhibit 14**.

Exhibit 14
GENERAL LAYOUT OF PROPOSED MUNITIONS STORAGE AREA



Note: M&I is Maintenance and Inspection.
Source: National Guard Bureau, 2016.

1.5 REQUESTED FEDERAL ACTIONS

This section summarizes the Federal actions and approvals the Federal Government must give before the Sponsor can implement the Proposed Action, described in Section 1.4.

Federal Actions by the Federal Aviation Administration (FAA):

- Unconditional approval of the ALP to depict the proposed improvements pursuant to 49 USC §§ 40103(b) and 47107(a)(16); 14 CFR Part 77, *Objects Affecting Navigable Airspace*; and 14 CFR Part 157, *Notice of Construction, Alteration, Activation, and Deactivation of Airports*.
- Determination under 49 USC § 44502(b) that the airport development is reasonably necessary for use in air commerce or in the interests of national defense.
- Determination under 49 USC § 47106(a)(1) that the Selected Alternative is Reasonably Consistent with Existing Plans of Public Agencies Responsible for Development in the Area.
- Determination under 49 USC § 47106(a)(1) that the Selected Alternative is Reasonably Consistent with Existing Plans of Public Agencies Responsible for Development in the Area.
- Approval of a Construction Safety and Phasing Plan to maintain aviation and airfield safety during construction pursuant to FAA Advisory Circular 150/5370-2F, *Operational Safety on Airports During Construction*, [14 CFR Part 139 (49 USC § 44706)].
- Construction, installation, relocation and/or upgrade of various navigational and visual aids including but not limited to Localizer Array, PAPI; wind directional indicator cones, MALSR and associated equipment shelters; runway threshold and edge lights, and taxiway edge lighting and signage and associated utility lines. This equipment is necessary to ensure the safety of air navigation for aircraft operations at the Airport.
- Approval of demolition of 12 ECMs on and adjacent to Parcel "F" on AFP 44 following transfer of Parcel "F" to TAA.
- Implementation of revised and temporary air traffic control procedures below 3,000 feet above ground level; including temporary approach procedures to be used during construction.
- Establishment of new Standard Instrument Departure and Standard Terminal Arrival Route procedures.
- Approval of the TAA's request for release of Federal obligations on land owned by the Airport Authority for ultimate transfer to the USAF for AFP 44.
- Approval changes to the airport certification manual pursuant to 14 CFR Part 139.

- Determinations under 49 U.S.C §§ 47106 and 47107 relating to project grant application approval conditioned on satisfaction of project requirements, and project grant application approval conditioned on assurances about airport operations the proposed project for Federal funding assistance under the Airport Improvement Plan (AIP) for the proposed project as shown on the ALP.[9]
- Determination of eligibility for Federal assistance for the near-term development projects under the Federal grant-in-aid program authorized by the Airport and Airway Improvement Act of 1982, as amended (49 USC § 47101 et seq.).
- Appropriate amendments to air carrier operations specifications pursuant to 49 USC § 44705.
- FAA determination of the Proposed Action's effects on the safe and efficient use of navigable airspace.

Federal Actions by the United States Air Force:

- Approval of disposal of Parcel "F" and associated recorded deed restrictions for AFP 44.
- Approval of acquisition of Parcel "G" from TAA for use by the USAF at AFP 44.
- Approval of the ultimate transfer of Parcel "H" from TAA to the USAF, a portion of which would be designated for use by the National Guard Bureau.
- Approval of construction of replacement ECMs on AFP 44.
- Approval of deactivation and subsequent demolition of 12 ECMs (also known as "A" Magazines) located on and adjacent to Parcel "F".
- Approval of construction of a replacement AFP 44 perimeter fence along the western boundary of Parcel "F".

Federal Actions by the National Guard Bureau:

- Approval of appropriate agreements between the USAF and NGB for use of land in Parcel "H" for construction of a Munitions Storage Area.
- Approval of funds for design/construction of a Munitions Storage Area to support the AANG at Tucson Air National Guard Base on Parcel "H".

[9] Certain requirements for AIP funding overlap with environmental review requirements for approval of the ALP and so are addressed as part of the EIS for the ALP. These determinations are a prerequisite to funding but do not complete the determinations that are necessary for funding. The decision to approve AIP and PFC funding are completed in separate processes.

1.6 THE ENVIRONMENTAL REVIEW PROCESS

FAA's environmental review is done in compliance with environmental requirements and policies including NEPA, the CEQ Regulations for Implementing the Procedural Provisions of NEPA (40 CFR §1506.6), and FAA Orders 1050.1F and 5050.4B. Throughout this process, FAA is directed to "[m]ake diligent efforts to involve the public in preparing and implementing [its] NEPA procedures."[10]

NEPA allows for an early and open process for determining the scope of issues to be addressed in an EIS and for identifying issues related to the Proposed Action. This public participation process is called scoping. Scoping is a fundamental part of the EIS development process and promotes better decision making. Scoping not only informs the public about the Proposed Action and alternatives, but also identifies issues and concerns early in the EIS process that are of particular interest to affected communities.

Scoping for the development of the EIS began with the publication of the Notice of Intent to prepare the EIS in the *Federal Register* on August 19, 2016. A notice of the scoping meeting was published in the *Arizona Daily Star*, 30 days in advance of the scheduled meeting.

A governmental agency scoping meeting for all federal, state, and local regulatory agencies which have jurisdiction by law or have special expertise with respect to any potential environmental impacts associated with the Proposed Action was held on September 22, 2016 at Tucson Executive Terminal at the base of the Old Airport Traffic Control Tower building, 7081 South Plumer Avenue, Tucson, Arizona.

FAA also conducted a public scoping meeting on September 22, 2016 at the same location during the evening. The public scoping meeting was conducted in an open house format designed to inform the public about the Proposed Action and NEPA process, and allow the public to speak with FAA, USAF, NGB, and Airport Sponsor representatives on issues and concerns they would like to see addressed in the EIS. During the scoping meeting, FAA staff gave a presentation on the proposed ASEP project and the objectives of the Proposed Action. Following the presentation, the public was provided the opportunity to comment on the project. A total of 22 individuals not including FAA, USAF, NGB, and Airport Sponsor representatives signed in at the meeting.

The public had the following five ways to provide comments to the FAA about the scope of the EIS during the scoping period:

- Submit written comments during the public scoping meeting;
- Provide comments orally to a stenographer at the scoping meeting;
- Provide comments orally by telephoning Dave Kessler, the FAA Project Manager, at (310) 725-3615;
- Submit comments electronically to dave.kessler@faa.gov; or

[10] 40 CFR 1506.6(a).

- Mail written comments to David B. Kessler, M.A., AICP, Regional Environmental Protection Specialist, AWP-610.1, Airports Division, Federal Aviation Administration, Western-Pacific Region. Mailing address: 15000 Aviation Boulevard, Lawndale, California 90261.

During the government agency scoping process from August 19, 2016 to October 3, 2016, six government agencies submitted comments about the project. These agencies included the Arizona State Historic Preservation Office, Arizona Department of Environmental Quality, National Park Service, the city of Tucson Environmental and General Services, Federal Emergency Management Agency Floodplain Management and Insurance Branch, and the U.S. Environmental Protection Agency.

A total of 18 public comments were received during the scoping period from August 19, 2016 to October 3, 2016. Thirteen people provided comments in support of the proposed project. Five comments were received concerning the possibility of additional military flights including the F-35 Lighting II fighter aircraft being based at DMA or Tucson Air National Guard Base. **However, the need for the Proposed Action at TUS does <u>not</u> involve, in any way, the new F-35 fighter aircraft**. Deployment of the F-35 to various installations around the United States and abroad is a decision made by the USAF. In August 2012, the USAF approved a Record of Decision to station the F-35A at Luke Air Force Base, west of Phoenix, Arizona. At this time, there is no proposal before the USAF or NGB to station the F-35 at DMA or Tucson Air National Guard Base. There will be no analysis of potential F-35 deployment at TUS in the EIS.

