SOUTH TEXAS REGIONAL AIRPORT – DEVELOPMENT PLAN

DRAFT FINAL REPORT – December 2017

HONDO
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City of Hondo
1600 Avenue M., Hondo Texas 78861
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South Texas Regional Airport at Hondo (HDO)

Airport Development Plan

DRAFT FINAL REPORT
December 2017

Prepared for:
The City of Hondo and South Texas Regional Airport

1600 Avenue M
Hondo, Texas 78861
&
Texas Department of Transportation (TxDOT)

Aviation Division
Austin, TX

Prepared by:
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1. Inventory

As the foundation for the planning process, the inventory serves as the initial step in an Airport Development Plan. Information compiled for this chapter is necessary to provide an understanding of the past and present airport conditions at South Texas Regional Airport. As a basis for airport development recommendations, a comprehensive inventory provides the framework for the proceeding analysis included in the Airport Development Plan. The plan outlined in this document recommends improvements in accordance with Federal Aviation Administration (FAA) criteria, taking into consideration anticipated changes in aviation activity and development opportunities at the local, regional, and national levels.

Beginning with an overview of the location and history of the South Texas Regional Airport and the surrounding community of Hondo, Texas, this chapter also details the following information:

- Information pertaining to airport ownership and management, transportation access, the relationship to the State and Federal Airport System, and history;
- An overview of the area's airspace, traffic control management, and meteorological conditions;
- Descriptions of facilities and services provided at the Airport, including a general description of airside, terminal, landside, and support facilities;
- Descriptions of users of property adjacent to the Airport, development plans and needs, and planning timeframe.

The data collected for this phase of the study was gathered from a variety of sources, including airport management, tenants and users, the City of Hondo, area businesses, community organizations, and Airport service providers. The information gathered is current as of April 2017. Updated information gathered throughout the development of the plan can be found in subsequent chapters.

During the onset of this development plan, interviews with Airport and TxDOT representatives revealed the following items that this plan should consider.

This development plan will attempt to address these topics as well as include any additional topics that may arise during the course of the study.

1.1 Airport and Community Overview

This section provides an overview of South Texas Regional Airport with regard to its history, general location, management, and defined roles within various airport systems.

HISTORY

The City of Hondo began developing in 1881 with the construction of the railroad nearly 200 years after Spanish explorer Alonso De Leon passed through, naming the Medina River and Hondo Creek on his journey to East Texas. In 1842, the Republic of Texas fought the Mexican Army in the Battle of Arroyo Hondo. A post office was later established in 1882 and plots of land began to be offered for sale. By 1884, the population on Honda has grown to 25.

The City experienced a period of significant growth between 1891 and 1915. The population had grown to over 200 when Medina County voters chose Hondo to serve as the new county seat in 1892. Subsequently, new municipal facilities including a courthouse and jail were established in 1893. By the end of this period, the population had risen to over 2,500.

In 1930, a sign near the city limits saying "This is God's Country. Don't drive through it like Hell" was constructed by the Hondo Lions Cub and would become a famous Hondo landmark.

Following the great depression, the City experienced another period of rapid growth resulting from the onset of World War II. In 1942, Hondo was incorporated as a city and became host to the largest air navigation school in the world, the Hondo Army Airfield. In an incredible feat of engineering, the Zachry Company of San Antonio employed a workforce of 3,000 who constructed more than 600 buildings, road network, utilities, and airfield infrastructure in 89 days. The project cost exceeded $7 million. The airfield was opened for operation on July 4, 1942 and the first navigation class on August 10, 1942. The facility would go on to graduate its first class in November of that same year. By the end of 1942, nearly 5,300 military personnel were stationed at the base. The base was host to several aircraft types including the Lockheed B-34, Douglas B-18, and Beechcraft AT-7 and AT-11 bombers. During WWII, approximately 14,158 navigators were trained at Hondo Army Airfield. Following the end of WWII, the base was closed and by 1950 the population has dropped from 12,000 to 4,220.

The field continued to support the United States Air Force through the 1980's as a pilot screening center utilizing the T-41 Mescalero, a modified version of the Cessna 172 Skyhawk featuring performance upgrades including a variable pitch propeller. The base largely transitioned to industrial use after the final closure of the base in 1950.

MODERN SOUTH TEXAS REGIONAL AIRPORT

Today, South Texas Regional Airport is a fully operational general aviation airport that provides no scheduled commercial airline service. Its primary function is as an industrial, business and recreational flight service center that caters to all forms of general aviation.

Airport Ownership and Mangement

Following the Airports transfer from the military, South Texas Regional Airport has been owned and operated by the City of Hondo, Texas. The Airport Manager oversees the maintenance and development of the airport. In addition, an airport board has been established to provide insights and recommendations related to policies carried out at the Airport.

As outlined in the *2013 Business Plan*, the day-to-day operation of the Airport is the responsibility of the Airport Manager. The position is responsible for all facets of Airport administration, lease management, Airport policies and regulations, and the responsibility for the equipment and maintenance of grounds at the Airport.

The Airport is staffed from 7:00 am to 5:00 pm, Monday through Friday, and on call Saturday and Sunday. The Airport offers a General Aviation Terminal that includes public restrooms, flight planning room and lounge. The Terminal is open 24/7 for use by pilots and passengers.

Many of the day-to-day functions associated with operating the Airport rest with the Airport Technicians. This includes fueling and general ramp service operations, maintenance of facilities and equipment, landscaping, janitorial duties, tracking tenants, billing transient aircraft, and minor repair and maintenance of airfield infrastructure (such as runway marker lights, windsocks, and signs).

Based on an understanding of the operation and goals of the Airport, the mission for HDO is clear, "*It is the mission of South Texas Regional Airport to serve as an engine for economic development in the Hondo area, providing operational safety; outstanding service; and a secure environment for aircraft owners, operators and the flying public*." While this mission may be broad, it allows HDO to utilize its resources, facilities, and assets to attract industry, develop businesses, and create jobs for the area. To do this, it is recommended that HDO continue to undertake community outreach to create awareness and interest, but also develop and maintain airside and landside facilities to meet the needs and expectations of the community.

The City, through its ownership and oversight of the Airport, has an obligation to achieve its mission. The development plan's goals are consistent with that of the Airport. The development plan is intended to support, determine and justify development needs to help the City achieve its mission for the Airport. Therefore, the development plan may be considered a guiding document for the City and its plan for the Airport's future.

AIRPORT LOCATION AND ACCESS

As shown in **Exhibit 1-1**, South Texas Regional Airport is located in South Texas, two miles northwest of the City of Hondo, in Medina County. The Airport and the City of Hondo are accessible by US Highway 90 (running east/west) and Texas State Highway 173 (running north/south). These and other U.S. and State highways radiate from Hondo providing access to South Texas Regional Airport, which is,

- 40 miles west of San Antonio, TX
- 40 miles east of Uvalde, TX
- 92 miles northeast of the border of Mexico

Exhibit 1-1: Airport Location

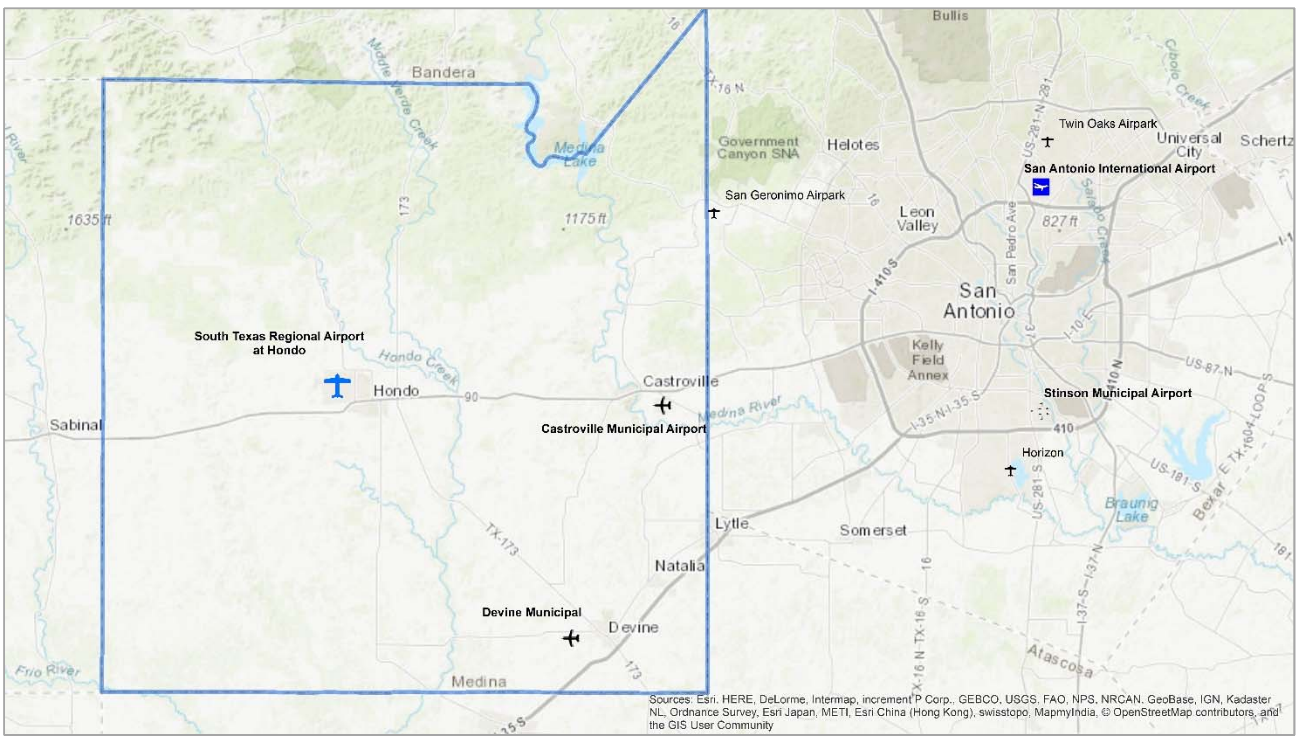


Table 1-1 below provides a summary of important elements for South Texas Regional Airport. Note that the most recent Airport Layout Plan (ALP), FAA Airport Master Record (Form 5010), Texas Aviation System Plan (TASP), FAA National Plan of Integrated Airport Systems (NPIAS), and FAA General Aviation Asset Study were utilized as the source for a large portion of the data.

Table 1-1: Existing Conditions

AIRPORT NAME	South Texas Regional Airport at Hondo
FAA DESIGNATION	HDO
ASSOCIATED TOWN	Hondo, TX
AIRPORT OWNER/SPONSOR	City of Hondo, TX
AIRPORT MANAGEMENT	Full-time city staff, on-site
DATE ESTABLISHED	July 4, 1942
AIRPORT ROLES	Texas Airport System Plan (TASP) – Business/Corporate FAA NPIAS – General Aviation FAA Asset Study – Local
COMMERCIAL AIR SERVICE	None
AIRPORT ACREAGE	2,328
AIRPORT REFERENCE POINT (ARP)	29°21’32.8700”N / 99°10’38.9700”W
AIRPORT ELEVATION	930.1 ft.
AREA MEAN MAX TEMPERATURE	

SOURCE: Airport record, FAA Form 5010, *Airport Master Record,* Medina County Property Records

AIRPORT SYSTEM ROLE

All airports play a variety of different functional roles and contribute at varying levels to meet the transportation and economic needs on a national, state, and local level. Identifying and understanding the various roles that an airport plays is essential for any airport in a system so it can continue to develop facilities and services that appropriately fulfill its respective role.

State Role: As defined in the *Texas Airport System Plan Update 2010*, South Texas Regional Airport is classified as “Business/Corporate” (BC). This role provides access to turboprop and turbojet business aircraft and are located where there is sufficient population or economic activity to support a moderate to high level of business jet activity and/or to provide capacity in metropolitan areas. Business/Corporate airports serve communities located more than 30 minutes from the nearest Commercial Service or Reliever airport. These airports are generally located 25 miles from other Business/Corporate airports and serve an area of concentrated population, purchasing power, or mineral production. Each have or are forecasted to have 500 or more annual Business/Corporate aircraft operations within five years, or have two permanently based jets. Some of these airports may be located within 25 miles of a significant national recreation or preservation area. There are 67 general aviation Business/Corporate airports in the TASP.

National Role – NPIAS: As defined in the FAA’s *National Plan of Integrated Airport Systems (NPIAS) 2015-2019*, the Airport is classified as “General Aviation.” Inclusion in the NPIAS is a requirement for receiving federal funding through the Airport Improvement Program (AIP). When an airport accepts funds from the AIP, it must agree to certain obligations (or assurances). These obligations require the Airport to maintain and operate the facilities safely and efficiently in accordance with specified conditions.

National Role – Asset Study: As defined in the FAA's *2012 General Aviation Airports: A National Asset* study, South Texas Regional Airport is classified as a "Local" General Aviation airport, meaning that it "supplements local communities by providing access primarily to intrastate and some interstate markets." It is currently one of 1,236 such airports across the county. This 2012 study identifies 2,952 general aviation airports, selected to be part of the NPIAS that contribute to the U.S. economy and support activity that is not feasible at most commercial service airports due to capacity constraints. Local airports can serve flight activity and community needs through a variety of different activities.

CURRENT AVIATION ACTIVITY

Aviation activity at HDO during the year ending February 15, 2017 featured approximately 25,000 total operations, including takeoffs and landings. The broad categorization of aviation activity at HDO is shown in **Table 1-2**, as provided by the FAA Form 5010 Master Record. Additional detail, history and descriptions of activity are provided in Chapter 2 – Forecast of Aviation Demand.

Table 1-2: Airport Operational Statistics

Single Engine:	36	AIRCRAFT OPERATIONS: AVG. 68/DAY*
Multi Engine:	4	
Jet:	1	80% LOCAL GENERAL AVIATION
TOTAL FIXED WING:	**41**	
Helicopters:	3	20% TRANSIENT GENERAL AVIATION
Gliders:	0	
AIRCRAFT BASED ON THE FIELD:	**44**	

SOURCE: Airport records, Form 5010

*For 12-Month Period Ending February 15, 2017

CURRENT AVIATION SERVICES

Airports can provide a wide range of services to meet the varied demands of its individual market area. **Table 1-3** below provides a general listing of South Texas Regional Airport's current range of services.

Table 1-3: Existing Aviation Services

Aviation Fuel – 100LL, Jet-A	Airframe Service – Minor
Aircraft Parking – Based (Tiedowns)	Powerplant Service – Minor
Aircraft Parking – Based (Hangars)	General Aviation Terminal
Aircraft Parking – Transient (Tiedowns & Hangar)	Agricultural Spraying

SOURCE: Airport records, Form 5010, www.airnav.com

SWOT ANALYSIS

A key component of the Airport Development Plan is the Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis. The Airports most recent SWOT analysis was completed in 2012, coinciding with the preparation of the Airport Business Plan. South Texas Regional Airport features multiple strengths and opportunities that will be explored throughout the planning process including; available land and developable property, updated terminal building, and proximity to the San Antonio market just to name a few. The SWOT analysis will also incorporate the development of a Mission, and Vision Statement for South Texas Regional Airport. The updated SWOT analysis is available in **Appendix A**.

1.2 Airfield

Presently, South Texas Regional Airports supports General Aviation activity with four (4) paved runways. The primary runway (17L/35R) features a full length parallel taxiway and associated connectors. The airfield is supported by several visual and instrument approach aids. Exhibit 1-2 shows the current existing facilities and the following sections provide additional details.

KSA

Legend	Existing
Airport Buildings	
Airport Property	
Runway Protection Zone	
Existing Pavement	
Threshold Lights	•••• ••••

Label	Description	Area(Sq. Ft.)
A1	T-HANGAR	8,730
A2	T-HANGAR	8,730
A3	SHADE HANGAR	8,730
A4	T-HANGAR	8,730
A5	T-HANGAR	8,730
A6	T-HANGAR	8,730
A7	SHADE HANGAR	3,600
A8	T-HANGAR	3,600
A9	HONDO AEROSPACE	24,275
A10	CORPORATE BOX HANGAR	13,500
A11	PRIVATE BOX HANGAR	5,000
A12	CORRIGAN AIR CENTER	20,000
A13	CORRIGAN AIR CENTER	10,000
A14	BOX HANGAR	8,500
A15	GENERAL AVIATION TERMINAL	5,160
A16	BOX HANGAR	12,600
A17	RAYNEKE AVIATION	2,075
A18	BOX HANGAR	38,600
A19	MRO HANGAR	18,000
A20	MRO FACILITY	4,825

South Texas Regional Airport at Hondo

Existing Facilities

RUNWAYS

Runways are given an identifier that is determined based on its magnetic compass orientation. Each runway end is named accordingly. For example, Runway 17 has a magnetic heading of 170 degrees, and Runway 35 has a magnetic heading of 350 degrees. Runway headings are important so pilots can identify which runway aligns with the prevailing winds.

South Texas Regional Airport is serviced by the 4 paved runways as detailed in **Tables 1-4** through **1-8** below.

Table 1-4: Runway 17L/35R Data Summary

	RUNWAY 17L/35R	
DIMENSIONS	6,002 x 100 ft.	
SURFACE	Concrete, Excellent Condition	
RUNWAY EDGE LIGHTING	Medium Intensity	
WEIGHT BEARING CAPACITY (LBS. IN THOUSANDS)	Single Wheel	30.0
	Double Wheel	45.0
	Double Tandem	90.0
	RUNWAY 17	RUNWAY 35
LATITUDE	29°22'02.7990"N	29°21'03.3840"N
LONGITUDE	99°10'19.2730"W	99°10'19.2350"W
THRESHOLD ELEVATION	929.4 ft.	911.7 ft.
TRAFFIC PATTERN	Left	Right
RUNWAY HEADING	172 magnetic, 180 true	352 magnetic, 360 true
MARKINGS	Non-precision, Fair Condition	Non-precision, Poor Condition
VISUAL SLOPE INDICATOR	4-light PAPI on left (3.00 degrees)	4-light PAPI on left (3.00 degrees)
RUNWAY END IDENTIFIER LIGHTS	Yes	Yes
TOUCHDOWN POINT	Yes, No Lights	Yes, No Lights
INSTRUMENT APPROACH	RNAV(GPS)	RNAV(GPS), NDB

SOURCE: Airport records, FAA Form 5010

Table 1-5: Runway 17R/35L Data Summary

	RUNWAY 17R/35L	
DIMENSIONS	3,224 x 140 ft.	
SURFACE	Asphalt, Good Condition	
RUNWAY EDGE LIGHTING	Medium Intensity	
WEIGHT BEARING CAPACITY (LBS. IN THOUSANDS)	Single Wheel	30.0
	Double Wheel	45.0
	Double Tandem	90.0
	RUNWAY 17R	RUNWAY 35L
LATITUDE	29°21'46.8370"N	29°21'14.9220"N
LONGITUDE	99°10'59.8800"W	99°10'59.8680"W
THRESHOLD ELEVATION	927.9 ft.	916.9 ft.
TRAFFIC PATTERN	Right	Left
RUNWAY HEADING	172 magnetic, 180 true	352 magnetic, 360 true
MARKINGS	Non-precision, Good Condition	Non-precision, Good Condition
VISUAL SLOPE INDICATOR	None	None
RUNWAY END IDENTIFIER LIGHTS	Yes	Yes
TOUCHDOWN POINT	Yes, no lights	Yes, no lights
INSTRUMENT APPROACH	None	None

SOURCE: Airport records, FAA Form 5010

Table 1-6: Runway 13/31 Data Summary

	RUNWAY 13/31L	
DIMENSIONS	5,545 x 150 ft.	
SURFACE	Concrete, Excellent Condition	
RUNWAY EDGE LIGHTING	None	
WEIGHT BEARING CAPACITY (LBS. IN THOUSANDS)	Single Wheel	30.0
	Double Wheel	45.0
	Double Tandem	90.0
	RUNWAY 13	RUNWAY 31
LATITUDE	29°21’42.1800”N	29°21’03.3900”N
LONGITUDE	99°11’05.8300”W	99°10’21.5000”W
THRESHOLD ELEVATION	927.3 ft.	912.0 ft.
TRAFFIC PATTERN	Right	Left
RUNWAY HEADING	127 magnetic, 135 true	307 magnetic, 315 true
MARKINGS	Non-precision, Good Condition	Non-precision, Good Condition
VISUAL SLOPE INDICATOR	None	None
RUNWAY END IDENTIFIER LIGHTS	None	None
TOUCHDOWN POINT	Yes, no lights	Yes, no lights
INSTRUMENT APPROACH	None	None

SOURCE: Airport records, FAA Form 5010

Table 1-7: Runway 9/27 Data Summary

	RUNWAY 9/27	
DIMENSIONS	3,451 x 75 ft.	
SURFACE	Concrete, Good Condition	
RUNWAY EDGE LIGHTING	None	
WEIGHT BEARING CAPACITY (LBS. IN THOUSANDS)	Single Wheel	30.0
	Double Wheel	45.0
	Double Tandem	90.0
	RUNWAY 9	RUNWAY 27
LATITUDE	29°21’50.5300”N	29°21’50.5500”N
LONGITUDE	99°11’05.7000”W	99°10’26.7000”W
THRESHOLD ELEVATION	930.1 ft.	926.0 ft.
TRAFFIC PATTERN	Left	Left
RUNWAY HEADING	082 magnetic, 090 true	262 magnetic, 270 true
MARKINGS	Basic, Poor Condition	Basic, Poor Condition
VISUAL SLOPE INDICATOR	None	None
RUNWAY END IDENTIFIER LIGHTS	None	None
TOUCHDOWN POINT	Yes, no lights	Yes, no lights
INSTRUMENT APPROACH	None	None

SOURCE: Airport records, FAA Form 5010

TAXIWAYS AND APRON

HDO features a full length parallel taxiway that provides access from the terminal area to the approach ends of Runway 17L/35R.