The next milestone for the EIS is to collect comments on the purpose, need, and alternatives working paper and to begin preparing the Draft EIS document. The public release of the Draft EIS is anticipated to take place in the spring of 2018. The Final EIS is anticipated to be released in the fall of 2018, with a Record of Decision completed in late fall/early winter 2018. Permits and other mitigation requirements, if necessary, and the final design of the proposed project, are likely to extend beyond that timeframe. Construction of the proposed project is expected to take approximately three years. Under this timeline, if the FAA decides to proceed with the project following environmental review, the Proposed Action could be completed and operational by 2022.

SECTION 2 ALTERNATIVES

2.1 ALTERNATIVES INTRODUCTION

An EIS describes and discusses the significant environmental impacts that would be caused by the Proposed Action, its reasonable alternatives and the no action alternative. The purpose of this Working Paper is to identify potential reasonable alternatives to the Proposed Action. When considering alternatives, the FAA must:

- Develop and describe the range of reasonable alternatives capable of achieving the Purpose and Need (see 40 CFR § 1502.14; FAA Order 1050.1F, paragraph 7-1.1(e)) including the Proposed Action, any reasonable alternatives not within the jurisdiction of the lead agency, and the No Action Alternative; and
- Rigorously explore and objectively evaluate all reasonable alternatives, and provide reasons why any alternatives were eliminated from further study (40 CFR § 1502.14(a)).

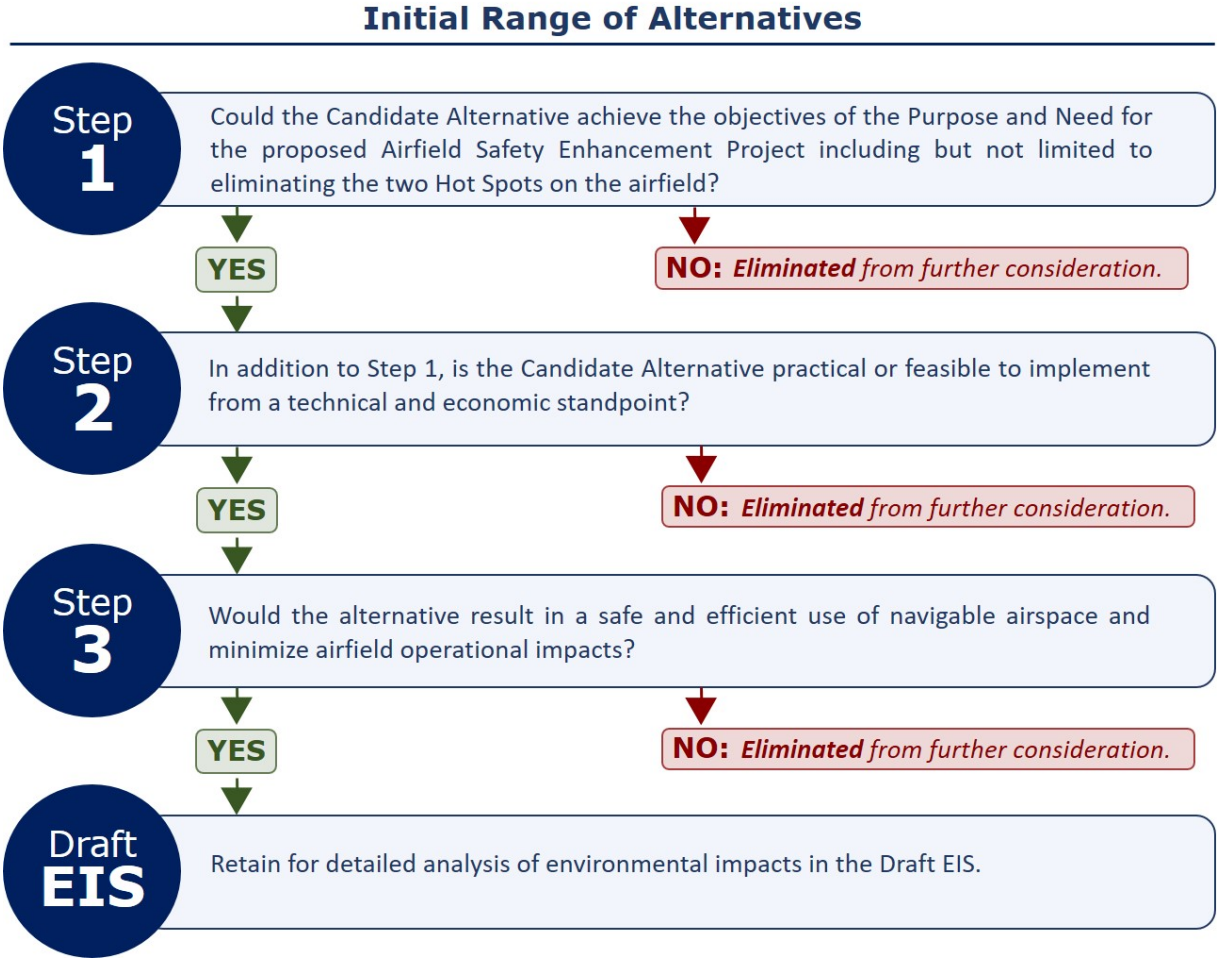
This Working Paper describes and applies a screening process to determine reasonable alternatives that are capable of achieving the Purpose and Need, and to describe the alternatives that will be evaluated in detail in the Draft EIS. There are two similar actions for which alternatives are being considered. The first screening process identifies alternatives for the ASEP. The second screening process identifies alternatives for the location of a proposed munitions storage area. The FAA is making this Working Paper available to the public and government agencies for review and comment. Once that review is complete, in whole or in summary, this Working Paper will become part of the EIS. **The FAA is not making a decision about the Preferred Alternative in this Working Paper. That decision would be made as part of a Record of Decision on the Final EIS.**

2.2 AIRFIELD SAFETY ENHANCEMENT ALTERNATIVES SCREENING PROCESS

FAA established a multi-step screening process to identify a range of reasonable ASE alternatives responsive to the Purpose and Need for the Proposed Action. The first step in this screening process was to determine if the proposed ASE alternative was capable of addressing the Purpose and Need.

After determining whether the proposed ASE alternatives were capable of addressing the Purpose and Need, various alternatives were carried forward into a second step evaluation to consider whether the alternative is practical or feasible to implement from an economic and technical standpoint. At the completion of this second step evaluation, ASE alternatives moved forward to a third step to determine if the alternative would result in safe and efficient use of navigable airspace and if the alternative would minimize airfield operational impacts. If the ASE alternative advanced through all three steps, it was retained for a more detailed environmental evaluation in the EIS process. The screening process for the ASE alternatives is portrayed conceptually in **Exhibit 15**.

Exhibit 15
AIRFIELD SAFETY ENHANCEMENT ALTERNATIVES SCREENING PROCESS



2.3 INITIAL RANGE OF AIRFIELD SAFETY ENHANCEMENT ALTERNATIVES

This section provides a brief description of the ASE alternatives that are subject to the multi-step screening process. The initial range of alternatives to be evaluated include the No Action Alternative, on-site airfield alternatives, and off-site alternatives.

2.3.1 NO ACTION ALTERNATIVE

Exhibit 16 presents the No Action Alternative, where no changes would be made from the existing conditions and the airfield would remain as it is today. Parallel Runways 11L/29R and 11R/29L measure 10,996 feet by 150 feet and 8,408 feet by 75 feet, respectively, and are separated by 706 feet. The crosswind Runway 3/21 measures 7,000 feet by 150 feet. While the No Action Alternative does not meet the Purpose and Need, the No Action Alternative must be carried forward in the assessment of environmental impacts as required by 40 CFR § 1502.14(d). The No Action Alternative serves as a baseline to compare the impacts of the other alternatives.

Exhibit 16
NO ACTION ALTERNATIVE

Source: TAA, Airport Layout Plan, 2014.

2.3.2 ON-SITE AIRFIELD ALTERNATIVES

The range of on-site airfield alternatives includes those identified in the TAA's Master Plan, dated June 1, 2014; TAA's ASE Implementation Study dated May 2015; and the TAA's ALP drawings.[11] These alternatives were evaluated through the screening process to determine whether they meet the Purpose and Need.

Existing 706-Foot Separation alternatives

The common feature of the three alternatives below is that they each maintain a 706-foot separation between parallel runway centerlines.

Existing 706-Foot Separation Plan A

This Alternative, as shown in **Exhibit 17**, retains the existing length, threshold locations, and centerline geometry of both Runways 11L/29R and 11R/29L. This Alternative removes various taxiway crossings currently used by GA aircraft accessing Runway 11R/29L. Various other taxiway improvements are proposed to promote pilot awareness on the airfield, most importantly the removal of the taxiways leading to the north ends of Runway 11L/29R and 11R/29L. The addition of several taxiway segments would replace removed taxiways and would comply with FAA design standards. Similar to the existing condition, parallel Runways 11L/29R and 11R/29L would measure 10,996 feet by 150 feet and 8,408 feet by 75 feet, respectively, and would still be separated by 706 feet.

[11] Tucson Airport Authority. ALP drawing approved by the TAA Chief Executive Officer on June 2, 2014 and conditionally approved by FAA on June 24, 2014.

Exhibit 17
EXISTING 706-FOOT SEPARATION PLAN A

Source: TAA, Master Plan Airfield Alternative 2A, 2015.

Existing 706-Foot Separation Plan B

This Alternative, as shown on **Exhibit 18**, creates an Airplane Design Group-IV capable runway by widening and extending Runway 11R/29L south so that the ends of the two runways line up and are no longer staggered. Both runways would also be extended north to intersect with Taxiway D. Currently, both runways end south of Taxiway D. Various other taxiway improvements are proposed to promote pilot awareness on the airfield. These improvements include the removal of the taxiways leading to the north ends of Runway 11L/29R and 11R/29L. The addition of several taxiway segments would replace removed taxiways and would comply with FAA design standards. Parallel Runways 11R/29L and 11L/29R would both measure 11,330 feet by 150 feet. This alternative retains the current separation between the parallel runways of 706 feet.

Exhibit 18
EXISTING 706-FOOT SEPARATION PLAN B

Source: TAA, Master Plan Airfield Alternative 2B, 2015.

706-Foot Separation Plan C

This Alternative, as shown on **Exhibit 19**, utilizes many of the elements of the 706-Foot Separation Plan B Alternative. However, this Alternative displaces the Runway 11L/29R and 11R/29L arrival thresholds south of their current positions to allow Taxiway D to function as an end-around taxiway. Various other taxiway improvements are proposed to promote pilot awareness on the airfield. These improvements include the removal of the taxiways leading to the north ends of Runway 11L/29R and 11R/29L. The addition of several taxiway segments would replace removed taxiways and would comply with FAA design standards. Parallel Runways 11R/29L and 11L/29R would both measure 10,807 feet for departures and 9,618 feet of distance for landings. This Alternative retains the current separation between the parallel runways of 706 feet.

Exhibit 19
EXISTING 706-FOOT SEPARATION PLAN C

Source: TAA, Master Plan Airfield Alternative 2C, 2015.

800-Foot Separation Alternatives

The common feature of the two alternatives below is that they both include an 800-foot separation between parallel runways, which allows for a parallel taxiway to be constructed between the runways. These alternatives would require the replacement of Runway 11R/29L.

800-Foot Separation Plan A

This Alternative, as shown on **Exhibit 20**, includes the replacement of Runway 11R/29L with a full-length parallel runway. The distance between the parallel runways would be expanded to 800 feet. A center parallel taxiway would be constructed to allow aircraft to queue prior to crossing the other parallel runway. The center parallel taxiway would minimize the potential for pilots to inadvertently cross an active runway by forcing them to first turn onto the taxiway. Pilots would then contact the ATCT to receive clearance to cross the runway. An additional parallel taxiway west of the relocated Runway 11R/29L would limit direct access from aircraft approaching the runway from the west. Various other taxiway improvements are proposed to promote pilot awareness on the airfield, most importantly the removal of the taxiways leading to the north ends of Runway 11L/29R and 11R/29L. The addition of several taxiway segments would replace removed taxiways and would comply with FAA design standards. Parallel Runways 11R/29L and 11L/29R would both measure 10,996 feet by 150 feet.

Under this Alternative, TAA would acquire approximately 58 acres of land along the shared property boundary between the Airport and AFP 44 in order to demolish 12 ECMs to protect airport safety areas.

Exhibit 20
800-FOOT SEPARATION PLAN A

Source: TAA, 2016.

800-Foot Separation Plan B

This Alternative, as shown on **Exhibit 21**, includes the same basic elements of the 800-Foot Separation Plan A Alternative, but shifts the parallel runways approximately 2,700 feet to the southeast along the centerline. The relocation of the runways and addition of other taxiways on the west side of the airfield would allow Taxiway D to be used as an unrestricted end-around taxiway. Parallel Runways 11R/29L and 11L/29R would both measure 10,996 feet by 150 feet. This Alternative would expand the separation between the parallel runways to 800 feet. Under this Alternative, TAA would also acquire approximately 58 acres of land along the shared property boundary between the Airport and AFP 44 in order to demolish 12 ECMs in order to protect airport safety areas.

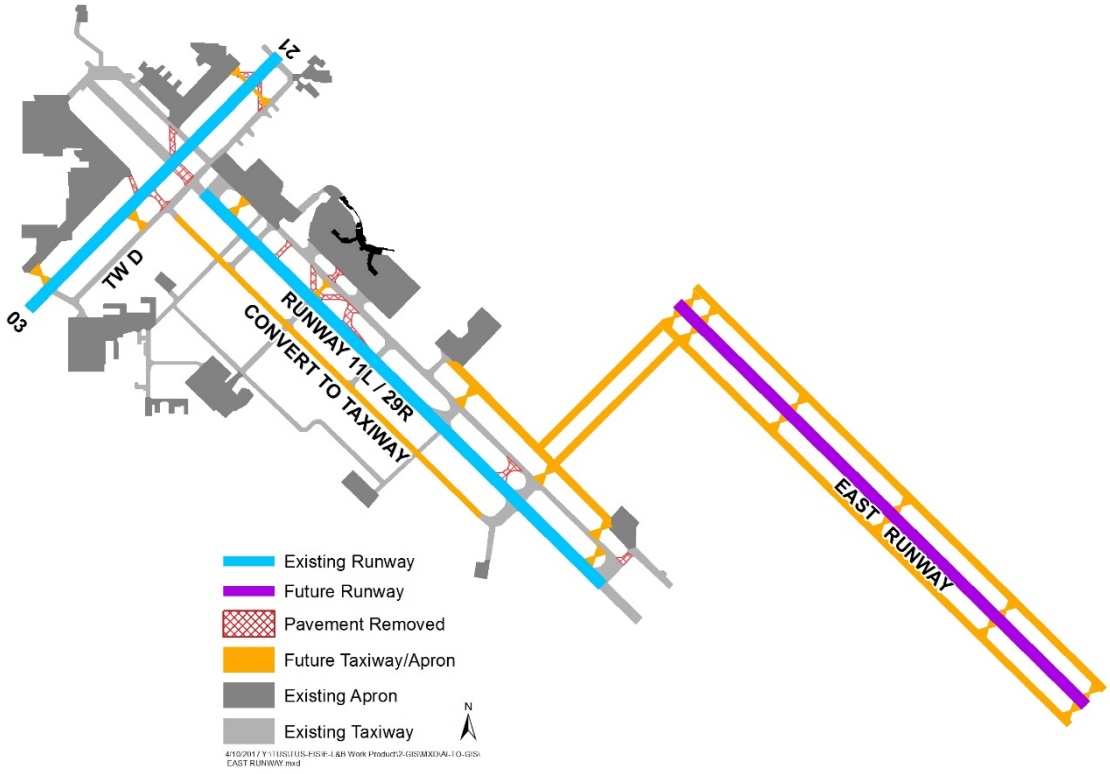
Exhibit 21
800-FOOT SEPARATION PLAN B

Source: TAA, Master Plan Airfield Alternative 5, 2015.