The Airport currently has one paved apron measuring approximately 2,682,199 square feet.

VISUAL LANDING AIDS

The Visual Landing Aids available at HDO are depicted on Exhibit 1-2. South Texas Regional Airport currently possesses a basic level of navigational instrumentation. The primary runway (17L/35R) features medium intensity lights (MITL) while both ends of the runway are supported by a 4-light Precision Approach Path Indicator (PAPI) as well as threshold lights. Runway 17L/35R is equipped with non-precision markings.

The parallel runway (17R/35L) also features medium intensity lights (MITL) and is equipped with non-precision markings. Runways 13/31 and 9/27 are both non-lighted and equipped with non-precision and basic markings.

The Airport is equipped with a rotating beacon located on the east side of the field directly south of the General Aviation Terminal and east of the fuel farm. The Airport’s primary lighted wind cone is located within the segmented circle, adjacent to the mid-point of Runway 17L/35R on the west side of the runway.

WEATHER REPORTING CAPABILITES

South Texas Regional Airport features on-site weather reporting capabilities provided by an Automated Weather Observation System 3 (AWOS-3). A typical AWOS is capable of reporting wind speed, gust, direction, temperature, dew point, altimeter setting, and density altitude. An AWOS-3 provides weather updates, which are available to pilots at HDO via telephone (830-426-3060) or VHF frequency 119.675. The AWOS is located directly west of Runway 18L/36R and north of Taxiway “C”.

1.3 Landside Facilities

The landside facilities at South Texas Regional Airport are illustrated in Exhibit 1-2.

TERMINAL BUILDING

The terminal building at South Texas Regional Airport is a 4,000-square foot facility which recently underwent a complete rehabilitation. The facility features a visitor waiting area, complete pilot lounge, flight planning area, public restrooms with shower facilities, free wireless internet, and a private conference room. The terminal is accessible to pilots and passengers 24 hours a day.

HANGARS

South Texas Regional Airport features seven (6) T-Hangar facilities offering a total of 44 units, and two (2) shade hangar housing 20 units.

FUEL FACILITIES

A critical part of airport operations is the storage of aviation fuel. Fuel at South Texas Regional Airport is sold to transient users via FBO fueling and self-service pumps. The Airport currently utilizes two 12,000-gallon storage tanks and one 3000 gallon fuel truck. Both 100LL and Jet-A are available to operators at HDO.

1.4 Airport Comparison

Table 1-8 lists airports near South Texas Regional Airport and outlines their facilities in comparison to HDO.

Table 1-8 Airport Facility Comparison

Airport	ID	Acres	Longest Runway (ft.)	Based Aircraft (Jets)	Total Operations	Approach Capability	ATC	Jet-A	Transient Storage	NPIAS/ASSET Role	Texas Airport System Plan
South Texas Regional	HDO	3,500	6,002	44(0)	25,000	Non-Precision	No	No	TIE	GA Local	Community Service
Garner Field	UVA	356	5,256	21(0)	12,565	Non-Precision	No	Yes	HGR, TIE	GA Local	Business Corporate
Castroville Municipal	CVB	459	5,001	57(0)	16,420	Non-Precision	No	No	TIE	GA Local	Community Service
Devine Municipal	23R	63	3,399	11(0)	6,100	Non-Precision	No	No	TIE	GA Basic	Community Service
McKinley Field	T30	141	5,027	9(0)	3,870	Non-Precision	No	Yes	HGR, TIE	-	Community Service
Stinson Municipal	SSF	360	3,907	15(0)	5,000	Non-Precision	Yes	Yes	HGR, TIE	GA Regional	Regional
San Antonio International	SAT	2,305	8,505	215(80)	165,213	Precision	Yes	Yes	HGR, TIE	Major Hub	Commercial Service

SOURCE: FAA Airport Record, Form 5010, NPIAS, Texas Airport System Plan.

1.5 Navigation and Airspace

South Texas Regional Airport operates within the larger National Airspace System (NAS), which comprises a wide array of services, systems and requirements for airports as well as for the pilots that function within it. The following sections provide an overview of some of the Airport's key considerations with respect to navigating and operating within the NAS including a review of the following elements as they are related to HDO.

- Air Traffic Service Areas and Aviation Communications
- National Airspace System
- Navigational Aids
- Part 77 Airspace Surfaces

AIR TRAFFIC SERVICE AREA AND AVIATION COMMUNICATIONS

FAA Order 7110.65M, Air Traffic Control (ATC), established that the mission of ATC is safety by stating that the "primary purpose of the ATC system is to prevent a collision between aircraft operating in the system and to organize and expedite the flow of traffic." ATC is the means by which aircraft are directed and separated within controlled airspace.

Within the continental United States, there are some 22 geographic areas that are under ATC jurisdiction. Air traffic services within each area are provided by air traffic controllers in Air Route Traffic Control Centers (ARTCCs). The ARTCCs provide air traffic service to aircraft operating on Instrument Flight Rules (IFR) flight plans within controlled airspace, and primarily during the en-route phase of flight. Those aircraft operating under Visual Flight Rules (VFR) that depend primarily on the "see and avoid" principle for separation, may also contact the ARTCC or other ATC services to request traffic advisory services. Traffic advisory service is used to alert pilots of other known aircraft near, or within the flight path of the aircraft. The airspace overlying South Texas Regional Airport is contained within the San Antonio ARTCC jurisdiction, which also covers airspace over most of south Texas.

Aircraft on instrument flight plans that are approaching or departing an airport are also subject to airspace and ATC. The primary means of controlling aircraft employed by air traffic controllers is computerized radar systems that are supplemented with two-way radio communications. Altitude assignments, speed adjustments, and radar vectors are examples of techniques used by controllers to ensure that aircraft maintain proper separation. The specified lateral and vertical separation criterion for aircraft used by controllers is as follows:

- Lateral Aircraft Separation: three (3) miles (radar environment)
- Lateral Aircraft Separation: five (5) miles (non-radar environment)
- Vertical Aircraft Separation: 1,000 feet below (below 29,000 feet) and 2,000 feet (29,000 feet and above)

NATIONAL AIRSPACE SYSTEM (NAS)

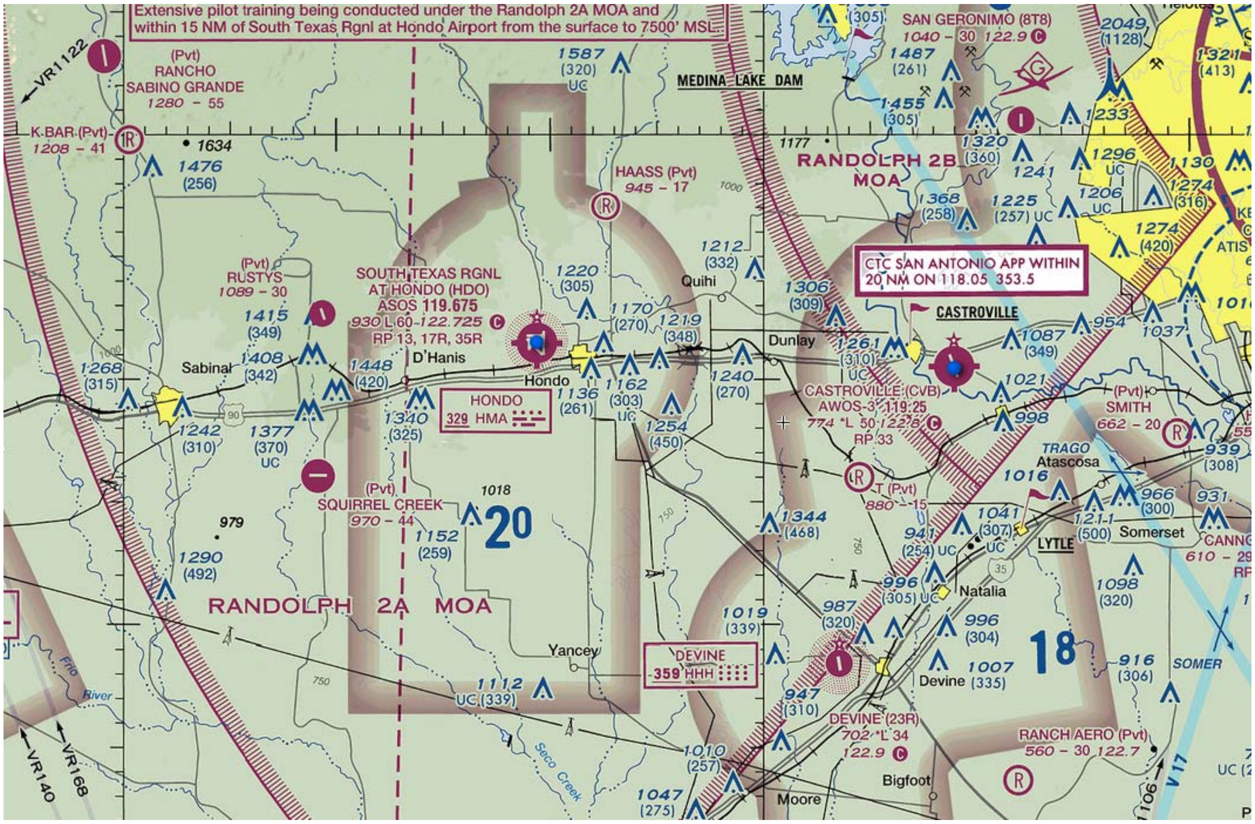
To ensure a safe and efficient airspace environment for all aspects of aviation, the FAA has established an airspace structure through the Federal Aviation Regulations (FAR) that regulates and establishes procedures for aircraft that use the NAS. This airspace structure essentially provides two basic categories of airspace: controlled (classified as A, B, C, D and E) and uncontrolled (classified as G).

Further, FAR Part 71 and FAR Part 73 establish these classifications of airspace with the following characteristics.

- Class A airspace is generally the airspace from 18,000 feet mean sea level (MSL) up to Flight Level 600 (or 60,000 feet MSL). Unless otherwise authorized, all operation in Class A airspace is conducted under instrument flight rules (IFR).
- Class B airspace is generally airspace from the surface to 10,000 feet MSL surrounding the nation's busiest airports in terms of airport operations or passenger enplanements. An ATC clearance is required for all aircraft to operate within Class B airspace, and all aircraft that are so cleared receive separation services within the airspace. Clearance into Class B airspace can only be received when the controller specifically calls the tail number of the aircraft and grants explicit clearance to enter the airspace. (e.g. "N1234, you are cleared to enter the Class B airspace").
- Class C airspace is generally airspace from the surface up to 4,000 feet above the airport elevation (charted in MSL) surrounding those airports that have an operational control tower, are serviced by radar approach control and have a certain number of IFR operations or passenger enplanements. Each aircraft must establish two-way radio communications with the ATC facility providing air traffic services prior to entering the airspace and, thereafter, maintain those communications while in the airspace.
- Class D airspace is generally airspace from the surface up to 2,500 feet above the airport elevation (charted in MSL) surrounding those airports that have an operational control tower. Unless otherwise authorized, each aircraft must establish two-way radio communications with the ATC facility providing air traffic services prior to entering the airspace and thereafter maintain those communications while in the airspace.
- If the airspace is not classified as A, B, C, or D, and is controlled airspace, then it is Class E airspace. Class E airspace extends upward from either the surface of designated altitude to the overlying or adjacent controlled airspace. Only aircraft operating under IFR are required to be in contact with ATC when operating within Class E airspace
- Glass G or uncontrolled airspace is the portion of airspace that has not been designated with any of the above classifications. It extends from the surface to the base of the overlying Class E airspace. Although ATC has no authority or responsibility to control air traffic, pilots must still abide by visual flight rules (VFR) minimums in Class G airspace.

South Texas Regional Airport lies within Class E airspace that is configured to contain all instrument procedures associated with HDO. The flow of this Class E airspace is established at 700 feet above ground level (AGL) and extends to 1,200 feet MSL. Exhibit 1-3 shows a portion of the sectional chart published by FAA's National Aeronautical Charting Office for the immediate regional airspace around South Texas Regional Airport. The magenta shaded area around HDO indicated the limits of the Class E airspace surrounding the Airport.

Exhibit 1-3: HDO Airspace



SOURCE: Dallas Fort Worth Sectional Chart, US Department of Commerce, National Oceanic and Atmospheric Administration

It should also be noted that South Texas Regional Airport is located within the Randolph 2A Military Operations Area (MOA) which includes extensive pilot training within 15 nautical miles of South Texas Regional Airport from the surface to 7500' MSL. Military Operations Area are the designation for airspace in which certain military training activities occur on a regular basis. San Antonio is home to Randolph Air Force Base which hosts extensive student pilot training in T-1 Jayhawk, T-6 Texas II, and T-38 Talon aircraft. Pilots operating within or near an MOA should exercise caution while flying within it, follow any restrictions related to it, and monitor frequencies depicted on the sectional chart legend to avoid such traffic.

NAVIGATIONAL AIDS

In 2003, the FAA implemented Wide Area Augmentation Systems (WAAS) availability to public airports. Pilots are now benefiting from the large number of Area Navigation (RNAV) Global Positioning System (GPS) approaches and lower minimums provided by WAAS-enabled systems. These systems are greatly more abundant than instrument landing systems (ILS) and other ground based systems from the 20th century. As of June 2015, there are 3,554 Wide Area Augmentation System (WAAS) Localizer Performance with Vertical Guidance (LPV) approach procedures serving 1,732 airports, 989 of these airports are Non-ILS airports. Currently, there are also 594 Localizer Performance (LP) approach procedures in the U.S. serving 429 airports.

A variety of navigational facilities are currently available to pilots around South Texas Regional Airport, whether based at the field or at other locations in the region. Many of these navigational aids (NAVAIDs) are available to en route air traffic as well. The NAVAIDs available for use by pilots near HDO are VOR/DME and NDB facilities.

A VOR/DME (VHF Omnidirectional Range and Distance Measuring Equipment) is a ground-based electronic navigation aid, transmitting very high frequency signals, 360 degrees in azimuth oriented from magnetic north, with equipment used to measure, in miles, the slant range distance of an aircraft from that navigational aid. The Center Point (CSI) VOR/DME is located approximately 34 miles north of HDO.

A non-directional beacon (NDB) is a radio beacon transmitting non-directional signals whereby the pilot of an aircraft equipped with direction finding equipment can determine his bearing to or from the radio beacon and track to or from the station. The Hondo (HMA) NDB is located on the north end of the airport in the approach path for Runway 17L.

There are three published instrument approach procedures that serve the primary runway, 17L/35R at South Texas Regional Airport: RNAV (GPS) Runway 17L, RNAV (GPS) Runway 35R, and NDB Runway 35. Table 1-9 summarizes the approach and visibility minimums of these published approaches. Exhibits 1-4, 1-5, and 1-6 present the current approach plates for these published instrument procedures.

Table 1-9: Instrument Approach Procedures

	LOWEST STRAIGHT-IN MINIMUMS		LOWEST CIRCLING MINIMUMS	
INSTRUMENT APPROACH	CEILING	VISIBILITY	CEILING	VISIBILITY
RNAV (GPS) RWY 17L	300’	1 mile	500’	1 mile
RNAV (GPS) RWY 35R	300’	1 mile	500’	1 mile
NDB RWY 35	700’	1 mile	700’	1 mile

SOURCE: U.S. Terminal Procedures

.