East Runway

This Alternative, as shown on **Exhibit 22**, includes construction of a runway east of the terminal area. This Alternative is conceptually depicted on TAA's 2014 ALP. Runway 11R/29L would be converted into a western parallel taxiway to service the west airfield. Both runways would measure 10,996 feet by 150 feet. This Alternative expands the separation between the parallel runways to be approximately 4,900 feet. Under this Alternative, two aircraft could land at the same time using landing system technology. This type of operation called dual simultaneous instrument approaches could be implemented at TUS, as the minimum separation required is 4,300 feet between parallel runway centerlines with ILSs.

Exhibit 22
EAST RUNWAY



Note: This exhibit is not to the same scale as the previous alternatives due to the area needed for implementation of the East Runway.

Source: TAA, Airport Layout Plan, 2014.

2.3.3 OFF-SITE ALTERNATIVES

This use of other airports in the region is examined to determine if the relocation of aircraft operations to another airport would satisfy the purpose and need. There are no commercial service airports in the Tucson Metropolitan Area other than TUS. Therefore, off-site alternatives being considered would transfer activity from TUS to GA airports or USAF facilities.

Ryan Airfield

Ryan Airfield (RYN) is a GA airport, owned and operated by the TAA. TAA has a long-term lease with the city of Tucson to operate RYN. RYN is located approximately 10 miles southwest of the city of Tucson at the intersection of West Valencia Road and Ajo Way (State Route 86). RYN occupies over 1,804 acres, and currently serves as a GA reliever airport for TUS. RYN has three runways, including parallel Runways 6R/24L and 6L/24R, and crosswind Runway 15/33. Runways 6R/24L and 6L/24R are both asphalt and oriented in a northeast to southwest manner, with 6R/24L measuring 5,500 feet in length and 75 feet wide, and 6L/24R measuring 4,900 feet in length and 75 feet wide. Runway 15/33 measures 4,000 feet long and 75 feet wide. RYN has a 2,500 square foot administration building that includes administrative offices, a pilot's lounge and briefing room, a conference room, supply closets, and restrooms. An adjacent parking lot provides a total of 13 parking spaces.[12] There are currently 251 individual aircraft storage units at RYN, primarily consisting of T-hangars and conventional hangar spaces.

Marana Regional Airport

The Marana Regional Airport (AVQ) is classified as a GA reliever airport. It is located approximately 15 miles northwest of Tucson and is five miles west of Interstate 10 on Avra Valley Road. The Town of Marana is the airport sponsor for AVQ. The airport is home to more than 260-based aircraft and had more than 80,000 annual operations in 2014. The airport's main runway, Runway 12/30 is 6,901 feet long and Runway 3/21, the crosswind runway, is 3,892 feet long.[13]

Davis-Monthan Air Force Base

DMA, a part of the USAF's Air Combat Command, is located approximately four miles northeast of TUS. The base is home to the 355th Fighter Wing, responsible for training and deploying A-10 pilots, in addition to over 30 tenant units, including 12th Air Force, the 309th Aircraft Maintenance and Regeneration Group (AMARG), the 55th Electronic Combat Group, the 563rd Rescue

12 Ryan Airfield Master Plan Update, Draft Final, October 7, 2009.
13 Town of Marana, Arizona. Marana Regional Airport, Airport Master Plan Working Paper No. 1, December 2015.

Group, the 943rd Rescue Group, and a number of other organizations. DMA's aircraft inventory includes A-10Cs, EC-130s, HC-130Js, HH-60Gs, a contingent of

F-16s, and over 3,700 assorted aircraft in the AMARG Boneyard. DMA has one runway, Runway 12/30, which is 13,643 feet in length.

2.4 STEP ONE: ACHIEVES PURPOSE AND NEED

The following sections describe the Step One evaluation of each initial ASE alternative, which evaluates each alternative's ability to satisfy the Purpose and Need. **Table 3** at the end of Section 2.4 summarizes the evaluation findings.

2.4.1 NO ACTION ALTERNATIVE

To comply with 40 CFR 1502.14(d), FAA Order 5050.4B, and other special purpose environmental laws, the No Action Alternative is carried forward in the analysis of environmental consequences.

The No Action Alternative depicts the existing conditions of the Airport. Although the No Action Alternative would not address the Purpose and Need to enhance the safety and operational condition of the existing airfield, it provides a basis of comparison for the assessment of future conditions and impacts. Therefore, the No Action Alternative is carried forward through the Alternatives Screening and evaluated in the Environmental Consequences Chapter of the EIS.

2.4.2 ON-SITE AIRFIELD ALTERNATIVES

The FAA defines a "hot spot" as a location on an airport movement area with a history of potential risk of collision or runway incursion, and where heightened attention by pilots and drivers is necessary.[14] Typically, hot spots are located in areas with complex or confusing airfield geometry or in areas that have a history of incursions or the potential for incursions. A confusing condition may be compounded by a miscommunication between ATCT and a pilot, and may cause an aircraft separation standard to be compromised.[15] The FAA has identified two existing hot spots at the Airport, labeled as HS-1 and HS-2 as described in Section 1.3.

HS-1 is located at the end of Runway 29L. HS-1 has been a historical point of confusion between Runways 29L and 29R and Runway 29R and Taxiway A. On several occasions pilots on approach from the south have mistaken Runway 29R for Runway 29L and Taxiway A for Runway 29R, landing on the wrong runway or on Taxiway A.

HS-2 is located along Taxiway D between Runway 11L/29R and Runway 11R/29L. At this location, pilots taxiing along Taxiway D have crossed the approach path for Runway 11L/29R or Runway 11R/29L without proper clearance.

14 https://www.faa.gov/airports/runway_safety/hotspots/hotspots_list/

15 FAA Air Traffic Organization Office of Runway Safety. Focus on Hotspots- Prevent Runway Incursions Brochure. www.faa.gov/airports/runway_safety/publications

706-Foot Separation Plan A

This Alternative does not meet the need to eliminate HS-1 on the south of the Airport because under this Alternative, the Runway 11R/29L length, width, and basic airfield geometry would remain as they are today. Thus, the staggered runway ends would continue to exist.

This Alternative does not prevent aircraft from crossing directly between two parallel runways because it does not include a center parallel taxiway. This Alternative would not meet the need to maintain operational capability when there is a temporary closure of 11L/29R because the runways would remain as they are today. This Alternative would maintain AFP 44 and NGB capabilities. This Alternative was not carried forward for Step Two evaluation because it does not meet all of the stated needs.

Existing 706-Foot Separation Plan B

This Alternative does not meet the need to eliminate the existing HS-2. This is because this Alternative does not prevent aircraft from crossing directly between two parallel runways because it does not include a center parallel taxiway. This Alternative would maintain operational capability when there is a temporary closure of 11L/29R due to the expansion of Runway 11R/29L. This Alternative would maintain AFP 44 and NGB capabilities. This Alternative was not carried forward for Step Two evaluation because it does not meet all of the stated needs.

Existing 706-Foot Separation Plan C

This Alternative does not meet the need to eliminate the existing HS-2. This is because this Alternative does not prevent aircraft from crossing directly between two parallel runways because it does not include a center parallel taxiway. This Alternative would maintain operational capability when there is a temporary closure of 11L/29R. This Alternative would maintain AFP 44 and NGB capabilities. This Alternative was not carried forward for Step Two evaluation because it does not meet all of the stated needs.

800-Foot Separation Plan A

This Alternative would eliminate both existing hot spots. This Alternative would prevent aircraft from crossing directly between two parallel runways because it includes a center parallel taxiway. This alternative would maintain operational capability when there is a temporary closure of 11L/29R. This Alternative would maintain AFP 44 and NGB capabilities. This Alternative was carried forward for Step Two evaluation because it meets all of the stated needs.

800-Foot Separation Plan B

This Alternative would eliminate both existing hot spots. This Alternative would prevent aircraft from crossing directly between two parallel runways because it includes a center parallel taxiway. This Alternative would maintain operational capability when there is a temporary closure of 11L/29R. This Alternative would maintain AFP 44 and NGB capabilities. This Alternative was carried forward for Step Two evaluation because it meets all of the stated needs.

East Runway

This Alternative would eliminate HS-1 but not HS-2. This Alternative would prevent aircraft from crossing directly between two parallel runways because it includes a center taxiway. This Alternative would maintain operational capability when there is a temporary closure of 11L/29R. This Alternative would maintain AFP 44 and NGB capabilities.

This Alternative is shown on TAA's ALP as "conceptual" because it is a future capacity enhancement that is needed beyond the 20-year planning horizon of the Master Plan Update. At this time, implementation of this Alternative would not be warranted because TUS does not need additional airfield capacity. This Alternative was not carried forward for Step Two evaluation because it does not meet all of the stated needs, specifically it does not eliminate HS-2.

Table 3
STEP ONE SCREENING MATRIX

Alternative	Description	Alternatives Ability to Meet the Established Purposes and Needs				Move to Step Two
		Enhances Safety and Eliminates Existing Hot Spots	*Prevents aircraft from crossing directly between two parallel runways*	*Maintains Operational Capabilities when there is a temporary closure of 11L/29R*	*Maintains AFP 44 capabilities and NGB safety standards and capabilities*	
No Action	- Airport remains as it is today	No	No	No	Yes	**Yes**
706-Foot Separation Plan A	- Minimal action to taxiway connectors to increase pilot awareness and limit runway crossings	No	No	No	Yes	No
706-Foot Separation Plan B	- Dual full length parallel runway system - Retain both Runway 11's end thresholds	No	No	Yes	Yes	No
706-Foot Separation Plan C	- Dual full length parallel runway system - Displace both Runway 11's thresholds	No	No	Yes	Yes	No
800-Foot Separation Plan A	- Dual full length parallel runway system - Displace both Runway 11's thresholds, end-around Taxiway D for B-II aircraft	Yes	Yes	Yes	Yes	**Yes**
800-Foot Separation Plan B	- Dual full length parallel runway system - Shift runways southeast, unobstructed end-around Taxiway D	Yes	Yes	Yes	Yes	**Yes**
East Runway	- Dual full length parallel runway system - New Runway 12/30, east of terminal core - Dual independent approaches - Additional taxiways near west pad	No	Yes	Yes	Yes	No
Ryan Airfield	- Insufficient runway length & airport facilities	Yes	Yes	Yes	Yes	**Yes**
Marana Regional	- Insufficient runway length & airport facilities	Yes	Yes	Yes	Yes	**Yes**
Davis -Monthan Air Force Base	- Cannot accept commercial/public traffic	Yes	Yes	Yes	Yes	**Yes**

Note: Yes- Satisfies purpose and need
No- Does not satisfy purpose and need

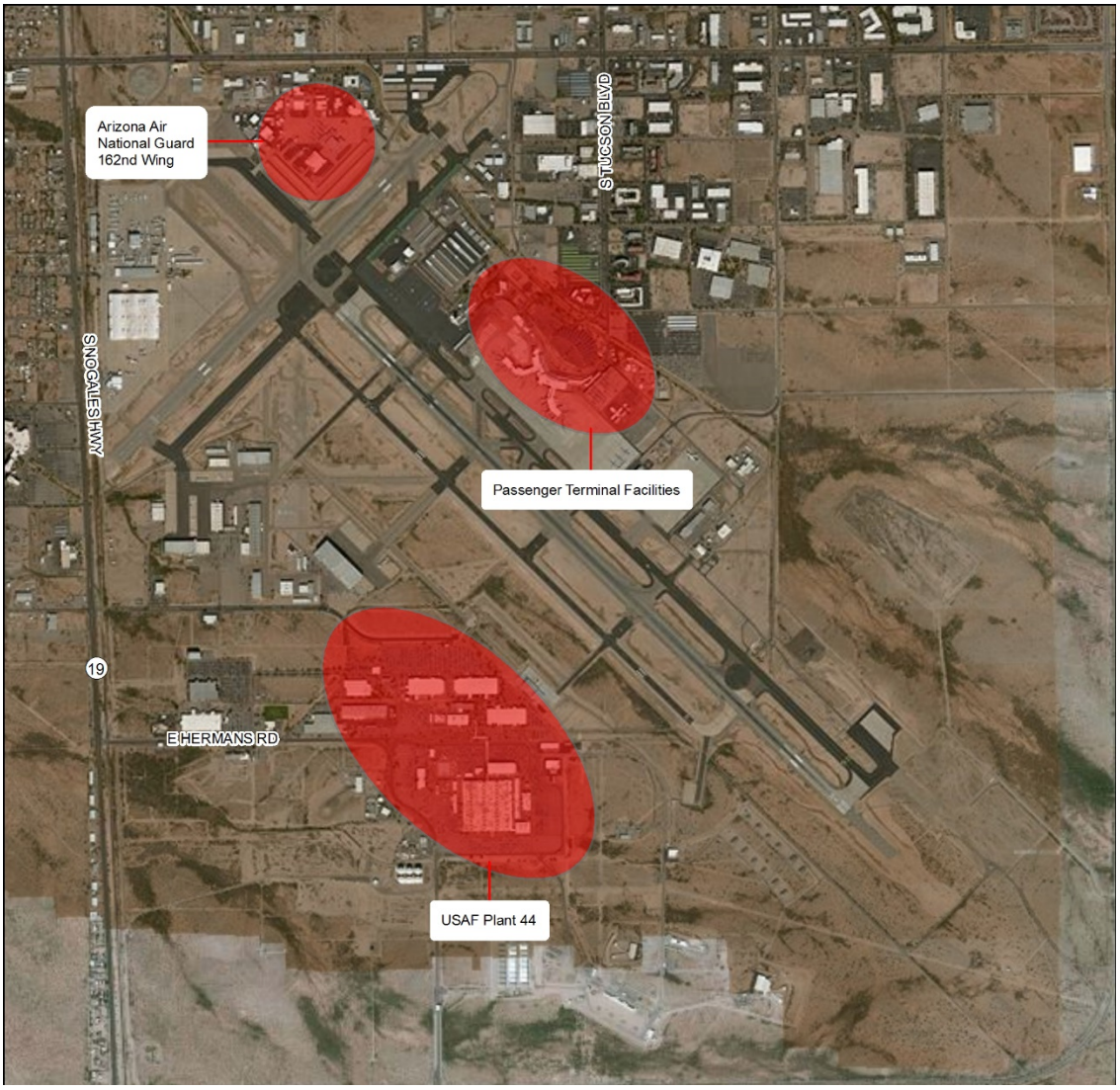
2.5 STEP TWO: PRACTICAL OR FEASIBLE TO IMPLEMENT

Based on the findings from the initial screening, two airfield alternatives and three off-site alternatives were identified as satisfying the Purpose and Need, in addition to the No Action alternative. The second step of the evaluation analyzed the alternatives a step further to evaluate if the alternative is practical or feasible to implement from a technical and economic standpoint.

The FAA reviewed the current layout of the Airport and its surroundings to identify constraints to potential implementation of alternatives. The facilities depicted on **Exhibit 23** are located on or immediately adjacent to the Airport and have been identified as development limitation constraints. Developing an alternative that would conflict with one of these existing facilities would result in substantial redevelopment costs or would inhibit development or maintenance of existing infrastructure and would therefore be impractical from a technical or economic standpoint. As such, no alternatives that directly affect these existing facilities were considered feasible to implement. The areas that are development limitation constraints for the alternatives include:

- **AFP 44 Facilities:** An alternative that would result in a major relocation of AFP 44 facilities would cause significant disruption to AFP 44 operations and would require substantial additional investment. Therefore, no alternatives that would cause substantial relocation of AFP 44 facilities would proceed to Step Three.
- **Passenger Terminal Facilities:** An alternative that would result in a major encroachment to the existing terminal core passenger processing facilities area would cause significant disruption of airline and passenger service. Therefore, no alternatives that require substantial relocation of facilities and additional investment would proceed to Step Three.
- **Arizona Air National Guard 162nd Wing (AANG) Facilities:** An alternative that would result in a major relocation of AANG facilities would cause significant disruption to their mission and would require substantial additional investment to complete. Therefore, no alternatives that would cause substantial relocation of AANG facilities are included in this analysis.