Exhibit 1-4: RNAV (GPS) Runway 17L

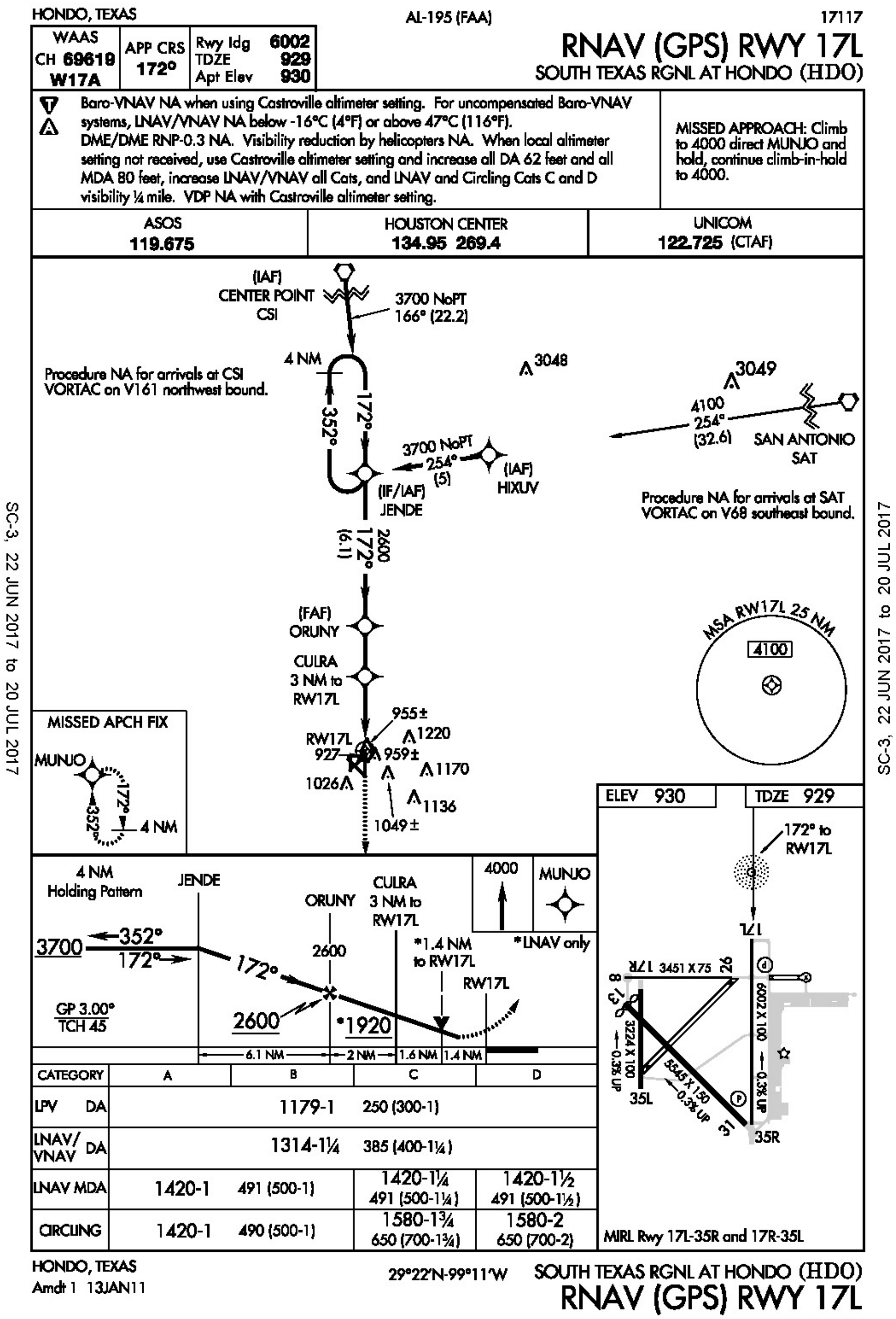
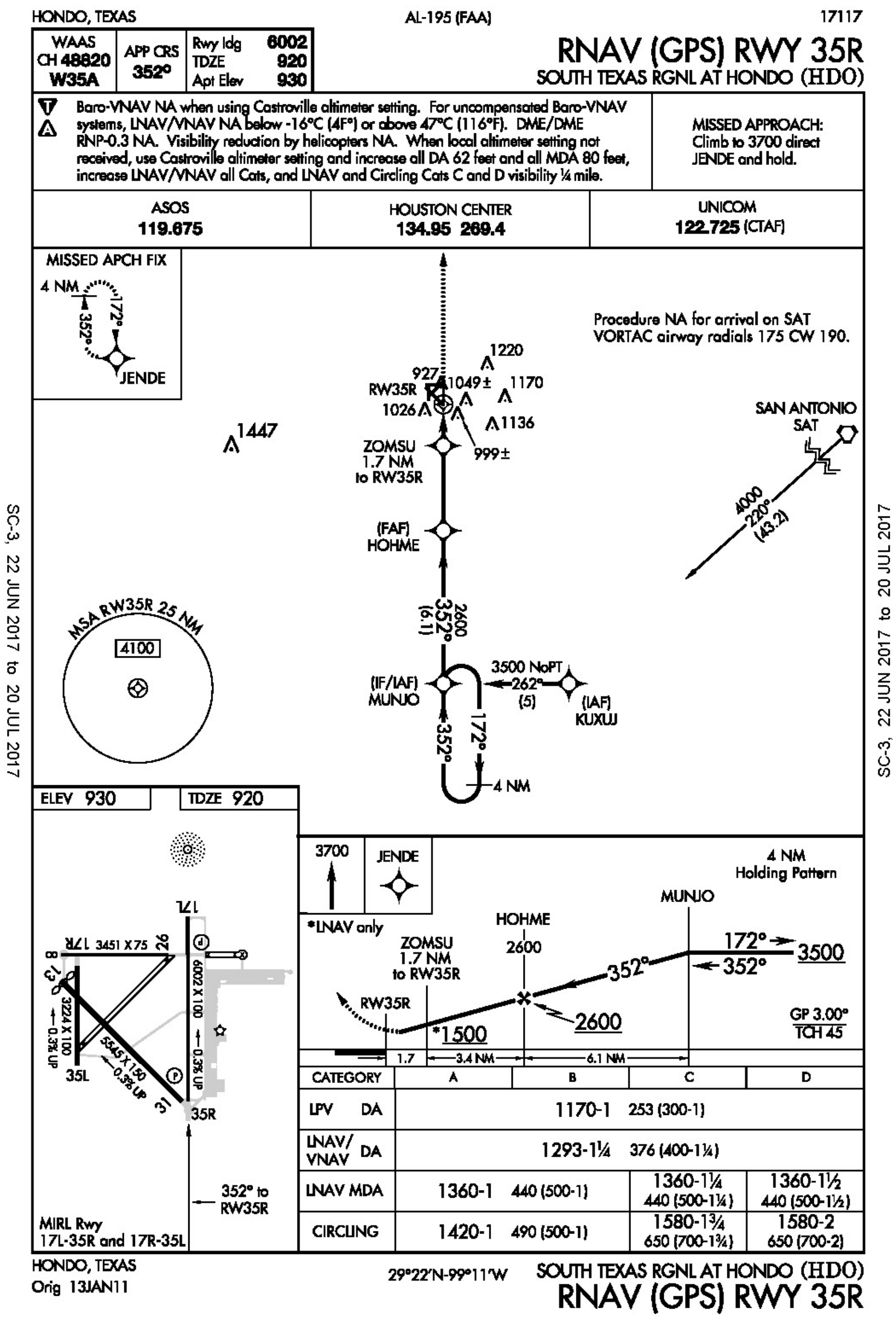
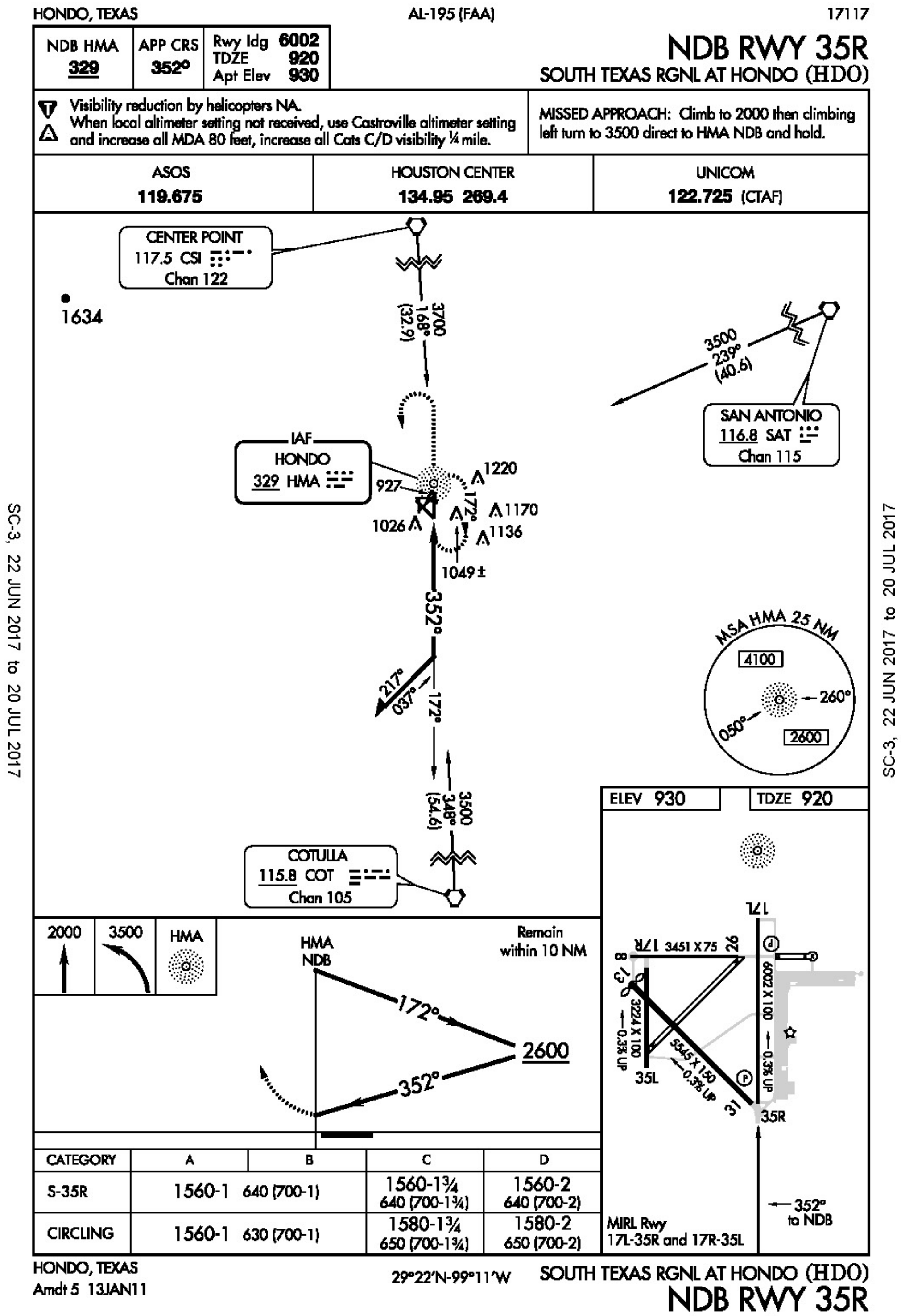


Exhibit 1-5: RNAV (GPS) Runway 35R



CATEGORY	A	B	C	D
LPV DA	1170-1 253 (300-1)			
LNAV/VNAV DA	1293-1¼ 376 (400-1¼)			
LNAV MDA	1360-1 440 (500-1)		1360-1¼ 440 (500-1¼)	1360-1½ 440 (500-1½)
CIRCLING	1420-1 490 (500-1)		1580-1¾ 650 (700-1¾)	1580-2 650 (700-2)

Exhibit 1-6: NDB Runway 35

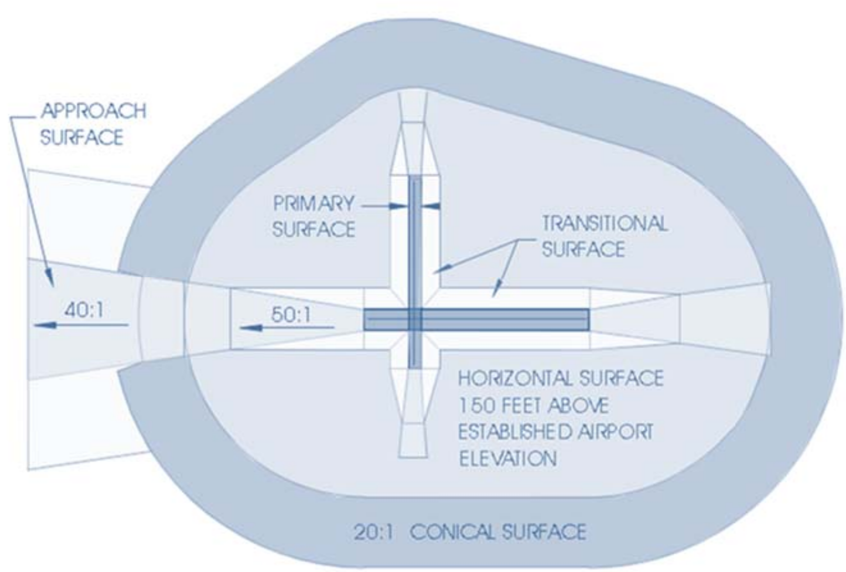


PART 77 SURFACES

Federal Aviation Administrations (FAR) Part 77, Objects Affecting Navigable Airspace, is a tool used to protect the airspace over and around a given airport and each of its runway approaches from potential obstructions to air navigation. It is important to note that as a federal regulation, all airports included in the NAS are subject to the requirements of Part 77. To determine whether an object is an obstruction to air navigation, Part 77 established several imaginary airspace surfaces in relation to an airport and each runway end. The dimensions and slopes of these surfaces depend on the configuration and approach categories or each airport's runway system. The size of the imaginary surfaces depends largely upon the type of approach to the runway in questions. The principal imaginary surfaces are described below and illustrated in Exhibit 1-7.

- Primary Surface: Longitudinally centered on the runway at the same elevation as the nearest point on the runway centerline.
- Horizontal Surface: Located 150 feet above the established airport elevation, the perimeter of which is established by swinging arcs of specified radii from the center of each primary surface end and connected via tangent lines.
- Conical Surface: Extends outward and upward from the periphery of the horizontal surface at a slope of 20:1 for a horizontal distance of 4,000 feet.
- Approach Surface: Longitudinally centered on the extended centerline, and extending outward and upward from each runway end at a designated slope (e.g. 20:1, 34:1, 40:1, and 50:1) based on the runway approach.
- Transitional Surface: Extends outward and upward at a right angle to the runway centerline at a slope of 7:1 up to the horizontal surface.

Exhibit 1-7: Part 77



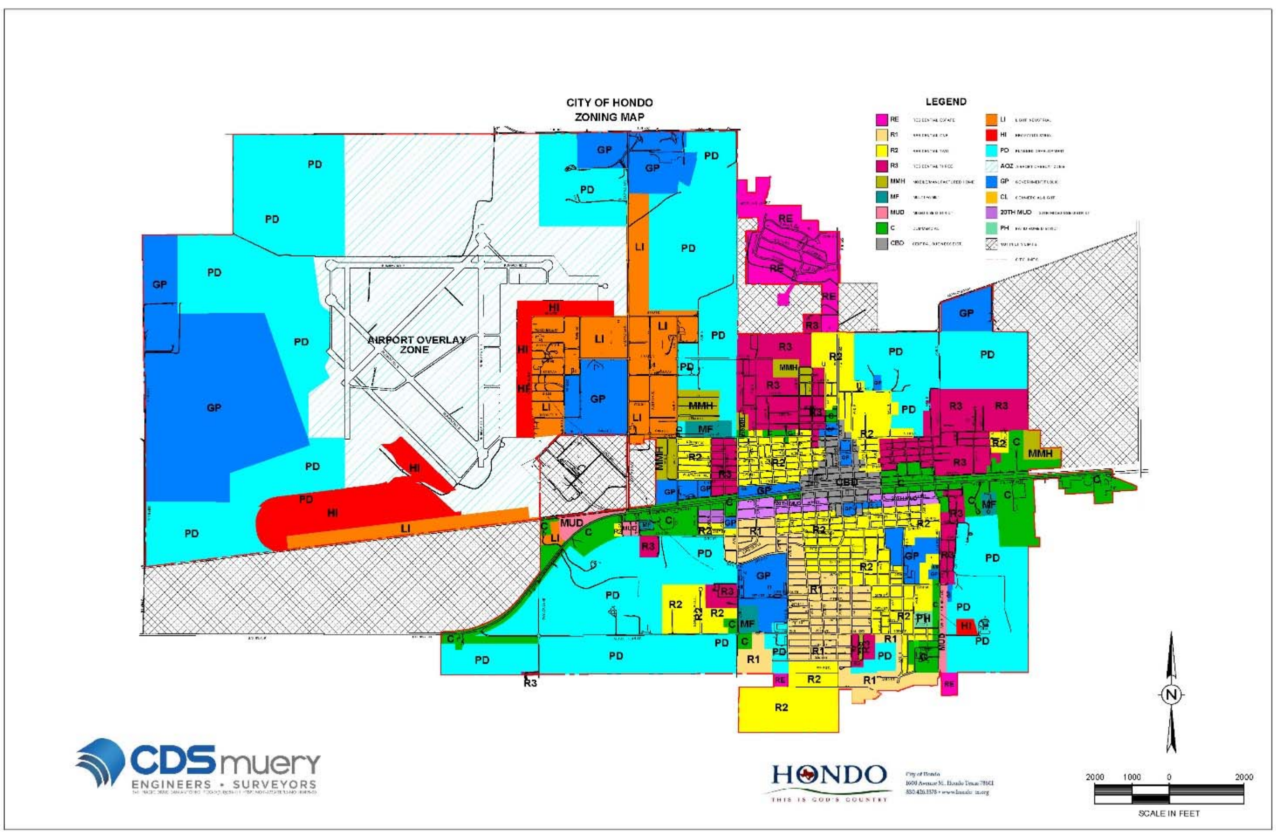
Known obstructions to the Part 77 surfaces described above will be illustrated on the ALP set being prepared with this development plan. It is important to note, however, that updated obstruction information for the Airport and its surroundings should be collected through an aerial photogrammetry/survey effort prior to any physical changes to the runway or modifications to approaches serving either runway end.

1.6 Land Use

ZONING

South Texas Regional Airport is located 2 miles northwest of the City of Hondo in Medina County. Most the land surrounding the Airport to the north and west is zoned as “Planned Development”. The land directly east of the “Airport Overlay Zone” which remains airport property is zoned for “Heavy and Light Industrial”. A complete zoning map of the City of Hondo is shown in **Exhibit 1-8**.

Exhibit 1-8: City of Hondo Zoning Map



SOURCE: City of Hondo

HONDO VISION PLAN

The City of Hondo accepted a progressive business plan with a vision to pursue the development of the South Texas Regional Airport and a new industrial intermodal park facility. This business park complex would consist of approximately 3,000 acres and is designed to accommodate air, rail, and freight operations. The South Texas Regional Intermodal Park is strategically located adjacent to major transportation corridors. The site has access to U.S. Highway 90 connecting Texas, California and Mexico. The site also has dual rail service being provided by Union Pacific Railroad and Burlington Northern Santa Fe (BNSF) Railroad. The industrial park is also home to the Hondo Railway which is the short line railroad operator within the Park.

1.7 Summary

This inventory chapter represents a consolidated resource containing the Airport's data that will be referenced during the completion of the South Texas Regional Airport Development Plan. When necessary, data presented in this chapter will be expanded on for the completion of specific development planning tasks. In addition, as the development plan progresses, new and/or updated data related to facilities and infrastructure examined in this chapter may become available. When appropriate, new data will be incorporated into this chapter and the entire development plan report.

The inventory data presented in this chapter provides a framework from which analysis in the South Texas Regional Airport Development Plan will proceed. Some inventory data, such as the Airport's history, provides general background knowledge. Other types of inventory data, such as airport role and existing airport facilities are used to help determine future facility requirements. Subsequent chapters, especially the Forecast of Aviation Demand, will also be key components to the development of facility requirements.

Much of the data presented in this chapter is used to conduct numerous analyses as the planning process works toward identifying a recommended development plan for HDO. The next step in the planning process is to formulate forecasts for the quality and type of future aviation activity expected to occur at the Airport during the 20-year planning period.

2. Forecast of Aviation Activity

Projecting future aviation demand is a critical element in the overall development planning process since many of the ultimate proposals and recommendations of the development plan are principally based on aviation activity demand forecasts. The forecasts of aviation activity developed in this chapter will be used in the subsequent tasks to analyze South Texas Regional Airport's (HDO) ability to accommodate future activity and to determine the type, size, and timing of future airside and landside developments. This aspect of the development planning process acts as the hub for the remainder of the plan. In many cases, the decision to proceed with projects is based on the anticipated levels of demand, including numbers as well as types of aircraft activity.

This chapter discusses the findings and methodologies used to project aviation demand at HDO for the next 20 years. Forecasting should consider the most accurate information available at the time the projections are completed, but it is not an exact discipline. It must be recognized that there are always likely to be some divergences of an airport's activity from a prepared forecast due to any number of factors that simply cannot be anticipated. However, when soundly established, the forecasts developed in a development plan will provide a sound, defensible and defined rationale to guide the analysis of future airport development needs and alternatives.

While the amount and type of aviation activity occurring at an airport are dependent upon many factors, they also usually reflect the services available to aircraft operators, the businesses located on the airport or within the community, and the prevailing general economic conditions within the surrounding area. The HDO forecast analysis includes methodologies that considered historical aviation trends at the Airport, the surrounding region, and throughout the nation. Projections of aviation activity for HDO were prepared for the near-term (2022), intermediate-term (2027), and long-term (2037) timeframes. Specifically, the aviation demand forecasts developed for HDO in this study are determined in the following sections:

- Overview of the Airport Market Area
- National Aviation Trends
- Regional Trends
- Historical and Existing Aviation Activity
- Projections of Aviation Activity
- Critical Aircraft
- Summary

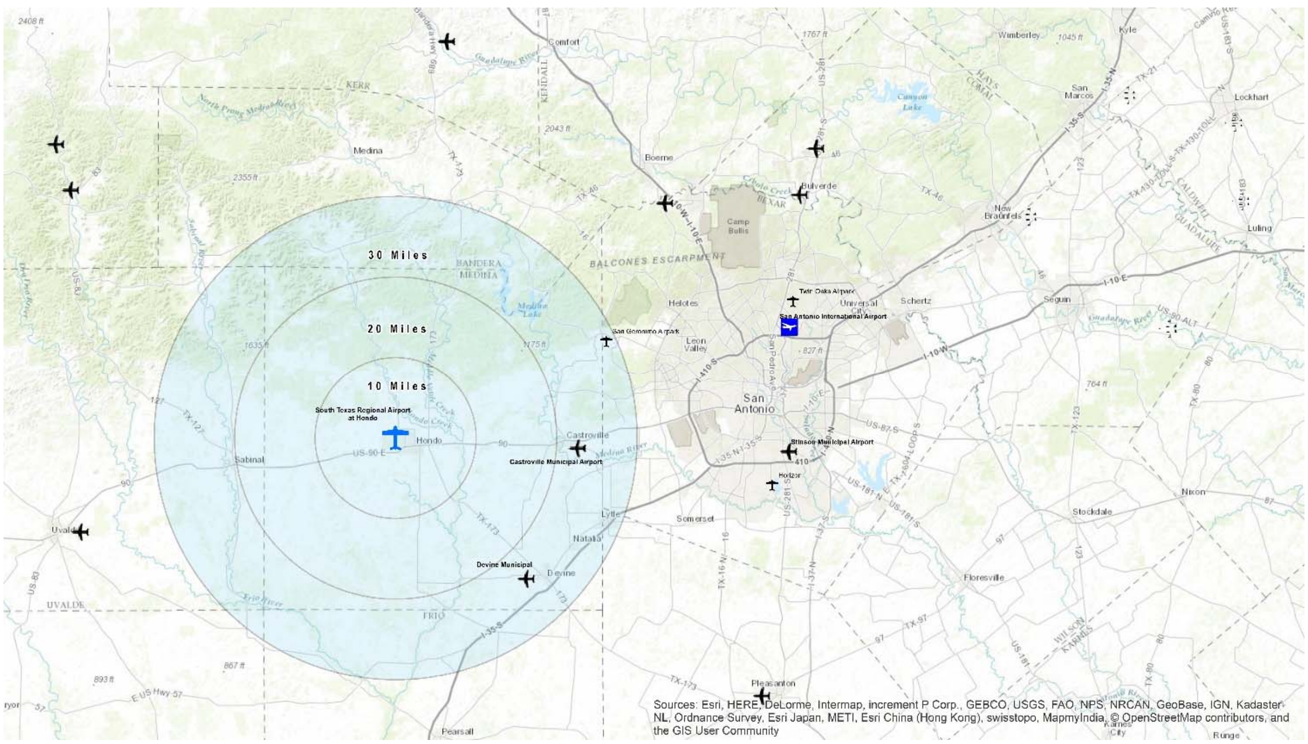
2.1 Overview of Airport Market Area

There is a strong correlation between a region's demographic and economic factors and aviation demand within that region. This section will define the HDO market area and the factors that often impacts the projections of aviation activity.

DEFINITION OF THE HDO AIRPORT MARKET AREA

An airport market area is defined as the actual geographic region served by an airport. For HDO, the airport market area has been identified as Medina County, Texas. Medina County is located 43 miles west of San Antonio, TX, 42 miles east of Uvalde, TX, and 57 miles south of Kerrville, TX. The City of Hondo serves as the county seat and offers an approximate population of just over 49,000 inhabitants.