Exhibit 23
ALTERNATIVE CONSTRAINTS



Source: Aerial photo provided by Google Earth.

2.5.1 NO ACTION ALTERNATIVE

To comply with 40 CFR 1502.14(d), FAA Order 5050.4B, and other special purpose environmental laws, the No Action Alternative is carried forward in the analysis of environmental consequences.

2.5.2 ON-SITE AIRFIELD ALTERNATIVES

Both of the airfield development alternatives were identified as being feasible to implement and avoiding existing facilities and were carried forward for Step Three evaluation.

2.5.3 OFF-SITE ALTERNATIVES

The ability to use another airport as a feasible and reasonable alternative is largely based on the potential for that airport to accommodate most, if not all of the aircraft operations that are currently using TUS.

Ryan Airfield

The current runways at RYN do not provide the length and width necessary to accommodate military training operations, regional jet, or large passenger jet operations. Further, there is a lack of proper passenger terminal facilities (terminal buildings, baggage services, fueling facilities, utility infrastructure, and parking) to support passenger service. TAA does not hold a Part 139 Certificate for RYN. The lack of terminal and runway facilities at RYN would restrict it from being considered a reasonable or feasible alternative due to the significant investment that would have to occur. Therefore, the use of RYN as an alternative was not carried forward for the Step Three evaluation. While TAA does have the responsibility for decisions to further develop RYN, FAA and TAA do not have the authority to divert air transportation activity from TUS to RYN.

Marana Regional Airport (AVQ)

The current runway at AVQ is not long enough to accommodate military training operations, regional jet, or large jet passenger operations. Further, there is a lack of proper terminal facilities (secure terminal, baggage services, and parking) to support passenger service. The lack of terminal and runway facilities at AVQ would restrict that airport from being considered a reasonable or feasible alternative due to the significant investments that would have to occur. Therefore, the use of AVQ as an alternative was not carried forward for Step Three evaluation. Unlike TUS and RYN, TAA does not have the responsibility for decisions to further develop AVQ. FAA and TAA do not have the authority to divert air transportation activity from TUS to AVQ.

Davis-Monthan Air Force Base

DMA is a military installation closed to the public. Pilots must obtain special permissions prior to landing at DMA. Because DMA is not a public-use airport, relocating commercial aviation activity from TUS to DMA is not possible. Therefore, the use of DMA is not a feasible or reasonable alternative to the Proposed Action at TUS and was not carried forward for Step Three evaluation.

Table 4
STEP TWO SCREENING MATRIX

Alternative	Description	Step Two Screening Criteria	
		Is the Alternative practical or feasible to implement from a technical and economic standpoint?	**Move to Step Three**
No Action	- Airport remains as it is today	Yes	**Yes**
800-Foot Separation Plan A	- Dual full length parallel runway system - Displace both Runway 11's thresholds, end-around Taxiway D for B-II aircraft	Yes	**Yes**
800-Foot Separation Plan B	- Dual full length parallel runway system - Shift runways southeast, unobstructed end-around Taxiway D	Yes	**Yes**
Ryan Airfield	- Insufficient runway length & airport facilities	No	No
Marana Regional	- Insufficient runway length & airport facilities	No	No
Davis -Monthan Air Force Base	- Cannot accept commercial/public traffic	No	No

Note: Yes- Satisfies Step Two screening criteria
No- Does not satisfy Step Two screening criteria

2.6 STEP THREE: MINIMIZE AIRFIELD OPERATIONAL IMPACTS

Based on the analysis from Step One and Step Two of the initial screening, two airfield alternatives were carried forward for Step Three screening in addition to the No Action alternative. The third step of the evaluation analyzes the ASE alternatives' ability to result in a safe and efficient use of navigable airspace and minimize airfield operational impacts.

This Working Paper identifies and evaluates all reasonable, feasible, prudent, and practicable alternatives that might accomplish the objectives of the Proposed Action. Each of the ASE alternatives carried forward to this point appears feasible in terms that the alternative is physically capable of being built and could be operated safely. This Step Three screening considered the alternatives' impacts on airfield operations and issues of practicality and prudence.

Here, the most evident impact from the ASE alternatives considered was the potential increase in taxi times of aircraft going from the runways to the terminal, the AANG facility, and the GA ramp and on potential supporting infrastructure that would need to be built to support the alternatives.

2.6.1 NO ACTION ALTERNATIVE

The No Action Alternative required pursuant to 40 CFR § 1502.14(d) provides a basis of comparison for the assessment of future conditions and impacts. Therefore, the No Action alternative was carried forward for detailed evaluation in the EIS.

2.6.2 800-FOOT SEPARATION PLAN A

From an operational standpoint, this Alternative would provide an efficient use of the airfield and would maintain taxi times most similar to existing conditions.

2.6.3 800-FOOT SEPARATION PLAN B

From an operational standpoint, this Alternative would require additional runway pavement and taxiways to route aircraft to the passenger terminal area, the AANG facility, and the GA ramp and additional infrastructure development such as extension of utilities.

In addition, this alternative would cause a significant increase to taxi times for aircraft as compared to the existing conditions. It would not be practical or prudent to construct this Alternative because the additional resources needed for implementation and due to the increase in airfield operational impacts, specifically taxi time. Therefore, this Alternative was not carried forward for detailed evaluation in the EIS.

Table 5 summarizes the Step Three evaluation findings.

Table 5
STEP THREE SCREENING MATRIX

Alternative	Description	Step Three Screening Criteria		
		Would the Alternative result in a safe and efficient use of navigable airspace?	***Does the Alternative minimize airfield operational impacts?***	**Retain for detailed EIS impact evaluation**
No Action	- Airport remains as it is today	Yes	No	**Yes**
800-Foot Separation Plan A	- Dual full length parallel runway system - Displace both Runway 11's thresholds, end-around Taxiway D for B-II aircraft	Yes	Yes	**Yes**
800-Foot Separation Plan B	- Dual full length parallel runway system - Shift runways southeast, unobstructed end-around Taxiway D	Yes	No	No

Note: Yes- Satisfies Step Three screening criteria
No- Does not satisfy Step Three screening criteria

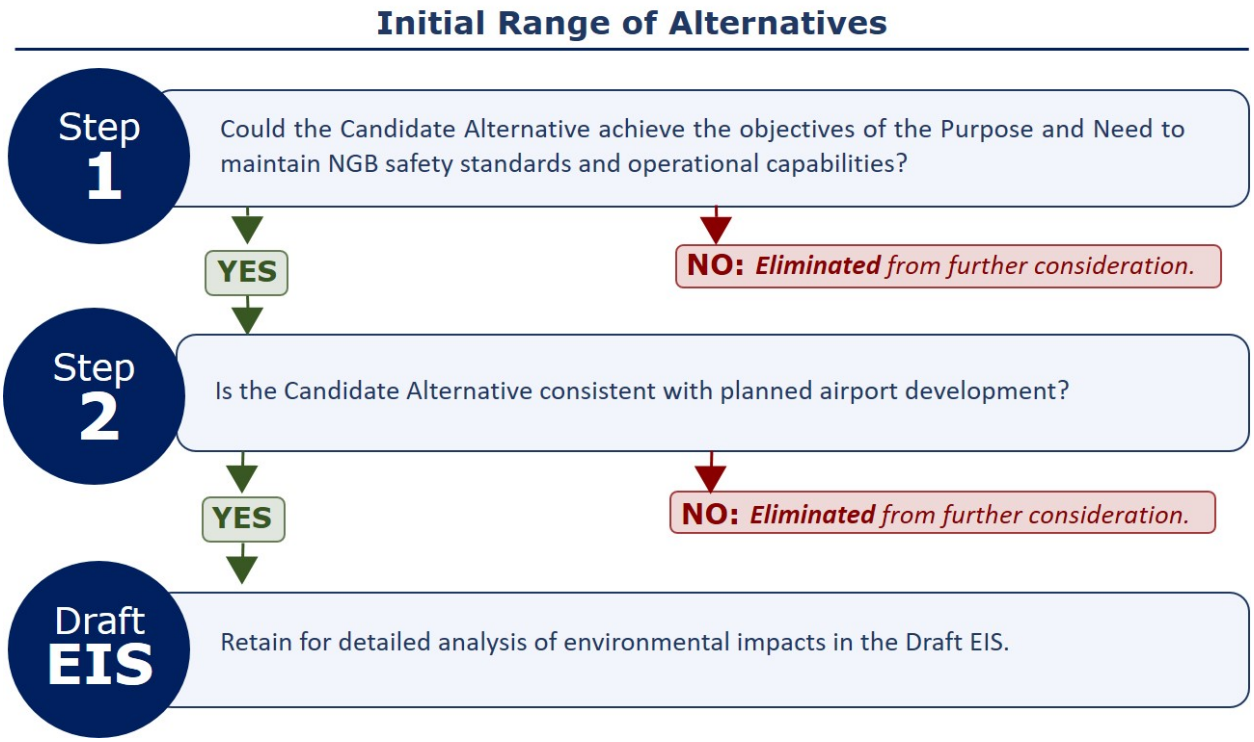
2.7 MUNITIONS STORAGE AREA ALTERNATIVES SCREENING PROCESS

This section provides a second screening process in order to identify alternatives for the location of a proposed munitions storage area (MSA). The proposed MSA is a separate project from the ASEP, but is considered a similar action under 40 CFR 1508.25(a)(3). The environmental consequences of the proposed MSA is similar to the ASEP, because they have common timing and geography. Inclusion of the MSA in the EIS also avoids unnecessary duplication and delay in preparing federal environmental documents.

The AANG currently maintains MSAs as part of their operational capability. Munitions storage areas may include ECMs but also includes other facilities to support munitions-related operations such as inspection areas, secured roadways, loading docks, and maintenance areas. Not all the munitions used by the AANG can be stored at the existing facilities. Some munitions must be stored at DMA. The AANG needs additional areas to maintain the safe storage of munitions and provide safety areas consistent with USAF standards to ensure the public is not in close proximity to any munitions in the event of a mishap.

FAA and NGB established a screening process to identify a range of reasonable munitions storage area alternatives. The screening process determined if the initial range of alternatives were able to meet the NGB's Purpose and Need and if the alternative was consistent with planned airport development. If the munitions storage area alternative advanced through the screening process, it was retained for a more detailed environmental evaluation in the EIS. The screening process is portrayed conceptually in **Exhibit 24**.

Exhibit 24
MUNITIONS STORAGE AREA ALTERNATIVES SCREENING PROCESS



2.7.1 INITIAL RANGE OF MUNITIONS STORAGE AREA ALTERNATIVES

The NGB's purpose and need is to maintain NGB safety standards and operational capabilities at the Tucson Air National Guard Base. In order to meet NGB safety standards, NGB needs to meet required separation distances for its MSA. The existing MSA does not meet the separation distances required for all the munitions utilized by the AANG. Some munitions must be stored at DMA. Recognizing the need to enhance safety and efficiency, the AANG has expressed interest in removing munitions storage from its current site at the existing AANG facilities located west of the Runway 21 end to a new MSA that would hold all necessary munitions for safe and efficient operations.

From a safety perspective, potential munitions storage area alternative sites must have the necessary clear zone arcs that are required in accordance with United States Air Force Manual 91-201, *Explosive Safety Standards*. The clear zone arcs keep the munitions and explosive operations a safe distance from the public. From an operational perspective, the MSA needs to be in close proximity to existing AANG facilities while minimizing runway crossings, as well as appropriate landside and airside access for staff.

In addition to meeting the NGB's purpose and need, it is also important to identify potential MSA locations that do not conflict with future planned developments at the Airport. Developing an alternative that would conflict with current or future airport facilities may result in substantial future redevelopment costs or would inhibit development. As such, no alternatives that would conflict with the ultimate development depicted on TAA's ALP were considered feasible or practical from a technical or economic standpoint to implement.

The NGB has identified that the area needed for the potential munitions storage area alternatives will need to be at least 55 acres in order to provide all the necessary facilities. Potential storage areas north and west of the airport core were not considered due to the lack of available land and impact to non-aviation related land. The following sections provide a brief description of the munitions storage area sites that are subject to the screening process.

East Los Reales Road Site

The East Los Reales Road Site is located east of the Air Freight ramp, southeast of intersection between East Los Reales Road and Country Club Road. This potential site, which is located on Airport property, is the closest to the AANG's current operations. Access to the AANG from the East Los Reales Road Site would utilize the existing East Los Reales Road to gain direct airside access and travel along the terminal apron airport service road.

South Alvernon Way Site

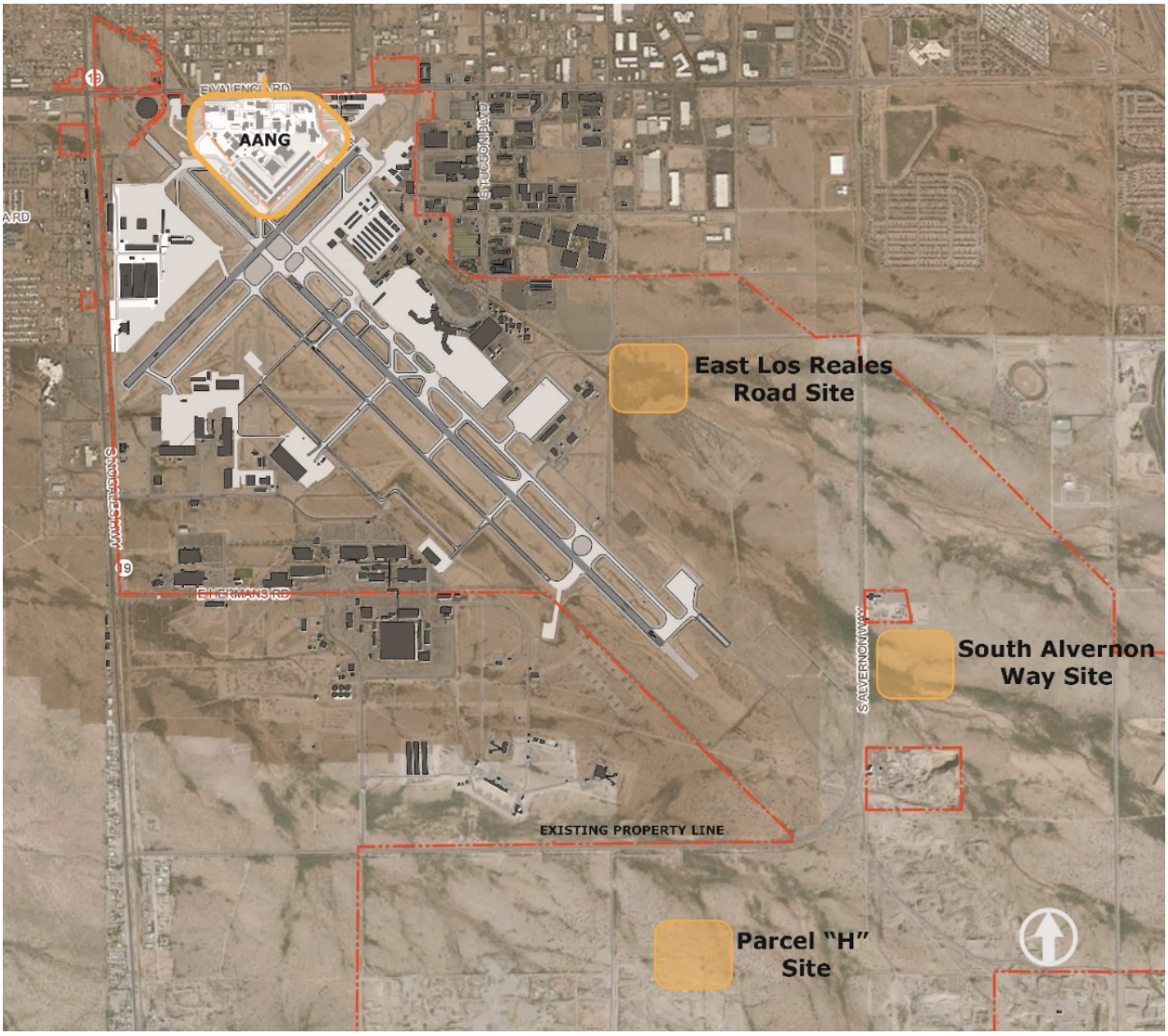
The South Alvernon Way Site is located east of the Runway 29 ends, along South Alvernon Way. This potential site is located on Airport property. However, this location is between two parcels that TAA does not own or control – parcels owned and operated by Crown Products Incorporated and Sierra Mining and Crushing.