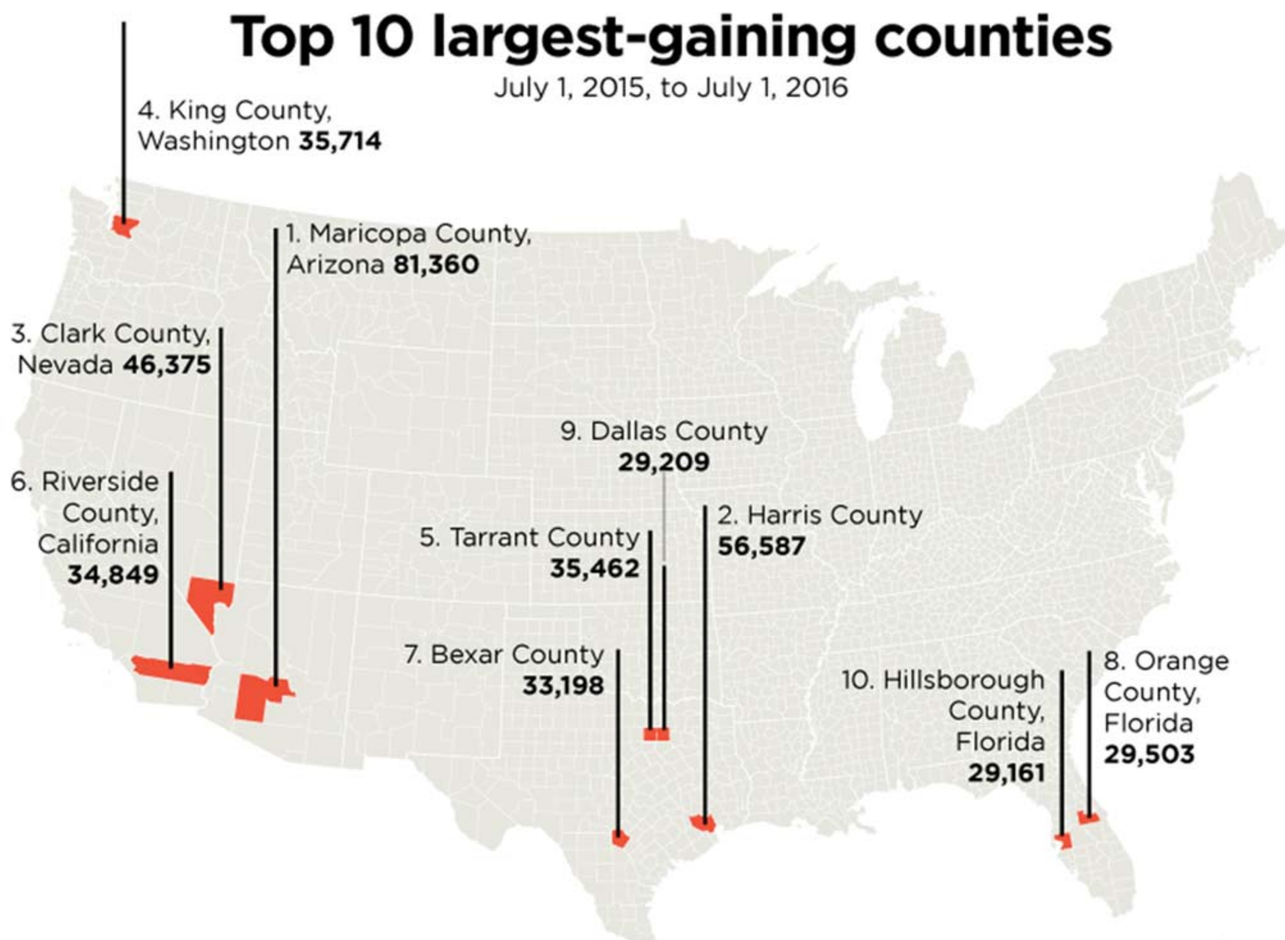
Exhibit 2-1: HDO Market Area



SOUTH TEXAS MARKET

San Antonio, the second largest city in Texas, located less than an hour from South Texas Regional Airport, presents the largest opportunity for future demand at the Airport. This region is growing exponentially with most recent trends occurring in neighboring Bexar County, which experienced a population growth increase of 12.5% from 2010 to 2016, increasing population from 1,714,774 to 1,928,680. Bexar County has also been named in the top 10 fastest growing counties in the U.S. by the United States Census Bureau as shown in Exhibit 2-2.

Exhibit 2-2: Fastest Growing U.S. Counties



SOURCE: Dallas Morning News, March 2017, Michael Hogue/Staff Artist, U.S. Census Bureau

Additionally, as shown in **Table 2-1** there are currently a total of 109 registered aircraft in Medina County and 987 registered aircraft in Bexar County. This shows a large population base of registered aircraft owners that may be attracted to Medina County and Hondo as rising hangar costs, limited space, and other factors influence where these owners base their aircraft. As shown in **Exhibit 2-1**, the location of HDO plays a key factor in attracting based aircraft from the surrounding market area. This will allow the airport to capitalize on its location by providing quality facilities to attract new based aircraft.

Table 2-1: Registered Aircraft by County

County	Registered Aircraft
Medina	109
Bexar	987
Bandera	61
Uvalde	89

SOURCE: FAA Records

2.2 National Aviation Trends

In preparing a forecast for HDO, it is important to have a general understanding of recent and anticipated trends in the overall aviation industry. National trends can provide important insights that can be leveraged for the development of aviation activity projections at an airport. Various data sources were utilized and examined to identify these trends. The sources utilized in this effort included the following.

- Federal Aviation Administration (FAA), FAA Aerospace Forecasts, 2017-2037
- General Aviation Manufacturers Association (GAMA), 2015 General Aviation Statistical Databook & 2016 Industry Outlook
- National Business Aircraft Association (NBAA), Aviation Fact Book, 2014
- Honeywell, Global Business Aviation Outlook, 2016

GENERAL AVIATION (GA) TRENDS

At the national level, fluctuating trends related to general aviation usage and economic uncertainty resulting from the nation's and international business cycles all have significant impacts on general aviation demand levels. This section provides an overview of those general aviation trends, as well as some of the various factors that have influenced those trends in the U.S. and Texas. These are important considerations in the development of projections of aviation demand for HDO.

General aviation aircraft are classified as all aircraft flown by commercial airlines or the military. This includes an incredibly diverse array of flying that ranges from a personal vacation trip in a small single engine plane to an overnight package delivery to an emergency medical evacuation to a morning sightseeing flight to flight instruction that trains new pilots to helicopter traffic reports that keep drivers informed of rush-hour delays. Simply stated, general aviation encapsulates all of those individual unscheduled aviation activities that enrich, enhance, preserve, and protect our lives.

As defined by the FAA, general aviation activities are divided into six use categories.

- Personal – Approximately one third of private flying in the United States is for personal reasons, which may include practicing flight skills, personal or family travel, personal enjoyment, or personal business.
- Instructional – All private flight instruction for purposes ranging from private pilot to airline pilot is conducted through general aviation.
- Corporate – About 12 percent of the total private flying in the U.S. is done in aircraft owned by a business and piloted by a professional. Many of these flights are in jets and cover long distances, with some flying to intercontinental and international destinations. Businesses elect to fly these trips to save time and expand their geographic and operational networks.
- Business – About 11 percent of the total private flying in the U.S. is done by business persons flying themselves to meetings or other events, primarily in piston or turboprop aircraft. Most of the pilots own or work for relatively small businesses and use the aircraft to accomplish missions that would otherwise take more time or would be infeasible.
- Air Taxi – When scheduled air service is not available or inconvenient, businesses and individuals use charter aircraft from air taxi service providers. These flights save time and make it possible to fly directly to places that cannot be reached by scheduled service. (Note that "air taxi" is also utilized as a commercial air service classification.)
- Other – All other activities are classified as being "other." Given the diverse nature of general aviation, this includes disaster relief, search and rescue, police operations, news reporting, border patrol, forest firefighting, aerial photography and surveying, crop dusting, and tourism activities, among many others.

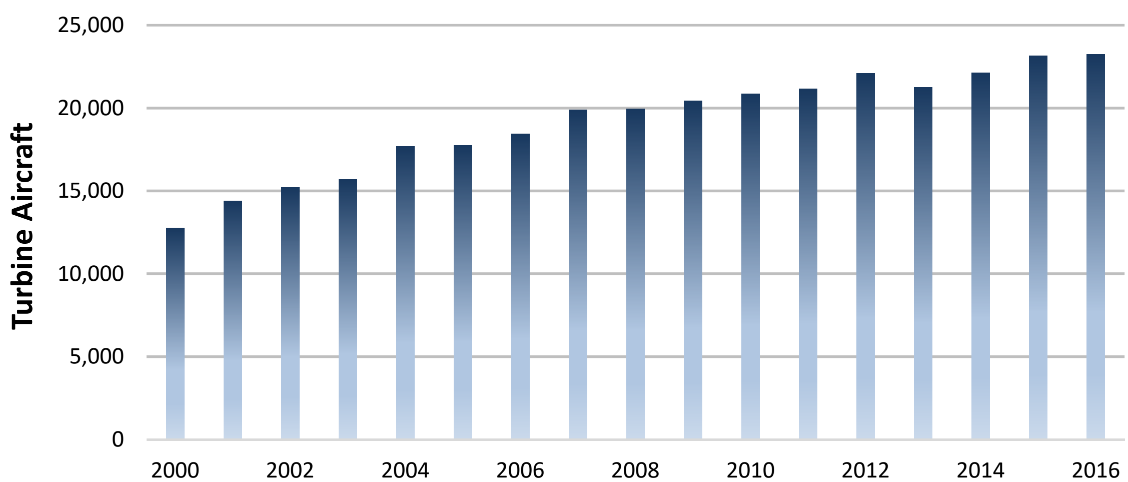
BUSINESS USE OF GENERAL AVIATION

Business and corporate aviation are the fastest growing facets of general aviation. Companies and individuals use aircraft as a tool to improve the efficiency and productivity of their business and personnel. Use of general aviation aircraft afford businesses direct control of their travel itineraries, destinations and significantly reduce travel times and inconveniences often associated with scheduled airline service.

Corporate general aviation is not the exclusive concern of Fortune 500 companies. In fact, per the NBAA's Business Aviation Fact Book 2015, only 3 percent of the approximately 15,000 business aircraft registered in the U.S. are flown by these companies. The remaining 97 percent are operated by a broad cross-section of organizations, including government, universities, charitable organizations and businesses of all sizes. The clear majority of the U.S. companies that utilize business aircraft (85 percent) are small and mid-sized businesses, many of which are based in the dozens of communities across the country where the airlines have reduced or eliminated service. The benefits of corporate general aviation are evidenced by the significant growth that business/corporate general aviation has recently experienced.

Business use of general aviation aircraft ranges from small, single-engine aircraft rentals to multiple aircraft corporate fleets supported by dedicated flight crews and mechanics. Business aircraft usage by smaller companies has also escalated dramatically as various chartering, leasing, and fractional ownership, interchange agreements, partnerships, and management contracts have emerged. FAA statistics depicted in **Exhibit 2-3** show the growth in the number of general aviation turbine aircraft used predominantly for business use.

Exhibit 2-3: General Aviation Turbine Aircraft Growth 2000-2016



SOURCE: FAA

Of note is the immense popularity of fractional ownership operations, which began in 1986 with the creation of a program that offered aircraft owners increased flexibility in the ownership and operation of aircraft. The program uses current aircraft acquisition concepts, including shared or joint aircraft ownership, and provides for the management of the aircraft by an aircraft management company. The aircraft owners participating in the program agree not only to share their own aircraft with others having a shared interest in the aircraft, but also to lease their aircraft to other owners in the program. The aircraft owners use a common management company to provide aviation management services including maintenance of the aircraft, pilot training and assignment, and leasing management of the aircraft.

Even in an unsteady economy, fractional operators say business has continued to improve as existing customers re-enter the market or increase their fractional aircraft usage. In addition, they say an increasing number of new prospects are making the move to fractional ownership as an alternative to flying commercially or owning a business jet outright. In the U.S., fractional-share ownership makes up 15% of business-aviation flights.

Growing segments of the business aircraft fleet mix include business liners and very light jets (VLJ). Business liners are large business jets, such as the Boeing Business Jet and Airbus ACJ, which are reconfigured versions of passenger aircraft flown by large commercial airlines. Labeled as "personal jets," VLJs are small, six-seat jets costing substantially less than typical business jet aircraft. Popular aircraft models in this category include the Eclipse 500 and 500, Embraer Phenom 100 and 300, Cessna Mustang and HondaJet.

ANTICIPATED GENERAL AVIATION TRENDS

Examples of measures of national general aviation activity that are monitored and forecasted by the FAA on an annual basis in the FAA Aerospace Forecasts include active aircraft fleet and active hours flown.

Single and multi-engine piston aircraft experienced a decline in the number of aircraft between 2010 and 2016. Although still the largest portion of aircraft in the active fleet, the number of single engine aircraft fell from 139,500 in 2010 to 126,000 in 2016, a 1.6 percent average annual decline. During that same period, multi-engine piston aircraft has a much steeper decline, falling from 15,900 aircraft to 13,200, a 3.1 percent annual decrease. In total, active piston aircraft decreased at 1.7 percent annually over the last seven years. In its annual aviation forecast, the FAA indicated that it expects the number of active piston general aviation aircraft to continue to decline, but by a lower rate than in the past decade. Over the next decade, the decrease in the number of piston aircraft is expected to be 0.8 percent per year over the next two decades. The result of those predictions show a total piston aircraft (combined single and multi-engine) falling from 141,100 in 2015 to 117,500 in 2037.

As indicated above, turboprop and jet aircraft experienced substantial growth between 2010 and 2016, increasing from approximately 20,800 to 23,200 aircraft, a 3.1 percent average annual increase over that period. One of the most important trends identified by the FAA in their forecasts is the growth anticipated in active general aviation jet aircraft. The active general aviation turboprop and jet aircraft fleet is anticipated to continue to increase dramatically over the projection period, to over 34,000 aircraft in 2037, with jet aircraft almost doubling in numbers within this same period.

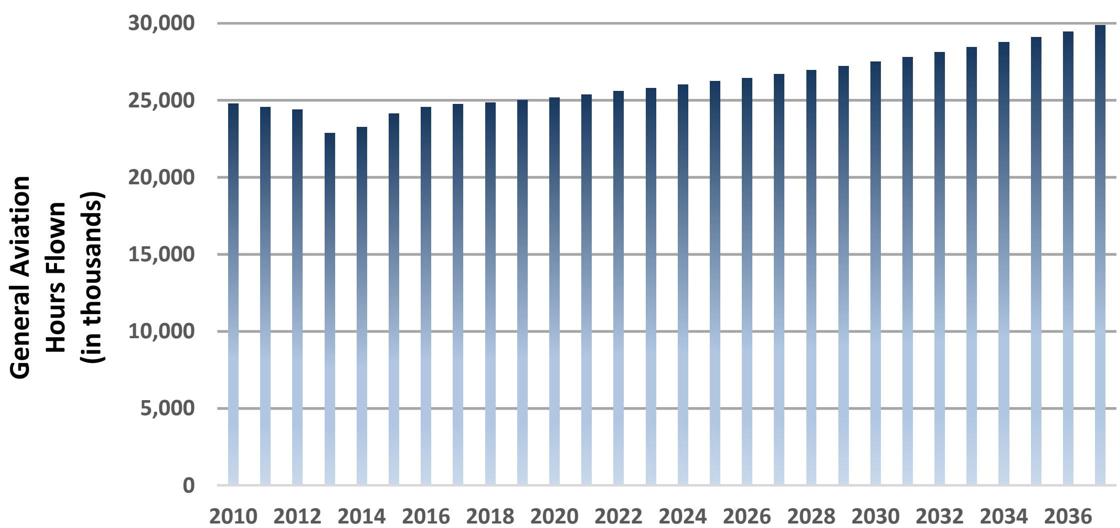
Business aviation is expected to grow faster than private or recreational aviation, driven by a growing U.S. and world economy, and as discussed above, turboprops and jets will fare better than piston aircraft, with continuing growth of about 2.3 percent per year. Even with the anticipated decline of piston aircraft during the 20-year planning period, growth in jet aircraft is expected to more than make up for the decline, resulting in a gain of total general aviation aircraft of 1.1 percent per year. This trend illustrates a movement in the general aviation community toward higher-performing, more demanding aircraft.

Several years ago, the FAA established a relatively new category of aircraft, experimental/light sport aircraft. These aircraft are very small aircraft (usually holding only one or two people). With over 30,000 aircraft currently flying, the FAA predicts this category to grow 5.1 percent per year to 41,000 aircraft by the end of the planning period.

The FAA also tracks and projects a valuable metric known as active general aviation and air taxi hours flown. This metric captures several activity-related data including aircraft utilization, frequency of use, and duration of use. Hours flown in general aviation piston aircraft experienced a significant decrease of 1.5 percent annually, from 2010 to 2016. However, hours flown within this category are expected to improve over the 20-year planning period with an annual decrease rate of 0.8 percent. For turboprop and jet aircraft, hours flown are expected to continue to gown at a relatively high rate of 2.5 percent per year from 2016 to 2037.

Exhibit 2-4 depicts general aviation hours flown from 2010 through 2016 as well as projected hours flown through 2037. As shown by the graph, hours flown during the period from 2012 to 2015 experienced a slight decline spurred by a slowing economy, impacting piston aircraft owners the most. The FAA predicts annual growth of hours flown over the 20-year period will be 0.9 percent. Compared to the projected negative 1.0 percent average annual growth rate of the general aviation aircraft, the difference from hours flown represents anticipated increases in utilization. Total hours flown by general aviation aircraft are estimated to reach 29.9 million by 2037, compared to 24 million in 2015.

Exhibit 2-4: Historical/Projected General Aviation and Air Taxi Hours Flown



SOURCE: FAA Aerospace Forecasts 2017-2037

2.3 Regional Trends

As noted previously, not all national trends are experienced on a regional level. Therefore, additional data was collected and reviewed to illustrate the potential growth areas in aviation demand for HDO. This focused heavily on socioeconomic development potential in a surrounding the HDO airport market area.

Aviation activity has traditionally been linked to various demographic and socioeconomic factors, such as population, employment, and earnings. The link is related to the discretionary nature of personal and business travel as well as the recreational component of general aviation activity. The data presented below was taken from the 2016 U.S. Census Data prepared by the U.S. Census Bureau. In most cases, the data provides a conservative estimate of growth. Additional data sources included the Texas Water Development Center, U.S. Bureau of Economic Analysis (BEA) and U.S. Bureau of Labor Statistics.

This analysis examined the historical trends and future projections of the area's populations, employment, and earnings.

POPULATION

Table 2-2 summarizes population growth trends experienced between 2000 and 2016 and population projections through the year 2037 for Medina County, the State of Texas, and the United States. Trends impacting cities and towns within the region may impact South Texas Regional Airport. These trends are compared to population trends in Texas and the United States.

Table 2-2: Population Projections

Year	Medina County	State of Texas	United States
2000	39,304	20,851,820	281,421,906
2010	46,006	25,145,561	308,745,500
2016E	49,283	26,438,000	323,127,500
2000-2016 AAGR	**1.3%**	**1.4%**	**0.8%**
Projected			
2022	52,653	29,510,000	339,698,000
2027	59,694	33,628,000	352,281,000
2037	65,676	37,736,000	374,401,000
2016-2037 AAGR	**1.1%**	**1.2%**	**0.5%**

SOURCE: U.S. Census Bureau, Texas Water Development Center
AAGR = Average Annual Growth Rate

EMPLOYMENT AND PERSONAL INCOME

There are several socioeconomic factors that impact, to varying degrees, the demand for general aviation in any region. In addition to population trends, regional economic trends can also significantly impact aviation demand. Per capita personal income reflects the average wages and salaries of workers within a defined geographic area as well as other sources of income, while household income represents the value in the middle when all incomes in a geographic region are arranged highest to lowest. This is reflective of how positive the business climate is in a region. The growth in employment and personal income relates to aviation activity in that corporate and private use of general aviation services is sometimes discretionary in nature. As with other demographic indicators, current employment, per capita personal, and household income for Medina County, the State of Texas, and the United States was compiled from U.S. Census data and presented below in Table 2-3.

Table 2-3: Employment, Per Capita Personal, and Median Household Income

Year	Employment	Per Capita Personal Income	Median Household Income
		Medina County	
2000	16,168	$15,210	$36,063
2010	18,412	$20,604	$49,138
2016E	19,610	$23,830	$49,283
AAGR	**1.1%**	**2.7%**	**1.9%**
		State of Texas	
2000	10,006,803	$19,617	$41,994
2010	11,391,102	$24,870	$51,914
2016E	11,745,250	$26,999	$53,889
AAGR	**0.9%**	**1.9%**	**1.7%**
		United States	
2000	47,401,000	$21,587	$51,994
2010	151,661,500	$27,334	$51,914
2016E	155,922,000	$28,930	$53,889
AAGR	**0.3%**	**1.7%**	**1.5%**

SOURCE: U.S. Census Bureau

2015E – Estimated, AAGR = Average Annual Growth Rate, Personal Income Reflected in current year $

For both employment and income levels, the socioeconomic indicators for Medina County shows slightly higher annual growth than that of the overall state and national averages.

2.4 Historical and Existing Aviation Activity

Historical aircraft and operations data for HDO provides the baseline from which future activity at the Airport can be projected. While historical trends are not always reflective of future periods, historical data can provide insight into how local, regional, and national demographic and aviation related trends may be tied to a given airport. The following sections include historical overviews of HDO's aircraft operations (generally defined as either an aircraft landing or departure – hence a takeoff and landing would count as two operations) and based aircraft (generally defined as an aircraft that is permanently stored at an airport).

BASED AIRCRAFT

As shown in Table 2-4, historical based aircraft data is from the FAA Terminal Forecast (TAF) while the base year, 2016, was provided by airport personnel. As noticeable, there have been fluctuations with regards to overall based aircraft since 2005. It is estimated, with coordination from airport staff that the current based aircraft is approximately 69.

Table 2-4: HDO Based Aircraft

Year	Aircraft	Year	Aircraft
		Medina County	
2005	22	2011	28
2006	22	2012	31
2007	22	2013	35
2008	22	2014	43
2009	22	2015	44
2010	17	2016*	69

SOURCE: FAA Terminal Area Forecast, January 2016
*Airport Personnel

AIRCRAFT OPERATIONS

Annual aircraft operations represent the number of aircraft takeoffs and landings occurring at an airport during a calendar year. The historical operations data includes operations conducted by both based aircraft as well as operations conducted by itinerant aircraft, which are those based at other airports that arrive at HDO for a variety of reasons, including business, recreation, or flight training purposes. Historical aircraft operations data for HDO are summarized below in Table 2.5.

Aircraft operations are organized into two categories: itinerant operations and local operations. The FAA defines a local operations as any operation performed by an aircraft operating in the local traffic pattern or within sight of the tower, or aircraft known to be departing or arriving from flight in local practice areas, or aircraft executing practice instrument approaches at the airport.

Table 2-5: HDO Aircraft Operations

Year	Itinerant			Local		
	Commuter & Air Taxi	GA	Military	Civil	Military	Total
2005	0	7,496	144,570	9,995	0	162,061
2006	0	7,565	144,570	10,087	0	162,222
2007	0	7,635	144,570	10,180	0	162,385
2008	0	2,800	18,720	5,600	0	27,120
2009	0	2,800	18,720	5,600	0	27,120
2010	0	75,000	0	20,000	0	95,000
2011	0	75,000	0	20,000	0	95,000
2012	0	75,000	0	20,000	0	95,000
2013	0	75,000	0	20,000	0	95,000
2014	0	75,000	0	20,000	0	95,000
2015	0	75,000	0	20,000	0	95,000
2016*	0	5,000	0	18,750	0	25,000

SOURCE: FAA Terminal Area Forecast, June 2017
*FAA Form 5010-1

While TAF operational data for non-towered airports is estimated, and accuracy of the total operational activity is a best guess effort, FAA Order 5090.3C, Field Formulation of the National Plan of Integrated Airport Systems (NPIAS) provides guidance or a framework with which to establish a reasonable level of aircraft activity, referred to as operations per based aircraft (OPBA). For airports similar to HDO, an OPBA level of 350 is suitable to calculate overall operations. A quick calculation shows the OPBA of 24,150 trends closely with the total operational count reflected for the base year 2016 of 25,000.

2.5 Projections of Aviation Activity

Projections of aviation activity are generated by employing historical data and incorporating assumptions, conditions, and trends. In truth, forecasting of any type is as much an art as science, and no matter how sophisticated, represents an "educated guess" of a point in time. Therefore, forecasts must be updated periodically and revised as necessary to reflect new conditions and developments.

During a development planning effort, aviation activity forecasts are typically established by using a wide variety of assumptions that result in a wide range of outcomes. This is intentionally done to provide a broad view of future airport utilization potentials. Once that broad view has been established, then a careful examination of those assumptions is undertaken to determine which could be reasonable applied given that airport's current situation.

For HDO, existing forecasts and different types of forecast methodologies were considered the key development plan forecast metrics for assessment. There forecasts and methodologies included the following:

1. FAA Terminal Area Forecast (2016)
2. FAA Aerospace Forecast (2017-2037)
    a. Active General Aviation and Air Taxi Aircraft
    b. Active General Aviation and Air Taxi Hours Flown
    c. Active General Aviation Pilots
3. Airport Market Area Demographic and Socioeconomic Projections
    a. Population Growth
    b. Employment Growth
    c. Per Capita Personal Income Growth
4. Operations Per Based Aircraft (OPBA)

The projected growth rates associated with these forecasts and metrics will be applied to the 2016 level of based aircraft and operations at HDO to produce a range of estimated levels of activity for the 20-year planning period.

BASED AIRCRAFT PROJECTIONS

Based aircraft are defined as those aircraft that are permanently stored at an airport. Estimating the number and types of aircraft expected to be based at HDO over the 20-year study period will impact the planning for its future facility and infrastructure requirements. As the number of aircraft based at an airport increases, so too does the aircraft storage required at the facility.

There are many factors that determine the number of general aviation aircraft that can be expected to be based at an airport, such as available facilities and services, proximity and access to the airport, amenities and facilities at adjacent, nearby airports. General aviation aircraft owners and operators are particularly sensitive to both the quality and location of their basing facilities. Owners would rather be near their home and/or work, and typically weigh this need as a primary need when considering aircraft storage needs. Per airport personnel, a total of 69 aircraft are stored on the field and the city maintains a current waitlist of individuals desiring additional aircraft storage options. Additional factors taken into consideration is the population growth expected in San Antonio and the surrounding Metropolitan Statistical Area (MSA), the on-field flight training school and their expansion potential, and the opportunity to attract MRO type facilities to the airport.

Table 2-6 and **Exhibit 2-5** summarize the results of the three-based aircraft projection range scenarios created through this analysis.

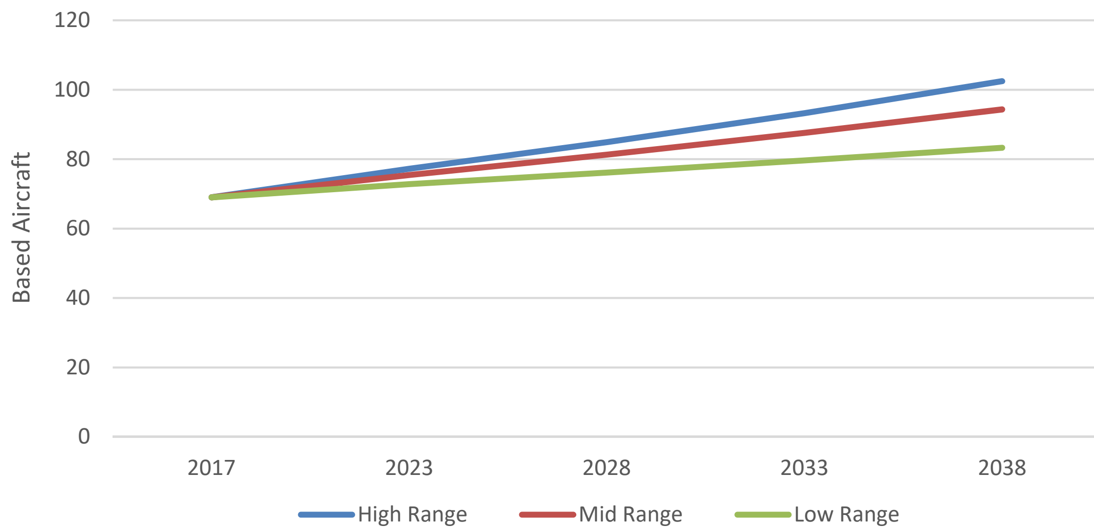
Table 2-6: Based Aircraft Projections

Year	Low	Mid	High
2017	69	69	69
Projected			
2022	73	75	77
2027	76	81	85
2032	80	88	93
2037	83	94	102
AAGR	0.9%	1.5%	1.9%

SOURCE: KSA

AAGR = Average Annual Growth Rate

Exhibit 2-5: Based Aircraft Projections Comparison



SOURCE: KSA

As shown, the three projection methodologies resulted in based aircraft forecasts ranging from 83 to 102 total based aircraft for the out-year of the planning period, 2037. Based aircraft growth rates represented by these forecasts ranged from an AAGR of 0.9 percent to 1.9 percent. While other scenarios predicting the future number of based aircraft could have been presented in this exercise, the range of the growth rates shown above represent the most realistic growth patterns considering the Airport's history and predicted regional, state and national growth estimates. A summary of each methodology is provided below.

- Low Growth – This range is representative of the growth estimated in the FAA's projections for active general aviation aircraft hours flown.
- Mid Growth – Many of the methodologies and activity drivers analyzed in this forecast fall within this growth range. Represented by population and employment growth projections for the region as well as FAA estimated for general aviation hours flown, all measures in this group range from 1.1 to 1.5 percent average annual growth.
- High Growth – This range is indicative of those elements within the FAA Aerospace Forecasts, 2017-2037 which considered growth in based aircraft as driven by turbine type aircraft, in addition to the inclusion of population growth to derive an overall average at HDO. The growth for this range equates to 1.9 percent.

Since many of the demographic, socioeconomic, and forecasting methodologies studied in this analysis fall within the **mid-growth range**, it is recommended that facility requirements be established using this growth rate.

BASED AIRCRAFT FLEET MIX

Through use of the high growth based aircraft projection, the total based aircraft for HDO over the planning period were allocated to five distinct aircraft categories – single-engine, multi-engine, jet, helicopter, and ultralight aircraft. The fleet mix projections were developed based on the fleet mix percentages exhibited at the Airport in 2016 with consideration given to aircraft ownership trends throughout the region and nation. The existing based aircraft fleet mix at HDO is summarized as follows:

- Single engine piston aircraft – 90 percent of total based aircraft
- Multi-engine piston aircraft – 6 percent of total based aircraft
- Jet aircraft – 0 percent of total based aircraft
- Helicopter aircraft – 1.4 percent of total based aircraft

The preferred based aircraft fleet mix projections are presented in **Table 2-7**. With expected growth in turbine aircraft throughout the country, it is reasonable to expect a greater share of based turbine aircraft at HDO in future years. While piston type aircraft will continue to be the largest percentage of overall based aircraft, this trends is anticipated to decrease over time as more turbine aircraft enter the fleet.

Table 2-7: Based Aircraft Fleet Mix

Year	Single Engine	Multi-engine	Jet	Helicopter	Other	Total
2017	62	4	0	1	2	69
2022	68	5	0	1	2	75
2027	70	7	1	1	2	81
2032	77	8	1	1	2	88
2037	81	9	1	1	2	94

SOURCE: KSA

AIRCRAFT OPERATIONS PROJECTIONS

Annual operations represent the number of aircraft takeoffs and landings occurring at an airport during a calendar year. Historic operations data for HDO includes operations conducted by based aircraft as well as those conducted by itinerant aircraft stored at other airports arriving at HDO for a variety of reasons including maintenance, business, recreation of flight training purposes.

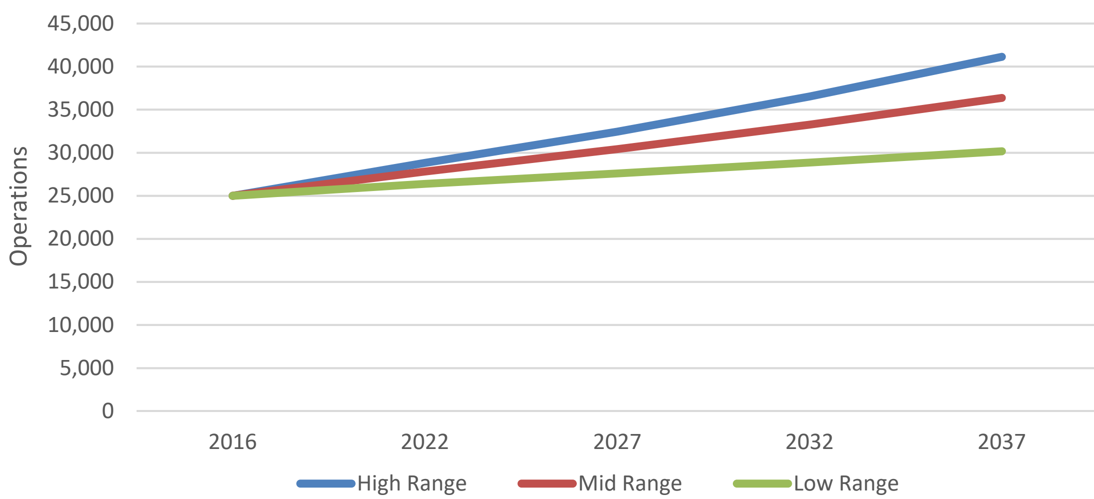
Many different factors can influence the number of aircraft operations at an airport, including, but not limited to, total based aircraft, area demographics, activity and policies at neighboring airports, and national aviation trends. These factors are considered in the application of three methodologies used to develop projections of future aircraft operations at HDO through the planning period. The results of the different aircraft operations projection scenarios examined in this analysis are presented in **Table 2-8** and compared to one another in **Exhibit 2-6**.

Table 2-8: Aircraft Operations Projections

Year	Low	Mid	High
2016	25,000	25,000	25,000
Projected			
2022	26,300	27,800	28,800
2027	27,500	30,400	32,400
2032	28,800	33,200	36,500
2037	30,100	36,300	41,100
AAGR	**0.9%**	**1.8%**	**2.4%**

SOURCE: KSA, AAGR = Average Annual Growth Rate

Exhibit: 2-6 Aircraft Projections Comparison



SOURCE: KSA

As shown, the three projection methodologies resulted in operations forecasts ranging from about 30,100 to 41,100 aircraft operations by the end of the 20-year planning period. Growth rates represented by these forecasts ranged from an AAGR of 0.9 percent to 2.4 percent. While other scenarios predicting operations could have been presented, the range of the growth rates shown above represent the most realistic growth patterns considering the Airport's history, location to the San Antonio metropolitan area, and predicted regional, state and national growth estimates. Similar to based aircraft projections, a summary of each methodology for operations has been provided.

- Low Growth – This range is representative of the growth estimated in the FAA's projections for active general aviation aircraft and pilots as well as the TAF.

- Mid Growth – Several methodologies and activity drivers analyzed in this forecast fall within this growth range. Represented by population and employment growth projections for the region as well as FAA estimates for general aviation hours flown, and OPBA (currently 386 operations per based aircraft), all measures in this group range from 1.1 to 1.8 percent average annual growth.

- High Growth – This range reflects turbine aircraft utilization growth variables as reflected in the FAA Aerospace Forecasts, 2017-2017 averaging an annual growth rate of 2.4 percent.

It is recommended that facility requirements be established using the mid-growth rate. The recommended forecast is consistent with many demographic and socioeconomic trends and forecasts presented earlier and allows for a reasonable amount of growth, given planned increases in based aircraft.

PROJECTED OPERATIONAL FLEET MIX

A further assessment of the forecasts involves the individual and collective use of the airport by various aircraft types. The expected use of aircraft at the airport assists in determining the amount and type of facilities needed to meet the overall aviation demand. While it is anticipated single-engine aircraft will still perform most the general aviation operations, as a percentage their activity level is decreasing, which is counter to the continued growth in the turbine-engine powered segment. **Table 2-9** below provides a summary of the proposed operations forecast by aircraft type.

Table 2-9: Aircraft Operations Fleet Mix

Aircraft Category	Existing	2022	2027	2032	2037
Single-Engine	18,500	20,700	22,250	24,150	26,200
Multi-Engine (Piston)	2,500	2,700	3,000	3,300	3,600
Turbo-prop	3,000	3,300	3,800	4,300	4,900
Business jet	500	550	750	800	900
Helicopter	500	550	600	650	700
TOTAL	25,000	27,800	30,400	33,200	36,300

SOURCE: KSA

PROJECTED LOCAL/ITINERANT SPLIT

An important consideration when examining historic and projected airport operations at an airport is whether they are local or itinerant. Local operations are those operations conducted by aircraft remaining in the airport's traffic pattern, many of which are training related. Itinerant operations are those conducted by aircraft coming from outside the traffic pattern or nearby airports. In the past, operations have averaged 25 percent itinerant and 75 percent local. These percentages have remained relatively steady over the past 10 years. However, due to the nature of national trends of more aircraft being utilized for business use, it is anticipated itinerant operations will slightly increase over the course of the planning period to 30 percent with local decreasing slightly to 70 percent. **Table 2-10** shows the anticipated split of itinerant and local operations for the planning period.

Table 2-10: Local/Itinerant Operations Projections

Year	Itinerant	Local	Total
Existing	6,250	18,750	25,000
2022	7,300	20,500	27,800
2027	8,300	22,100	30,400
2032	9,500	23,700	33,200
2037	10,800	25,500	36,300

SOURCE: KSA

2.6 Critical Aircraft

The development of airport facilities is impacted by both the demand for those facilities, typically represented by total based aircraft and operations at an airport, and the type of aircraft that will use those facilities. In general, airport infrastructure components are designed to accommodate the most demanding aircraft, referred to as the critical aircraft, which will utilize the infrastructure on a regular basis. The factors used to determine an airport's critical aircraft are the approach speed and wing span/tail height of the most demanding class of aircraft that is anticipated to perform at least 500 annual operations at the airport during the planning period. The criteria for these categories are presented in **Table 2-11**.

Table 2-11: Airport Reference Code

Aircraft Approach Category		
Approach Category	Approach Speed	
A	< 91 knots	
B	91 knots to < 121 knots	
C	121 knots to < 141 knots	
D	141 knots to < 166 knots	
E	166 knots or more	
Aircraft Design Group		
Approach Category	Tail Height	Wing Span
I	< 20 feet	< 49 feet
II	20 feet to < 30 feet	49 feet to < 79 feet
III	30 feet to < 45 feet	79 feet to < 118 feet
IV	45 feet to < 60 feet	118 feet to < 171 feet
V	60 feet to < 66 feet	171 feet to < 214 feet
VI	66 feet to < 80 feet	214 feet to < 262 feet

SOURCE: FAA Advisory Circular 150/5300-13A Change 1

After identifying an airport's critical aircraft, it is then possible to determine the facility's Airport Reference Code (ARC). The ARC is a coding system that relates airport design criteria to the operational and physical characteristics of the airplanes that are intended to operate at an airport. An airport's ARC is a composite designation based on the Aircraft Category and Airplane Design Group of that airport's critical aircraft.

The current Airport Layout Plan (ALP) for HDO shows the Airport having an ARC of C-II which represented a design aircraft with an approach speed between 121 and 141 knots and having a wingspan between 49 and 79 feet as well as a tail height between 20 and 30 feet. This ARC encompasses all recreational single-engine piston aircraft, larger twin turbo-prop aircraft, and most medium to large business and corporate jet aircraft.

Operations data from the FAA's Traffic Flow Management System Counts (TFMSC) database was used to elevate historical operations at HDO and can be used to help validate the appropriate ARC. Over the course of the last 5 years (2012-2017), the TFMSC data shows the Airport handled approximately 2,615 jet operations and over 11,000 turbo-prop operations. Because TFMSC does not capture all operational data by IFR aircraft (most pilots cancel IFR flight plans once they have the field in sight and other block any potential to track their aircraft), it can be assumed more operations are occurring by both jet and turbo-prop aircraft.

These operations were conducted by a wide range of corporate jet aircraft including: Beech 1900, Beech King Air 200-350, Cessna Citation CJ1-4, Cessna Citation V/Ultra/Encore, Cessna Caravan, Cessna Mustang, Challenger 600, Embraer Brasilia EMB 120, Hawker 800, and Learjet 45/55/60. These aircraft provide a cross section of maximum take-off weight range on the high end. Dependent upon the stage length operations from the airport, some aircraft surpass the 30,000-pound mark. The ample parking space, fueling options for local and cross-country operations, and the on-field maintenance shops will continue to attract and accommodate the full range of general aviation piston and turbine aircraft.

2.7 Summary

It is anticipated that HDO will continue to grow during the 20-year planning period. Market area demographic trends indicate that the Airport will slightly outpace national growth trends in general aviation and parallel existing trends in Texas growth. Based aircraft are expected to increase from 36 to 53 aircraft by 2037. The Airport will also see an increase in the number of operations. By the end of the planning period, over 36,000 operations could be expected. It is important to note that this is an unconstrained projection, which stipulates that all facilities necessary to accommodate growth will be constructed and that nothing will limit it. Table 2-12 provides a summary of the overall operational activity forecasted at the airport over the 20-year planning horizon.

Table 2-12: Projection of Activity Summary

	Existing	2022	2027	2032	2037
Based Aircraft					
Single-Engine	62	68	70	77	81
Multi-Engine	4	5	7	8	9
Business Jet	0	0	1	1	1
Helicopter	1	1	1	1	1
Other	2	2	2	2	2
Total	*69*	*75*	*81*	*88*	*94*
Operations					
Single-Engine	18,500	20,700	22,250	24,150	26,200
Multi-Engine	2,500	2,700	3,000	3,300	3,600
Turbo-prop	3,000	3,300	3,800	4,300	4,900
Business Jet	500	550	750	800	900
Helicopter	500	550	600	650	700
Total	25,000	27,800	30,400	33,200	36,300
Local Operations	18,750	20,500	22,100	23,700	25,500
Itinerant Operations	6,250	7,300	8,300	9,500	10,800

SOURCE: KSA

The development plan projections for aircraft operations and based aircraft are recommended for considerations in the continued analysis for this plan. The projection included in the forecast could be viewed as reasonable considering industry trends, future views of national general aviation activity and projected growth within the region.