Parcel "H" Site

The Parcel "H" Site is located south of AFP 44, southeast of intersection between former Hughes Access Road and South Country Club Road.

The existing AANG facilities and the three potential on-site AANG alternatives are shown in **Exhibit 25**.

Exhibit 25
ON-SITE AANG ALTERNATIVE SITES



Source: National Guard Bureau and Landrum & Brown, Inc. Analysis, 2017.

2.7.2 STEP ONE: ACHIEVES NGB PURPOSE AND NEED AND IS CONSISTENT WITH AIRPORT PLANNING

East Los Reales Road Site

This site would achieve the NGB's purpose and need and provide the necessary 55 acres of land. However, additional security considerations would be required as half of the site sits along public roadways. This site would conflict with the Airport's ultimate development and land use approach that recommends future development in this area. Because this site may expose the public to munitions while being transported and would conflict with the Airport's ultimate development plan, the East Los Reales Road Site was not carried forward for detailed evaluation.

South Alvernon Way Site

This site would achieve the NGB's purpose and need and provide the necessary 55 acres of land. However, additional security considerations would be required as transportation of munitions to the existing AANG would cross public roadways. From a land use perspective, combining the munitions storage area and publicly owned parcels of land in proximity to one another may present operational and security concerns in the future. This site would conflict with the Airport's ultimate development and land use approach that recommends future development in this area. Because this site may expose the public to munitions while being transported and would conflict with the Airport's ultimate development plan, the South Alvernon Way Site was not carried forward for detailed evaluation.

Parcel "H" Site

The Parcel "H" site provides the necessary 55 acres and achieves NGB's purpose and need. The Parcel "H" Site would require less security preparation because access to the AANG from the Parcel "H" Site could utilize a new secure roadway that does not leave Airport property or cross public roadways. From a land use perspective, the location would not conflict with the Airport's ultimate development and future land use efforts. For these reasons, the Parcel "H" site was selected to be carried forward for detailed evaluation.

Table 6
STEP ONE MUNITIONS STORAGE AREA ALTERNATIVES SCREENING MATRIX

Alternative	Description	Step One Screening Criteria		
		Does the Alternative maintain NGB safety standards and operational capabilities?	*Is the Alternative consistent with airport planned development?*	Retain for detailed EIS impact evaluation
East Los Reales Site	- Located east of Air Freight ramp - Closest to AANG - Security Concerns - Conflict with Airport's ultimate development	Yes	No	No
South Alvernon Way Site	- Security and safety concerns due to use of public road and proximity to non-Airport property	Yes	No	No
Parcel "H" Site	- Located south of AFP 44 - Could provide secure roadway that would not have to leave Airport property	Yes	Yes	**Yes**

Note: Yes- Satisfies Step One screening criteria
No- Does not satisfy Step One screening criteria

2.8 ALTERNATIVES RECOMMENDED FOR DETAILED EVALUATION IN THE ENVIRONMENTAL IMPACT STATEMENT

Based on the screening analysis presented, one ASE alternative (800-foot Separation Plan A) and one munitions storage area alternative (Parcel "H" Site) are recommended to be carried forward for further detailed environmental evaluation in the EIS. **Table 7** provides the screening summary for the ASE alternatives. **Table 8** provides the screening summary for the munitions storage area alternatives.

Table 7
AIRFIELD SAFETY ENHANCEMENT ALTERNATIVES SCREENING SUMMARY

Alternative	Description	Alternatives Ability to Meet the Established Purposes and Needs			Retain for detailed EIS impact evaluation
		Step-1 Achieve the objectives of Purpose and Need - Eliminates Existing Hot Spots?	*Step 2 – Practical or Feasible to Implement from an economic and technical standpoint?*	*Step 3 Results in Safe and Efficient use of Navigable airspace and Minimizes airfield operational impacts?*	
No Action	- Airport remains as it is today	No	Yes	Yes/No	**Yes**
706-Foot Separation Plan A	- Minimal action to taxiway connectors to increase pilot awareness and limit runway crossings	No	---	---	No
706-Foot Separation Plan B	- Dual full length parallel runway system - Retain both Runway 11's end thresholds	No	---	---	No
706-Foot Separation Plan C	- Dual full length parallel runway system - Displace both Runway 11's thresholds	No	---	---	No
800-Foot Separation Plan A	- Dual full length parallel runway system - Displace both Runway 11's thresholds, end-around Taxiway D for B-II aircraft	Yes	Yes	Yes	**Yes**
800-Foot Separation Plan B	- Dual full length parallel runway system - Shift runways southeast, unobstructed end-around Taxiway D	Yes	Yes	No	No
East Runway	- Dual full length parallel runway system - New Runway 12/30, east of terminal core - Dual independent approaches - Additional taxiways near west pad	No	---	---	No
Ryan Airfield	- Insufficient runway length & airport facilities	Yes	No	---	No
Marana Regional	- Insufficient runway length & airport facilities	Yes	No	---	No
Davis -Monthan Air Force Base	- Cannot accept commercial/public traffic	Yes	No	---	No

Note: Yes- Satisfies purpose and need
No- Does not satisfy purpose and need

Table 8
MUNITIONS STORAGE AREA ALTERNATIVES SCREENING SUMMARY

Alternative	Description	Alternatives Ability to Meet the Established Purposes and Needs		
		Step 1 Does the Alternative maintain NGB safety standards and operational capabilities?	*Step 2 Is the Alternative consistent with airport planned development?*	Retain for detailed EIS impact evaluation
East Los Reales Site	- Located east of Air Freight ramp - Closest to AANG - Security Concerns - Conflict with Airport's ultimate development	Yes	No	No
South Alvernon Way Site	- Security and safety concerns due to use of public road and proximity to non-Airport property	Yes	No	No
Parcel "H" Site	- Located south of AFP 44 - Isolated location - Could provide secure roadway that would not have to leave Airport property	Yes	Yes	**Yes**

Note: Yes- Satisfies screening criteria
No- Does not satisfy screening criteria

2.8.1 NO ACTION ALTERNATIVE

Under this alternative, the existing Airport would remain unchanged. The No Action Alternative required pursuant to 40 CFR § 1502.14(d) provides a basis of comparison for the assessment of future conditions and impacts.

2.8.2 800-FOOT SEPARATION PLAN A (PROPOSED ACTION)

This Alternative includes the replacement of Runway 11R/29L with a full-length parallel runway. The distance between the parallel runways would be expanded to 800 feet. A center parallel taxiway would be constructed to allow aircraft to queue prior to crossing the other parallel runway. An additional parallel taxiway west of the relocated Runway 11R/29L would limit direct access from aircraft approaching the runway from the west. Various other taxiways improvements are proposed to promote pilot awareness on the airfield, most importantly the removal of the taxiways leading to the north ends of Runway 11L and 11R. The addition of several taxiway segments would replace removed taxiways and would comply with FAA design standards. This Alternative would eliminate both HS-1 and HS-2. Parallel Runways 11R/29L and 11L/29R would both measure 10,996 feet by 150 feet and have parallel thresholds at both ends to enhance visual acquisition of the runway end by pilots in the air. The 800-foot separation Plan A alternative will move forward as the Proposed Action.

2.8.3 PARCEL "H" SITE

The Parcel "H" Site located south of AFP 44 and southeast of intersection between former Hughes Access Road and South Country Club Road would provide the AANG the appropriate landside and airside access for a new munitions storage area. In addition, this approximate 55-acre site would maintain NGB safety standards and operational capabilities and not conflict with future developments on the airfield. This site would also not conflict with AFP 44 operations.