These projections of operational activity presented in this chapter will be referenced in later chapters to help identify areas of the Airport that are or may be constrained in future years and assist in the recommendation of future facility requirements. Additional sections of the development plan will explore the facility implications of accommodating the projected demand as well as possible scenarios for accommodating activity projected in higher growth scenarios included in this chapter.

3. Facility Requirements

The purpose of this chapter is to determine and summarize capacity metrics for the existing airport facilities and support facilities while analyzing their ability to meet forecast demand for the planning horizon. A variety of facilities will be benchmarked to assess capacity measures including:

- Airport Annual Service Volume (ASV)
- Wind and Instrument Approach Analysis
- Apron and Hangar Space Requirements
- Terminal space and other landside facility needs (i.e., parking and ground access)
- Navigation Aids (NAVAID) and lighting requirements

The FAA specifically states the requirements for airports in FAA Advisory Circular (AC) 150/5300-13A, Change 1, *Airport Design.* Although recommendations can be driven by FAA safety and design standards, demand will also dictate what needs to be built to address suggested facility requirements in this section. The findings presented here will be the foundation for putting together alternatives and selecting a recommended development plan for the airport. Sections include:

- Airfield Demand-Capacity Analysis
- Airside Facility Requirements
- Landside Capacity and Facility Requirements
- Facility Requirement Summary

3.1 Demand/Capacity Analysis

Airport capacity is a complex and variable metric. For planning purposes, many things must be considered such as airfield geometry, aircraft operations, based aircraft, and fleet mix. Support facilities are also taken into consideration based on the role of the airport and expected services to be provided. This is largely dependent of the type of aircraft using the facility and their operational characteristics. Airfield capacity is defined using the following terms:

- **Hourly Capacity of Runways:** The maximum number of aircraft that can be accommodated under conditions of continuous demand during a one-hour period.
- **Annual Service Volume (ASV):** A reasonable estimate of an airport's annual capacity (i.e., the level of annual aircraft operations that will result in an average annual aircraft delay of approximately one to four minutes).

The determination of capacity for long-range planning purposes at HDO uses the methodology contained in FAA AC 150/5060-5, *Airport Capacity and Delay*. Certain site-specific factors influence airfield capacity, and include: aircraft mix, runway use, percent arrivals, touch-and-go activity, the location of exit taxiways, and local air traffic control rules and procedures.

AIRCRAFT MIX

Aircraft mix is related to the type and size of the aircraft using an airport, and is categorized into four classes: Classes A and B consist of small single-engine and twin-engine aircraft weighing 12,500 pounds or less; Class C is large jet and propeller aircraft weighting between 12,500 pounds and 300,000 pounds; and Class D is large jet and propeller aircraft weighing more than 300,000. Class C and D are typical of those aircraft used by the airline industry and military. Aircraft mix is defined as the relative percentage of operations conducted by each of these classes of aircraft. For HDO, the existing aircraft mix has been estimated at 98% classes A and B, and 2% class C.

- Class A: Cessna 172, Cessna 182, Mooney M20, Piper PA-28
- Class B: Beech King Air, Pilatus PC-12, TBM-700
- Class C: Cessna Citation 500/650, Dassault Falcon 50/900, Learjet 35/45, Hawker 800, Gulfstream 550/650

RUNWAY USE

The use configuration of the runway system is defined by the number, location, and orientation of the active runway(s) and relates to the distribution and frequency of aircraft operations to those facilities. Both the prevailing winds in the region and the existing runway facility at HDO combine to dictate the utilization of the existing runway system. Per airport personnel, the estimated runway utilization pattern for the airport is:

- Runway 17L/35R – 60%
- Runway 17R/35L – 5%
- Runway 13/31 – 15%
- Runway 8/26 – 20%

Other variables taken into consideration to analyze airport capacity include percentage of arrivals during peak periods, the amount of touch-and-go operations performed at the field, the amount and spacing of existing taxiways, and IFR weather conditions. Using these assumptions and AC 150/5060-5 guidelines, the existing and future ASV for HDO has been calculated at approximately 355,000 annual operations, significantly higher than the 36,000 operations expected by the end of the planning period. Planning guidelines typically assume that when an airport meets 60% capacity, planning for capacity enhancements should begin. At 80% capacity, construction for those projects should begin. If 100% capacity is reached, serious impacts to airport operations may occur resulting in increased delay. This analysis shows that the airport will adequately support demand in the planning period for all runway configurations.

3.2 Airfield Dimensional Requirements

When determining the requirements at the airport, the highest focus is the airfield/airside facilities that are required to accommodate the operation of aircraft. Safety, capacity, and design standards are extremely important as they directly relate to the operation of the airport for its sole purpose; the take-off and landing of aircraft. Planning for the future of the airport requires this foundation of airfield configuration to be the basis for additional landside development concepts. Fundamentally, the aircraft that use the airport (or are projected to use the airport) dictate the requirements for which the facilities should be designed. Aircraft are unique and have a set of characteristics that determine thresholds for pavement strength, design, and capacity.

AIRPORT DESIGN

There are many considerations in airport design that impact where and why portions of the airport are planned. Most criteria are based on safety and operational efficiency and can include many boundaries that are not clearly visible by simply looking at the airfield. These boundaries are necessary to establish capacity, alignments, and sizing of certain airport infrastructure.

AIRPORT REFERENCE CODE

The ARC is a coding system developed by the FRAA to relate airport design criteria to the operational and physical characteristics of the airplane types that will operate at an airport. The ARC has two components relating to the airport design aircraft. The first component, depicted by a letter, is the aircraft approach category (AAC), and pertains to aircraft approach speed (operational characteristics). The second component, depicted by a Roman numeral, is the airplane design group (ADG), and indicates either the aircraft wingspan or tail height (physical characteristics), whichever is most restrictive of the largest aircraft expected to operate on the runway and taxiways adjacent to the runway. Another distinction within groups can be the designation of the term small aircraft which relates to aircraft which gross weights of 12,5000 pounds or less.

For example, a Beech King Air 200 with an approach speed of 103 knots and wingspan of 54.5 feet operating at an airport would exhibit an ARC of B-II, while a large business jet such as the Gulfstream VI, with an approach speed of 145 knots and wingspan of 77.8 feet, would exhibit and RDC of D-II. Table 3-1 and Exhibit 3-1 illustrates the ARC criteria.

As presented in the preceding chapter, the critical aircraft is the largest airplane within a composite family of aircraft conducting at least 500 operations (combination of 250 takeoffs and landings per year at an airport. The critical aircraft is evaluated with respect to size, speed and weight, and is important for determining airport design and safety area standards, as well as structural and equipment needs for the airfield and terminal area facilities. Based on all applicable information, the Cessna Citation X turbo-jet of other similar category aircraft will continue to be chosen future demanding aircraft for HDO, which exhibits an associated RDC of C-II.

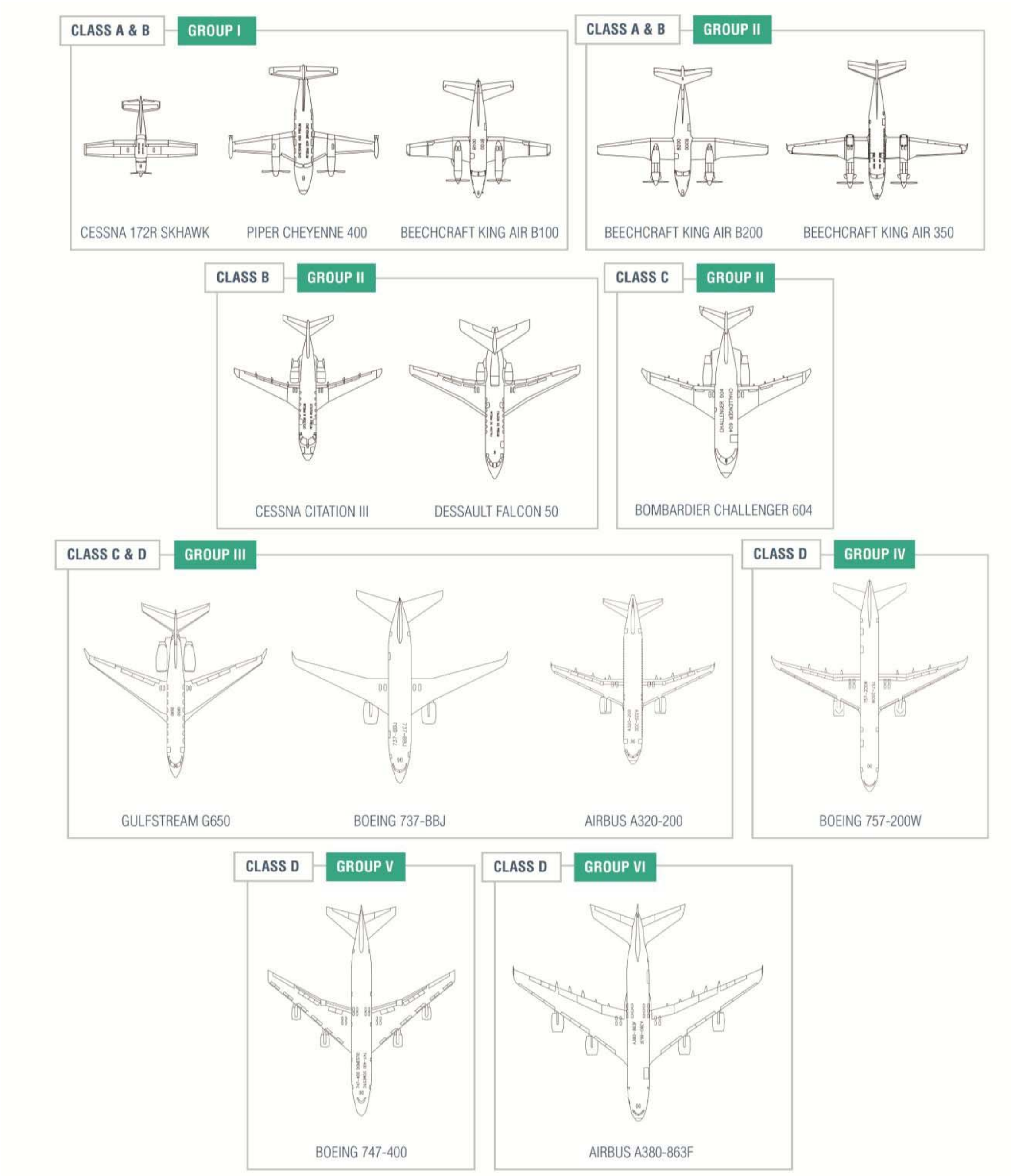
Table 3-1: Airport Reference Codes (ARC)

AIRCRAFT APPROACH CATEGORY (AAC)	
Approach Category	Approach Speed
A	< 91 knots
B	91 knots - < 121 knots
C	121 knots - < 141 knots
D	141 knots - < 166 knots
E	166 knots or more

AIRCRAFT BETWEEN 12,500 AND 60,000 POUNDS		
Design Group	Wingspan	Tail Height
I	< 49 feet	< 20 feet
II	49 feet - < 79 feet	20 feet - < 30 feet
III	79 feet - < 118 feet	30 feet - < 45 feet
IV	118 feet - < 171 feet	45 feet - < 60 feet
V	171 feet - < 214 feet	60 feet - < 66 feet
VI	214 feet - < 262 feet	66 feet - < 80 feet

SOURCE: FAA Advisory Circular 150/5300-13A, Airport Design, Change 1

Figure 3-1: Airport Reference Codes (ARC)



RUNWAY AND TAXIWAY SAFETY AREA

The Runway Safety Area (RSA) is an imaginary planning boundary that extends in a rectangular shape around the runway infrastructure. The area is prepared or suitable for reducing the risk of damage to aircraft in the event of an undershoot, overshoot, or excursion from the runway. Typically, this boundary should be flat, clear of any objects or hazards around the immediate vicinity of the runway in case of aircraft overruns. The specific size of the RSA is predicated on the previously mentioned ARC and approach minimums being accommodated at the Airport.

The Taxiway Safety Area (TSA) is centered on the taxiway centerline and is designed to limit encroachment of objects onto aircraft movement areas and to allow airport emergency vehicles to readily access aircraft on a taxiway. Reviewing the airport's current Airport Layout Plan Drawing (ALD), all RSA surfaces meet the design criteria as stipulated by the FAA. The ultimate size of the RSA will be shown on the Airport Layout Plan.

RUNWAY AND TAXIWAY OBJECT FREE AREA

The Runway Object Free Area (ROFA) is centered on the runway or taxiway centerline. The OFA standard requires clearing the OFA of above ground objects protruding above the runway safety area edge elevation. Except where precluded by other clearing standards, it is acceptable to place objects that need to be located in OFA for air navigation or aircraft ground maneuvering purposes and to taxi and hold aircraft in the OFA. To the extent practicable, objects in the OFA should meet the same frangibility requirements as the RSA. Objects non-essential for air navigation or aircraft ground maneuvering must not be placed in the OFA, including parked aircraft. Like the RSA, OFA criteria is based on the ARC and approach minimums are the airport.

RUNWAY PROTECTION ZONE

The Runway Protection Zone (RPZ) functions to enhance the protection of people and property on the ground beyond the end of the runway. This is best achieved through airport control of the RPZ. Control is preferably exercised through the acquisition of sufficient property interest in the RPZ and includes clearing the RPZ (and maintaining clear) of incompatible objects and activities. Trapezoidal in shape, the RPZ is centered on the extended runway centerline and begins 200 feet beyond the end of the area usable for take-off and landing. RPZ dimensions are a function of the ARC, aircraft size, and the lowest visibility minimums associated with a runway end. When a runway end accommodates a different landing threshold from the take-off threshold, two RPZs will be associated with the runway end in terms of an approach/departure RPZ. Table 3-2 outlines standard RPZ dimensions.

Table 3-2: Runway Protection Zone Dimensions

Item	Width at Inner Edge	Length	Width at Outer Edge	Airport Controls Entire RPZ
Required RPZ Dimensions				
Visual, Not lower than 1 mile, Small Aircraft Only	250’	1,000	450’	
Visual, Not lower than 1 mile, A & B Aircraft	500’	1,000	700’	
Visual, Not lower than 1 mile, C & D Aircraft	500’	1,700	1,010’	
Not lower than ¾ mile, All Aircraft	1,000’	1,700	1,510’	
Lower than ¾ mile, All Aircraft	1,000’	2,500’	1,750’	

SOURCE: FAA AC 150/5300, Airport Design, Change 1

TAXIWAY DESIGN

Recently, the FAA has updated the geometric requirements for taxiway design. Taxiway Design Groups (TDG) are now used to help design appropriate spacing and size of taxiways. It is important to note that the FAA lists seven conditions which should be addressed to reduce the potential for runway incursions:

1. Increase Pilot Situational Awareness: Keep taxiway systems simple, using a “three-node” concept.
2. Avoid Wide Expanses of Pavement: Requires placement of signs away from pilot’s line of sight.
3. Limit Runway Crossings: Reduces the number of occurrences and air traffic controller workload.
4. Avoid “High Energy” Intersections: Intersections in the middle third of the runways create the potential for a high speed/energy collision.
5. Increase Visibility: Using right angle intersections, both between taxiways and runways, provides the best visibility for pilots.
6. Avoid “Dual-Purpose” Pavements: Dual purpose runways/taxiways can lead to confusion.
7. Indirect Access: Taxiways leading directly from an apron to a runway without requiring a turn increases the possibility for incursions.

In addition to overall taxiway design changes, the FAA has promulgated a new subset of design criteria referred to as Taxiway Design Group (TDG). TDG is based on guidance that establishes requirements based on overall Main Gear Width (MGW) and the Cockpit to Main Gear Distance (CMG) for all aircraft operating at the airport. This criterion helps to establish design guidance for fillets and edge safety margins to help limit pilot error and use a consistent taxi method throughout the airport. FAA Advisory Circular 150/5300-13A, Airport Design, Table 4.1, provides the essential requirements for taxiway design and the associated design groups.

RUNWAY LENGTH REQUIREMENTS

The determination of runway length requirements is based on a combination of several factors. Generally, it is premised upon the most demanding aircraft within the GA fleet that operate, or are projected to operate, at an airport. In addition to airport elevation, mean maximum daily temperature of the hottest month, runway gradient, and balanced field length requirements. Runway length requirements are derived from FAA AC 150/5325-4B, *Runway Length Requirements for Airport Design.* Operations Data from the FAA Traffic Flow Management System Counts (TFMSC) database was used to evaluate historical operations at HDO. Since 2012, the airport has recorded over 2,600 jet operations and over 11,000 turbo-prop aircraft. Of the jet operations, there are over 40 unique makes of aircraft. The sample range of aircraft includes:

- Beechjet 400
- Cessna Citation CJ1-4, Citation Excel, Citation Mustang, Citation Sovereign, Citation II Bravo, Citation V Ultra/Encore, Citation X, and Citation XLS
- Challenger 300 & 600
- Falcon 10, 20, 50, 900, and 2,000
- Gulfstream 150, 200, III (300), IV (400), and V (500)

- Hawker 800 and 4,000
- Lear 35, 45, 55, and 65

Runway lengths for small aircraft (less than 12,500 lbs.) consider performance curves of propeller and some turbo-prop aircraft including maximum takeoff and landing weights, headwind component, optimal flap settings for normal operations, elevation above mean sea level, and mean maximum daily temperature for the airport. The recommended runway length for small piston aircraft should accommodate 95 percent of small GA aircraft fleet with less than 10 passenger seats. Additionally, the recommended runway length for turbo-prop aircraft conducting operations at HDO, and aircraft like the type identified as the airport's existing and future critical aircraft, should accommodate 100 percent of the GA fleet with less than 10 passenger seats.

Ultimately, considering the airport's future critical aircraft, which is expected to remain as C-II, the existing runway length of 6,002 feet is adequate for many the operations conducted at the airport; however, there may be times when additional runway is required for the larger aircraft jets. These runway lengths are solely dependent on variations in temperature, length of haul, weight, etc., for the associated aircraft. Therefore, length determination for such aircraft are obtained specifically through aircraft manufacturer performance charts. If larger type aircraft operate with a penalty (less fuel, shorter stage length) documentation should be recorded by airport staff to determine the optimal length adequate to support operations for all users of the field. Table 3-3 illustrates the airport's length requirements taking into consideration varying operational variables.

Table 3-3: Runway Length Requirements Summary

Airport and Runway Data	
Existing Conditions	
Airport Elevation (MSL)	930'
Mean Daily Max Temperature	97°F
Max Difference in Runway Centerline Elevation	18'
Runway 17L/35R	6,002'
Runway 17R/35L	3,224'
Runway 13/31	5,545'
Runway 8/26	3,451'
Small Aircraft (<12,500 pounds) with less than ten seats	
95% of Fleet	3,450'
100% of Fleet	4,100'
Small aircraft with more than 10 seats	4,500'
Aircraft weighting between (12,500 – 60,000) pounds	
75% of Fleet @ 60% Useful Load	4,900'
100% of Fleet @ 60% Useful Load	6,100'
75% of Fleet @ 90% Useful Load	7,400'
100% of Fleet @ 90% Useful Load	9,500'
Aircraft greater than 60,000 pounds	Based on performance charts published by airplane manufacturers for individual aircraft.

SOURCE: FAA AC 150/5325-4B, Runway Length Requirements for Airport Design
MSL = Mean Sea Level

RUNWAY WIDTH

The current runway widths for each individual runway meets the required design standards for the type of accommodated aircraft. Therefore, no widening of the runway is necessary is proposed or anticipated.

RUNWAY STRENGTH

The required pavement strength is an estimated based on average levels of activity and is expressed in terms of aircraft landing gear type and geometry (i.e., load distribution). The pavement design strength is not the maximum allowable weight of a particular aircraft. Limited operations be heavier aircraft than the critical aircraft may be permissible.

As identified in the Inventory chapter, the gross weight bearing capacity of 30,000 pounds single-wheel, 45,000 pounds dual wheel, and 90,000 pounds for double dual wheel is more than adequate to accommodate the aircraft that commonly utilize the runway.

3.3 Wind Analysis

One of the most fundamental impacts on runway orientation is wind. The number of runways and alignment depend largely on prevailing winds and their impact on specific types of aircraft operating at the airport. As aircraft are required to take-off and land into the wind, any direct crosswind to a certain runway alignment may have major effects on certain size aircraft. Crosswinds are quantified by a specific component of velocity based on resultant vector from a right angle to the runway. These components are the basis for allowable operations for aircraft. In general, the smaller aircraft, the smaller the allowable crosswind component for safe operations.

To determine if a certain runway (or group of runways) is adequate for these crosswind components, a wind analysis must be undertaken. FAA AC 150/5300-13A, Change 1, *Airport Design*, recommends that at least 95 percent crosswind coverage be provided by the runway system (one or more runways) at any airport. This means for planning purposes, the airport and its resulting runway(s) must accommodate aircraft operating 95 percent of the existing wind conditions without exceeding operation limitations.

As winds direction changes constantly, it must be quantified over a period to create average velocities, direction, and duration for wind at a given airport location to determine the likelihood the runway alignment cover most the conditions. Data is pulled from the National Climate Data Center for the last 10-years to be put in the FAA's Wind Analysis tool that summarized wind data by velocity and direction. This is then overlaid with the runway configuration to determine coverage percentage by crosswind component. Typical crosswind components for consideration in FAA analysis include 10.5 knots, 13 knots, and 16 knots, with 10.5 knots being able to accommodate a large portion of the general aviation fleet (predominantly single-engine aircraft).

The FAA recommends that an airport's runway configuration provides wind coverage during 95 percent of all possible weather conditions based on the airport's design aircraft. Tables 3-4 and 3-5 show the Airport's crosswind component coverage for both all-weather and IFR flight conditions.

Table 3-4: All Weather Wind Coverage Analysis

Runway	10.5-Knots	13-Knots	16-Knots
Runway 17L/35R & 17R/35L	94.41%	97.67%	99.53%
Runway 13/31	94.01%	96.65%	98.90%
Runway 8/26	87.07%	93.04%	97.75%
Combined	**99.69%**	**99.94%**	**99.99%**

SOURCE: FAA AGIS Wind Analysis Tool, National Climate Data Center (NCDC)
KHDO, Station 722533, 115,043 observations, January 2007-December 2016

Table 3-5: IFR Weather Wind Coverage Analysis

Runway	10.5-Knots	13-Knots	16-Knots
Runway 17L/35R & 17R/35L	96.54%	98.26%	99.49%
Runway 13/31	96.42%	97.85%	99.16%
Runway 8/26	94.80%	97.13%	98.83%
Combined	**99.74%**	**99.93%**	**99.99%**

SOURCE: FAA AGIS Wind Analysis Tool, National Climate Data Center (NCDC)
KHDO, Station 722533, 19,733 observations, January 2007-December 2016, Ceiling less than 1,000, but equal to or greater than 200 feet and/or visibility less than three miles, but equal to or greater than ½ mile.

3.4 Lighting and NAVAIDS

Navigational Aids (NAVAIDS) are any visual or electronic devices, airborne or on the ground, that provide point-to-point guidance information or position data to aircraft in flight. Airport NAVAIDs provide guidance to a specific runway end or to an airport. An airport is equipped with a precision, non-precision, or visual approach capabilities. In accordance with design standards that are based on safety considerations and airport operational, airspace, and capacity considerations determine an airport's eligibility and need for various NAVAIDs.

RUNWAY INSTRUMENTATION, LIGHTING, AND MARKING

For the past several years, the FAA has been transitioning from the common ground based navigation technology to satellite based Global Positioning System (GPS) technology. GPS has proven to be a reliable advancement capabilities to every runway in the airspace system. The continued development of Wide Area Augmentation Systems (WAAS) has further improved the technology by improving GPS accuracy and allowing for a very precise Localizer Performance with Vertical Guidance (LPV) approaches. Since EAAS precludes the need for ground based navigation equipment, cost and maintenance for the infrastructure is reduced without sacrificing approach capabilities that may be affected by signal reflection from aircraft, hangars, or other structures.

Currently, both ends of Runway 17L/35R support one-mile RNAV approaches. As more complex aircraft utilize the airport on a regular basis, it is reasonable to plan for instrument approaches below 1-mile at some point in the future. The caveat with any new approach is implementation is generally expensive and would be dictated by actual need, results of a benefit/cost analysis, and other justification requirements.

VISUAL LANDING AIDS

Currently, Runway 17L/35R and Runway 17R/35L are equipped with Medium Intensity Runway Lights (MIRL); in addition, Runway 17L/35R is the only runway accommodating a 4-Light Precision Approach Path Indicator (PAPI-4) system. It is recommended these lights be maintained throughout the planning period and be considered to potentially light Runway 13/31 at some point in the future. Runway 8/26 does not provide visual landing aids due to its visual approach only capabilities.

MARKINGS

All runways except for Runway 8/26 currently have non-precision instrument markings on both runway ends. These markings should remain intact to coincide with the one-mile approach. Should approaches lower than one-mile be implemented at some point, coinciding runway marking should follow suit.

RUNWAY END IDENTIFIER LIGHTS

Runway End Identifier Lights (REIL) include high intensity, photo strobe lights used for rapid identification of the thresholds during night and inclement weather conditions. Currently, no runway has REIL's installed. Typically, this type of equipment is installed at airport locations where light pollution is within proximity of the landing area, making it difficult to decipher runway end locations.

AIRPORT BEACONS

The airport beacon provides visual airport identification and location during night-time operations, as well as during inclement weather conditions. It is recommended the beacon be maintained in its current location for the foreseeable future and replaced when necessary during the planning period.

3.5 Landside Capacity and Facility Requirements

The airport's landside or terminal area facilities are those facilities that support the airside facilities, but are not actually a part of the aircraft operating area and typically include the passenger terminal building, auto parking area, aircraft hangars, aircraft parking apron, and fuel storage.

PASSNEGER TERMINAL BUILDING

The primary objective of the terminal building is to achieve an acceptable balance between passenger convenience, facility operational efficiency, capital investment, and aesthetics. A well-conceived terminal building should allow passengers and visitors to transition from the surface transportation mode to the air transportation mode with a minimum level of inconvenience. Potential expansion of the terminal building should be planned, design, and developed by taking into consideration allowable funding levels that include construction costs, as well as operational and maintenance costs.

The recommended terminal functional areas including square footage and parking facilities were determined by referring to FAA AC 150/5360-13, *Planning and Design for Airport Terminal Facilities*, as well as FAA AC 150/5390-9, *Planning and Design of Terminal Facilities at Non-Hub locations.* Table 3-6 summarizes the terminal building spatial needs throughout the 20-year planning period, including the accommodation of commercial service in the long-term.

Table 3-6: Terminal Building Needs Summary

Operational Activity	Existing	2022	2027	2032	2037
Annual Operational Demand (Itinerant Operations)	6,250	7,300	8,300	9,500	10,100
Peak Month Operations	31	36	42	48	54
Design Day Operations	1	1	1	2	2
Peak Hour Passengers	*7*	*11*	*13*	*18*	*20*
Terminal Building Spatial Needs (sq. ft.)	1,000	1,600	1,800	2,600	3,000
Existing Terminal Space			4,000		

SOURCE: KSA, FAA AC 150/5360-13, Change 1 and FAA AC 150/5360-9.

The existing passenger terminal building at the airport provides approximately 4,000 square feet of space and is adequate to meet the needs of the airport throughout the 20-year plan per standard methodology criteria. The methodology contained in AC150/5360-13 is based on passenger activity during the peak hour and the demand that is placed on the facility. A rule-of-thumb guideline from this AC indicates that for long-term passenger terminal planning purposes, the building area should provide approximately 150 square feet per peak hour passenger. Utilizing this guideline, a terminal building of approximately 3,000 square feet would be required by the end of the planning period. Should the airport accommodate operations more than what is forecasted, it is important to remember and expansion would be demand based. Planning and expansion should commence only when justification is met.

TERMINAL AUTO PARKING

The existing parking area associated with the terminal building currently accommodates 11 automobiles. Planning guidelines contained in AC 150/5360-9 indicate vehicle parking requirements are closely related to annual enplanements. Additionally, FAA AC 150/5360-13 indicates that an increase of 15 percent in the number of parking spaces should be provided to minimize the amount of time necessary to find a parking space. In determining the future public automobile parking needs, 1.5 spaces are allotted per peak hour passenger. Table 3-7 summarized the ultimate auto parking needs during normal airport operating conditions.

Table 3-7: Automobile Parking Needs Summary

Operational Activity	Existing	2022	2027	2032	2037
Peak Hour Passengers	7	11	13	18	20
Parking Spaces/Peak Hour Passenger	11	16	19	27	31
Existing Auto Parking Spaces	22	22	22	22	22
Parking Space Surplus/(Deficit)	11	6	3	(5)	(9)

SOURCE: KSA, FAA AC 150/5360-9.

Currently, calculations show the terminal building's auto parking facilities are adequate in the short-term but are deficient by the end of the long-term planning time from based on technical assumptions provided in FAA airport planning manuals. However, before construction or expansion commences, confirmation would need to be verified to understand whether deficiencies are common and indeed exist. Thus, retaining the existing layout and number of spaces is recommended throughout the planning period.

AIRCRAFT STORAGE REQUIREMENTS

Aircraft based at HDO are stored in various areas around the airfield, which range from apron tie-downs to T-Hangar structures. With the current number of 69 aircraft expected to increase to 94 by the end of the planning period, additional facilities will be necessary to accommodate the storage demands.

BASED AIRCRAFT APRON STORAGE

Based aircraft tie-downs are usually provided for those aircraft owners and operators that do not require or desire to pay the cost for long-term hangar storage, accommodate lower activity, and have lower turnover with size and type of aircraft. Space calculations for these areas are typically based on 360 square yards of apron for each aircraft tie-down. This space allotment provides for aircraft parking and circulation between the rows of tie-downs. Trends indicate that as more aircraft are based at an airport, hangar storage capacity is surpassed before additional hangar space is supplied.

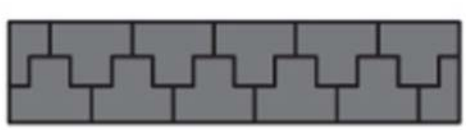
HANGAR STORAGE

A storage hangar typically consists of three walls, a roof, and a large door and serves to keep parked aircraft out of the elements. Storage hangars can be built to any size and dimension to meet the needs of the airport, tenant, and aircraft type.

T-Hangars

T-hangars come in two types: standard and nested. Standard T-hangar configurations produce a longer and narrower building and work well where existing infrastructure or available property is not wide enough for nested T-hangars while nested T-hangar configurations produce a shorter and wider building than the standard T-hangar. Nested T-hangars optimize the developable space and reduce the required taxi-lane pavements and allows for the construction of a larger rectangular unit or “pod” on the ends of the building for larger aircraft. Nested T-hangars are the most common hangar types.

T-hangars are typically constructed for single-engine and smaller twin-engine or those aircraft with a wingspan up to 79 feet. Single and twin-engine piston aircraft generally require approximately 1,200 to 3,000 square feet of storage space, with the average being 2,100 square feet.



10 UNIT NESTED T-HANGAR LAYOUT

10 UNIT STANDARD T-HANGAR LAYOUT

Clear Span/Box Hangars

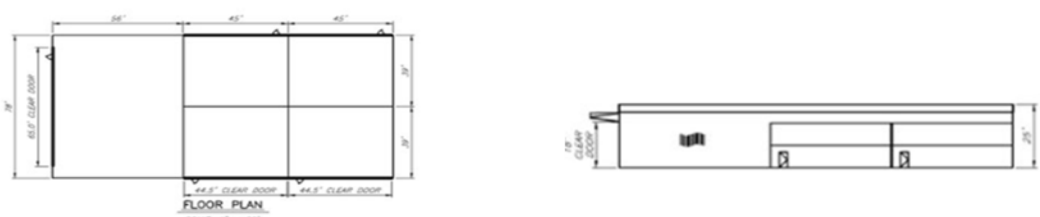
These types of hangars typically accommodate a single aircraft as stand-alone structures and are typically occupied by larger complex and more costly aircraft. Sizes can range from 60’x60’ up to 120’x120’ and at times, could double as a community type storage unit.

Corporate Hangar

A corporate hangar is usually a clear span/box hangar with the addition of dedicated space such as an office, restroom, conference room, break room, and lobby area. These types of hangars work well when there is a local FBO present or aircraft manager that oversees the hangar.

Executive Hangar

Executive hangars are hangars constructed when a conventional hangar is too big and T-hangar units are too small and are typical a single structure divided into as little as two and up to six storage units. These hangars most often accommodate large multi-engine piston and single twin-engine turbo-prop aircraft. Executive hangars provide flexibility for an airport that does not need hangar space to accommodate large aircraft but needs to house aircraft too large for a standard T-hangar. These hangars are usually custom sized and offer expansion capabilities.



Tables 3-8 and 3-9 present the type of facilities and the number of units or area needed to meet the forecast demand for each development phase. It is expected that most of the owners and operators of newly-based aircraft at the airport will desire hangar storage facilities. It should be noted that the actual number, size, type, and location of future hangars will depend on user needs, market conditions, and financial feasibility at the time demand occurs.

Table 3-8: Hangar Area Needs Summary

	Existing	2022	2027	2032	2037
Total Based Aircraft	69	75	81	88	94
Aircraft Hangar Need	67	73	79	85	91
Hangar Area Requirements					
T-Hangars	55,400	87,000	94,000	98,000	109,000
Executive Hangars (sq. ft.)	4,900	5,600	9,100	9,900	11,700
Corporate/Conventional Hangars (sq. ft.)	120,100	0	8,100	8,800	9,400
Total Hangar Area (sq. ft.)	180,400	92,500	111,200	116,700	130,100

SOURCE: KSA, FAA AC 150/5360-9.

While the airport has ample aircraft storage space for corporate and conventional needs, the Airport is deficient in accommodating storage needs for small aircraft in the form of T-hangars. The approximate 55,000 square feet of T-hangar storage space is predicted to double to 109,000 square feet by the end of the long-term planning horizon.

Table 3-9: Aircraft Apron Parking Needs Summary

	Existing	2022	2027	2032	2037
Based Aircraft Apron					
Tie-Down Need	2	2	2	3	3
Aircraft Hangar Need	67	73	79	85	91
Itinerant Aircraft Apron					
Single and Multi-Engine Apron (sq. yds.)	-	9,300	10,600	12,200	13,900
Turbo-prop and Jet Apron (sq. yds.)	-	2,600	3,000	3,400	3,800
Total Apron (sq. yds.)	178,000	12,700	14,500	16,500	18,700

SOURCE: KSA
Airport does not differentiate between based and itinerant parking areas.

Due to the current size of the apron, the airport offers plenty of area throughout the 20-year planning period. As demand and funding dictates, it is recommended the airport increase the overall area of the apron to accommodate the needs of the airport's users. It is also recommended that these areas be striped and properly marked to eliminate any potential confusion, in addition to allowing a proper aircraft maneuvering flow between the airside access points and the parking aprons.

3.6 Terminal Area Facility Requirements Summary

Table 3-10 summarizes the airport's terminal area facility requirements throughout the planning period.

Table 3-10: Terminal Area Facility Requirements Summary

Operational Activity/Factors	Existing	2022	2027	2032	2037
Terminal Building Requirements					
Annual Operational Demand (Itinerant Operations)	6,250	7,300	8,300	9,500	10,100
Peak Month (PMAD) Operations	31	36	42	48	54
Design Day Operation	1	1	1	2	2
Peak Hour Passengers	7	11	13	18	20
Terminal Building Spatial Needs (sq. ft.)	1,000	1,600	1,800	2,600	3,000
Existing Terminal Space Available (sq. ft.)			4,000		
Auto Parking Requirements					
Peak Hour Passengers	7	11	13	18	20
Parking Spaces/Peak Hour Passenger	11	16	19	27	31
Existing Auto Parking Facilities	22	22	22	22	22
Parking Space Surplus/(Deficit) Spaces	11	6	3	(5)	(9)
Hangar Requirements					
Total Based Aircraft	69	75	71	88	94
Aircraft Hangar Need	67	73	79	85	91
Hangar Area Requirements					
T-Hangars (sq. ft.)	55,400	87,000	94,000	98,000	109,000
Executive Hangars (sq. ft.)	4,900	5,600	9,100	9,900	11,700
Corporate/Conventional Hangars (sq. ft.)	120,100	0	8,100	8,800	9,400
Total Hangar Area (sq. ft.)	180,400	92,500	111,200	116,700	130,100
Apron Requirements					
Based Aircraft Apron					
Tie Downs	2	2	2	3	3
Apron Area (sq. ft.)	720	800	870	950	1,050
Itinerant Aircraft Apron					
Single and Multi-Engine Apron Area (sq. ft.)	-	9,300	10,600	12,200	13,900
Turbo-prop and Business Jet Apron (sq. yds.)	-	2,600	3,000	3,400	3,800
Total Apron (sq. yds.)	178,000	12,700	14,500	16,500	18,700

SOURCE: KSA

Figures rounded to the nearest hundred for planning purposes. Airport does not differentiate between based and itinerant parking areas.

3.7 Support and Other Facility Requirements

In addition to the aircraft storage and vehicular access and parking facilities described above, other support facilities at HDO that have quantifiable requirements and are vital in for the safe and efficient operation of the airport include fueling facilities.

FUEL STORAGE

According to fuel sales estimates provided by the Airport, there has been an average of 51,600 gallons of 100LL and 64,400 gallons of Jet-A fuel sold per year at the Airport over the last five years. Based on 2016 total operation counts, this equates to two and one-half gallons per operation for piston-engine aircraft and 17 gallons per operation for turbine engine aircraft. Typically, as operations increase, fuel storage requirements can be expected to increase proportionately. By increasing the ration of gallons sold per operation, an estimate of future storage needs can be calculated as a two-week supply during the peak month of operations. As can be seen in Table 3-11, the Airport's 12,000-gallon 100LL and 12,000-gallon Jet-A fuel storage tanks can easily accommodate the forecast fueling requirements through the 20-year planning period for a two-week supply utilizing existing storage facilities. The 3,000-gallon Jet-A mobile fuel dispenser is also adequate for mobile fueling purposes.

Table 3-11: Fuel Storage Needs Summary

	Existing	2022	2027	2032	2037
100LL Fueling Operations					
Average Day of Peak Month Operations	71	79	86	94	103
Two Weeks of Operations	1,000	1,100	1,200	1,300	1,400
Gallons Per Operation	2.5	2.8	3.0	3.1	3.4
Fuel Storage (Gallons)*	2,400	3,000	3,600	4,000	4,800
Jet-A Fueling Operations					
Average Day of Peak Month Operations	13	14	15	17	18
Two Weeks of Operations	175	200	220	240	260
Gallons Per Operation	17	19	21	22	23
Fuel Storage (Gallons)*	3,000	3,600	4,300	4,800	5,800

SOURCE: KSA

*Recommended fuel reserves equal Peak Day plus 3 days. Peak day fueling operations consider the peak month activity and divides that figure by 30 days and rounded to the nearest hundred.

FUEL TRUCK PARKING/SPILL CONTAINMENT

As part of any future Spill Prevention Control and Countermeasure Plan (SPCC) for the Airport, a fuel spill containment berm is recommended to be developed around future fuel truck parking areas to protect local groundwater sources from potential containment arising from a fuel spill or leakage.

A concrete/gravel fuel truck parking are is recommended to accommodate fuel truck operations. Additionally, construction of an earthen berm around the perimeter of the parking area for fuel truck storage is recommended. Lastly, the fuel truck parking area is recommended to be located immediately adjacent to the parking apron. This berm would be approximately eight inches in height with a bentonite clay core. The berm would be also constructed on the downgradient side of the aircraft apron to ensure that any fuel spills would be directed to the berm and prevent petroleum products from contaminating groundwater or soils in the area.

3.8 Summary

Now that the needs of the Airport have been determined, the next step of the master plan process is to ascertain the preferred airfield and terminal area development alternatives that best meet the operational needs of current and projected airport demand. The remaining elements of the development plan will be dedicated to highlighting future capital development, timing, cost, and potential environmental impacts associated with these improvements.

4. Alternatives

The previous chapter identified the airside and landside facility requirements needed to satisfy the forecast demand throughout the entirety of the planning period. Using the identified requirements, the following recommendations have been made to address how those requirements will be met using three development alternatives. This chapter will analyze the benefits and weaknesses associated with each alternative and provide a strategy for selecting a preferred airport development plan. Once selected, the preferred alternative will be implemented into the Airport Layout Plan (ALP) drawings.

The objective of this effort is to develop a balanced airside infrastructure and appropriate landside aircraft storage infrastructure to best serve the forecast aviation demands. Assessment of each alternative is grounded primarily in local, state, and federal planning standards; however, technical judgment must also be applied in order to determine the appropriate course of action, factors surrounding development and evaluation of design options should be assessed. These factors include:

- Develop a safety oriented and efficient aviation facility through compliance with Federal Aviation Administration (FAA) airport design standards and airspace criteria as defined in FAA Advisory Circular (AC) 150/5300-13A.
- Compatibility with the short and long-term development cost of the defined alternatives.
- Compatibility with the short and long-range goals of the City of Bonham and the Texas Department of Transportation.
- Mitigation of environmental impacts on and off-airport.

Alternatives to be considered will include options for both airside and landside development.

4.1 Facility Requirements Summary

Facility requirements are intended to compare existing facilities with current safety standards as well as the demand for new or expanded facilities. The facilities previously outline in Chapter 3 have provided the baseline to determine the feasibility to accommodate various alternatives. In addition, airfield demand/capacity, airside facility requirements, and landside capacity have all been evaluated during the selection of alternatives. Furthermore, two main standards are taken into account when evaluating facility requirements. First, alternatives must meet the design requirements established by the current and future Airport Reference Code (ARC) and second, standards identified in FAA Advisory Circular 150/5300-13A, *Airport Design* must be met.

To meet future facility requirements, Jones Field must make provisions to accommodate future operations. The demand for additional facilities was calculated in the previous chapter and can be summarized by examining forecast based aircraft and operations.

1. Based Aircraft – HDO currently accommodates 69 based aircraft; this number is expected to increase to as much as 94 by 2037. (Table 4-1)

2. Operations – In 2016, HDO had 25,000 aircraft operations; this is expected to rise to as much as 36,300 by 2037. **(Table 5-1)**

Table 4-1: Projection of Activity Summary

	Existing	2022	2027	2032	2037
Based Aircraft					
Single-Engine	62	68	70	77	81
Multi-Engine	4	5	7	8	9
Business Jet	0	0	1	1	1
Helicopter	1	1	1	1	1
Other	2	2	2	2	2
Total	*69*	*75*	*81*	*88*	*94*
Operations					
Single-Engine	18,500	20,700	22,250	24,150	26,200
Multi-Engine	2,500	2,700	3,000	3,300	3,600
Turbo-prop	3,000	3,300	3,800	4,300	4,900
Business Jet	500	550	750	800	900
Helicopter	500	550	600	650	700
Total	25,000	27,800	30,400	33,200	36,300
Local Operations	18,750	20,500	22,100	23,700	25,500
Itinerant Operations	6,250	7,300	8,300	9,500	10,800

SOURCE: KSA

Airside Requirements

Airfield facilities include infrastructure that interacts with the arrival and departure of aircraft as well as their subsequent movement around the airfield to parking and storage areas. Areas of focus include runway/taxiway dimensions, aprons, navigational aids (NAVAIDS), landing aids, and dimensional standards. These criteria are taken into account during the development of the airside alternatives.

The following airside improvements outlined in **Table 4-2** were recommended in the previous chapter and are intended to meet future design requirements as well as enhance the efficiency of the airfield. Each of the proposed alternatives will incorporate these improvements while ensuring compliance with FAA Airport Design standards.

Table 4-2: Summary of Facility Requirements		
Facility	Planning Period Requirements	Justification
Runway 17L/35R	It is recommended to retain this runway at its current length	Capacity. Accommodation of medium sized business jets and associated balanced field length requirements.
Runway 13/31	Extend 625' to the northwest to account for the runway shift to accommodate the new connecting taxiway.	
Runway 17L/35R	Recapture runway length to north end of pavement when conversion of Runway 8/26 to a taxiway is complete.	
Taxiway	It is recommended a new west side full-length parallel taxiway be constructed and connect with a newly converted Taxiway "F" (previously Runway 8/26). Additionally, Taxiway "G" is a proposed taxiway to connect to the Runway 17R end from the west.	Safety and Capacity. This will eliminate the need for aircraft to back-taxi on the runway. Improves safety and capacity.
Taxiway Connectors	A new connector is proposed by extending Taxiway "D" across Runway 17R / 35L to connect to the newly shifted Runway 31 end.	Safety and Capacity. This will eliminate confusion for aircraft maneuvering around the intersecting runways on the south end. Improves safety and capacity.
Single and Multi-Engine Aircraft Storage	A variety of hangars will be necessary during the planning period. These will vary in size by aircraft but will need to accommodate at least 19 new single-engine and 8 multi-engine aircraft.	Terminal / Revenue enhancement. This will accommodate the forecasted based aircraft number. If demands exceed the forecasted numbers, additional hangars should be built as needed for future tenants.
Corporate Hangar	At least 9,400 square feet of hangar space will need to be constructed within the planning period.	Terminal / Revenue enhancement. Forecast period will need to accommodate the addition of one based jet.
Parking	Expansion of the GA parking lot is recommended for the long-term.	Access. As new hangars are constructed, parking should be added to accommodate new tenants.
NAVAIDs	The current approaches are sufficient, however, it is recommended that the approach minimums be amended to ¾ mile visibility.	Capacity. As larger jet aircraft continue to utilize the airport, lower approach minimums will increase the ability of the airport to serve these customers.
Security Fencing	A majority of the airport has perimeter fencing. The airport should strive to complete securing the remainder of the field as funding allows. Additionally, as the airport constructs more hangars, it will be necessary to provide controlled access to eliminate and / or minimize any conflicts between auto and aircraft traffic.	Security. As the airport grows and gains additional based aircraft, a reasonable level of security should be provided to aeronautical users of the airport. Fuel facilities near the terminal area are a highly sensitive asset that will need to be protected from outside influences.

LANDSIDE

Various landside improvements are recommended to accommodate current and forecast aviation activity throughout the planning period at HDO. As stated in Chapter 3, areas of particular focus include the addition of T-Hangars and conventional hangars. These facility requirements are developed from the analysis of the demand and capacity requirements, and based on standards established by the FAA Advisory Circular 150/5300-13A, *Airport Design*.

The following landside improvements were recommended in the previous chapter and are intended to meet future demands for aircraft storage, safety/security and functionality. Each of these proposed alternatives will incorporate these improvements while following compliance with FAA Airport Design Standards with regards to the following landside development.

a) Provide additional T-Hangars
b) Provide additional conventional hangars

4.2 Evaluation Criteria

The following evaluation criteria have been developed to determine which of the following alternatives appropriately meet the future requirements of the Jones Field. These criteria were based on, but not limited to, FAA Airport Design Standards, facility requirements, implementation feasibility, operational efficiency, preliminary cost of development, and preliminary potential environmental impacts.

- Safety and operational efficiency
- Ability to address aviation demand/capacity considerations
- Location, size and configuration of available on and off-airport land for development
- Viability and ease of airside access to property
- Viability and ease of airside access to property
- Current use of designated use of on-airport property
- Current or planned use of off airport property adjacent to the airport
- Environmental conditions on and off-airport; noise, drainage, topography, waterways, historic resources, wetlands, soil conditions, etc.
- FAA imaginary airspace surfaces and height restrictions
- Land use plans of local agencies
- Development costs and financial feasibility
- Airport operational factors and design related standards criteria
- Existing and programmed roadway network
- Phasing and constructability considerations
- Benefit/Cost considerations
- Available funding
- Other factors to be determined in conjunction with the Sponsor and PAC

These design concepts represent the range of possibilities to reasonable improve certain design and operational characteristics at the airport. Following a review of these alternatives based on performance standards of future airport operational activity (individual or combination of strategies), a preferred alternative design will be selected and will be carried throughout the remainder of the study and ultimately used to update the Jones Field layout plan.

4.3 Development Alternatives Evaluation

AIRSIDE ALTERNATIVES

As outlined in the inventory, South Texas Regional Airport is based on four (4) runways and one (1) full-length parallel taxiway. The parallel taxiway is located on the east side of the field and connects the apron / parking area to each end of Runway 17L / 35R. In an effort to maintain continued safety at the airport and minimize confusion associated with the "V" threshold configuration of Runway 31 and Runway 35R on the south, it is recommended to extend Taxiway "D" to the west and connect to the Runway 31 end. Additionally, an extension of 505 feet to the northwest for Runway 13 / 31 will provide further runway length based on the shift of the Runway 31 threshold on the south end to accommodate the new access point from Taxiway "D".

Advisory Circular 150/5300-13A outlines the correct method for the layout of runways, taxiways, and taxiway connectors leading to another taxiway or runway entrance. This new guidance stipulates the disallowance of "lead-in" taxiways. Taxiways should be designed to mitigate incursions by limiting direct access from the apron to a runway by implementing a turn prior to entrance.

The following alternatives have been assembled to provide a full range of design options. These alternatives are based on the forecasts and potential future expansions at the airport.

Alternative One

Alternative One involves the following airfield modifications and enhancements:

Design Considerations:

- Shift Runway 13 / 31 625 feet to include a 505-foot extension to the northwest to eliminate incursions and confusion associated with the Runway 31 and Runway 35R thresholds. This will increase overall runway length of Runway 13 / 31 from 5,545 feet to 6,170 feet.
- Extend Taxiway "D" to the west to provide access to the new Runway 31 threshold
- Convert Runway 8 / 26 to a designated taxiway (Taxiway "F")
- Construct partial taxiway to Runway 17L end
- Re-capture 442 feet of Runway 17R / 35L to increase overall runway length from 3,224 feet to 3,666 feet
- Construct full-length west side parallel taxiway, with connectors, to Runway 13 / 31
- Square up Taxiway "E" to eliminate 45-degree entrance to Runway 35R end

<u>Pros:</u>

- Taxiway system provides better and safer access to runways and throughout the airport
- Provides additional length to two (2) runways
- Utilizes pavement more efficiently by keeping aircraft from traversing active runways
- Meets the short- to mid-term needs of the airport

<u>Cons:</u>

- Long-term cost for pavement maintenance of airport is significant
- Retains intersecting runway issue with Runway 13 / 31 and Runway 17R / 35L

Alternative Two

Alternative One involves the following airfield modifications and enhancements:

Design Considerations:

- Construct end-around taxiway to Runway 31 to minimize the incursion potential between Runways 31 and 35R threshold ends

- Construct west side full-length parallel taxiway, with connectors, to Runway 13 / 31
- Construct connector taxiway from Runway 13 end to Runway 8 / 26
- Convert Runway 8 / 26 to a designated taxiway (Taxiway “F”)
- Remark and restripe closed Runway 4 / 22 as a connector taxiway
- Square up Taxiway “E” to eliminate 45-degree entrance to Runway 35R end

Pros:

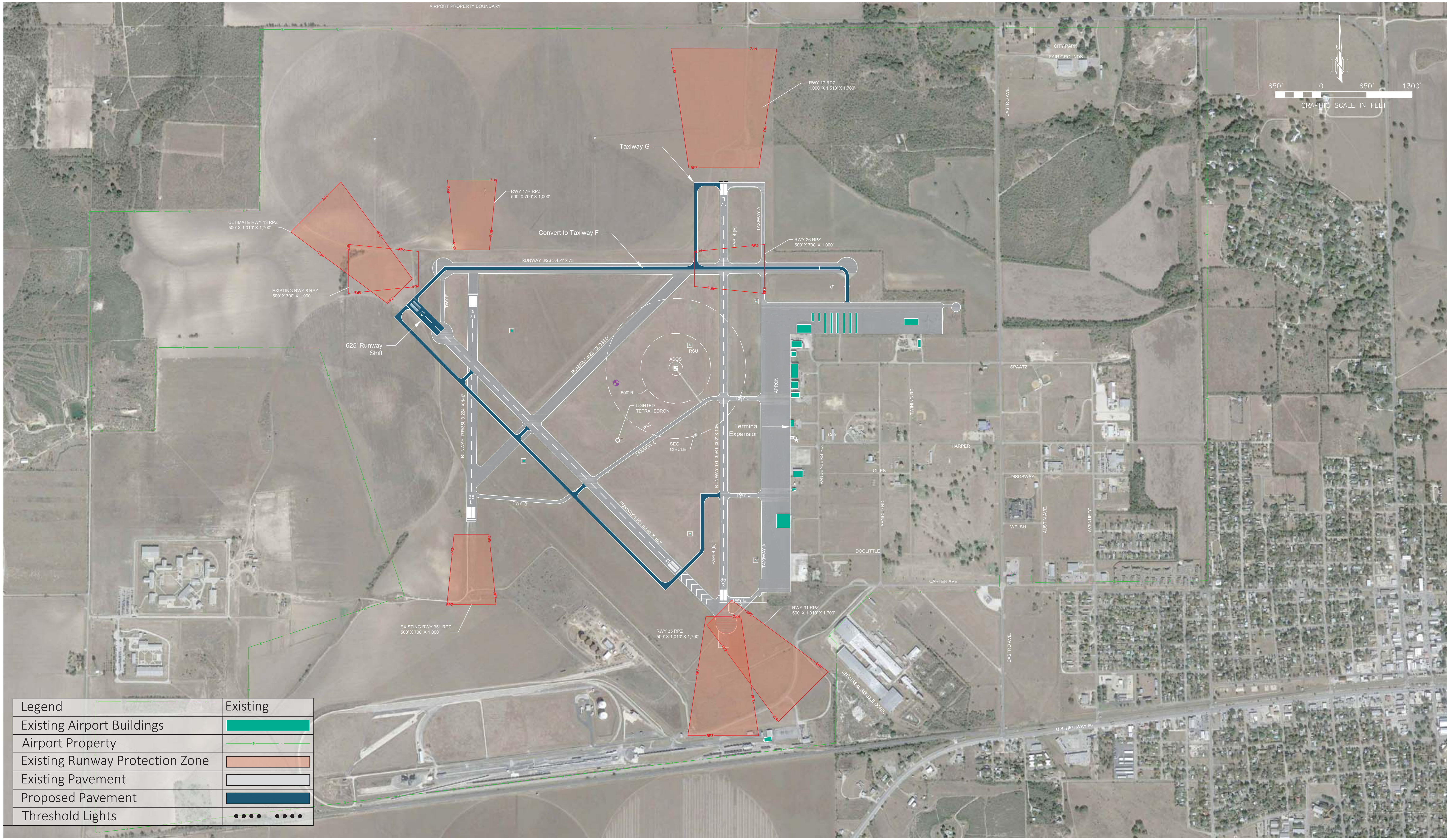
- Taxiway system provides better and safer access to runways and throughout the airport
- Utilizes pavement more efficiently by keeping aircraft from traversing active runways
- Meets the short- to mid-term needs of the airport

Cons:

- Long-term cost for pavement maintenance of airport is significant
- Runway 31 threshold remains in current location
- Retains intersecting runway issue with Runway 13 / 31 and Runway 17R / 35L
- End around taxiway traverses two Runway Protection Zones (RPZ) on south end of airport

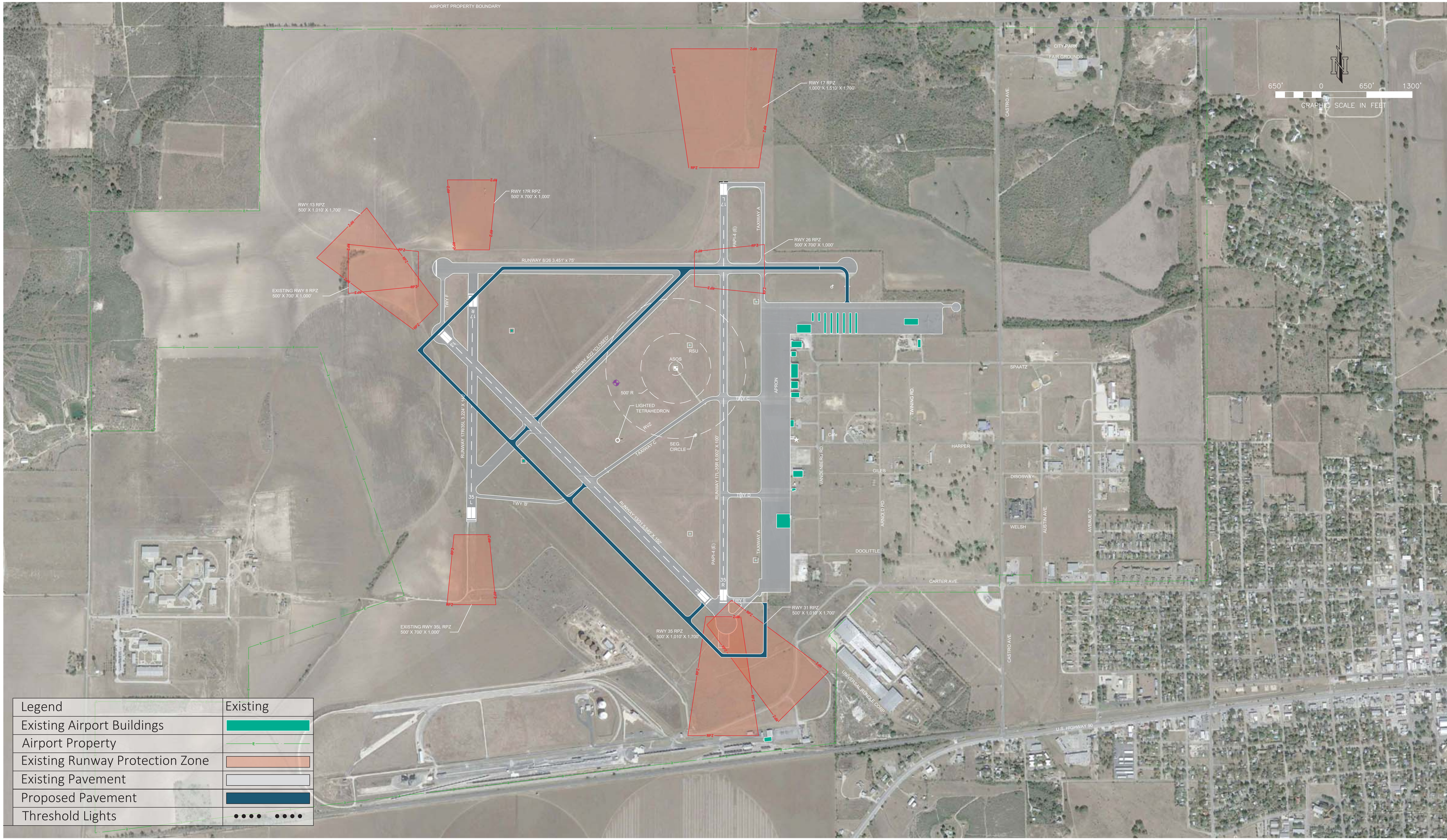
Each of the airside alternatives offer the airport the opportunity to provide better access to the Runway 31 end, via new taxiways, and take advantage of existing pavement for new stand-alone taxiways. Additionally, both options provide a new west side full-length parallel taxiway to Runway 13/31. However, Alternative One offers the best advantage for providing additional runway length to Runway 13 /31 and Runway 17R / 35L.

Exhibits 4-1 and 4-2 graphically illustrate each alternative for the airside options.



South Texas Regional Airport at Hondo

Airside Alternative 1



South Texas Regional Airport at Hondo

Airside Alternative 2

LANDSIDE ALTERNATIVES

With the completion of the Landside Facilities Requirements based on the inventory and forecast in previous chapters, alternatives will be presented for landside development evaluation.

To help determine terminal and support area facilities for the future planning periods, landside capacity and future demand were evaluated for itinerant and based aircraft parking aprons, aircraft storage facilities, automobile parking, fuel storage, and support area requirements. Findings for South Texas Regional were generally inefficient in a majority of these areas. Both conventional and T-hangars are needed during all time frames of the planning period.

Development strategies were explored for South Texas Regional based on the following criteria:

- Market position
- Regional economic development opportunities
- SWOT analysis results from stakeholders
- Property attributes

By analyzing the landside facility needs as well as the development strategies presented through the Master Plan process, alternatives were evaluated for development. The alternatives for this analysis were prepared in accordance with FAA Advisory Circular 150/5300-13A, *Airport Design* and based on a "neighborhood" type concept where smaller aircraft and larger aircraft facilities are placed in strategic locations across the airport to minimize any potential conflict with each other. Because the airport offers a vast amount of apron and aircraft parking area, the landside alternatives focus primarily on various type and size of hangar facilities. The following alternatives consider this "neighborhood" concept and have been assembled to provide a full range of design options.

Alternative One (East Side)

Alternative One involves the following airfield modifications and enhancements:

Design Considerations:

- New northside airport entrance road providing access to the north aircraft apron
- New T-hangar development area directly south of the existing T-hangar area
- 75' x 75' box hangars south of Runway 8 / 26 and north of the north aircraft apron
- Various sized box hangars with taxiway and auto access east and slightly north of the terminal building
- Large FBO / MRO type hangar developments adjacent to the main aircraft apron and the southside of the airfield
- 125' x 100' box hangars with taxiway and auto access east and slightly south of the terminal building

Pros:

- Exceeds hangar facility needs
- Ample available land for development
- Provides good mix of T-hangar, corporate, and FBO development areas
- Isolates small and large aircraft types to specific portions of the airfield

Cons:

- Overall cost for development

- Utility infrastructure not in place

Alternative Two (East Side)

Alternative Two involves the following airfield modifications and enhancements:

Design Considerations:

- New northside airport entrance road providing access to the north aircraft apron
- Relocate or remover existing T-hangars to a new T-hangar development area on the southside of the airport
- New FBO / MRO type hangars on both the north and south sides of the north apron
- Infield hangars between the north side and south side vary in size and are provided both taxiway and auto access

Pros:

- Exceeds hangar facility needs
- Ample available land for development
- Provides good mix of T-hangar, corporate, and FBO development areas
- Isolates small and large aircraft types to specific portions of the airfield

Cons:

- Overall cost for development
- Utility infrastructure not in place

Alternative Three (West Side)

Alternative Three involves the following airfield modifications and enhancements:

Design Considerations:

- New aircraft parking and maneuvering apron accessible by the newly proposed full-length parallel taxiway to Runway 13 / 31
- Three (3) large FBO / MRO (300' x 200') type hangar structures

Pros:

- Exceeds hangar facility needs

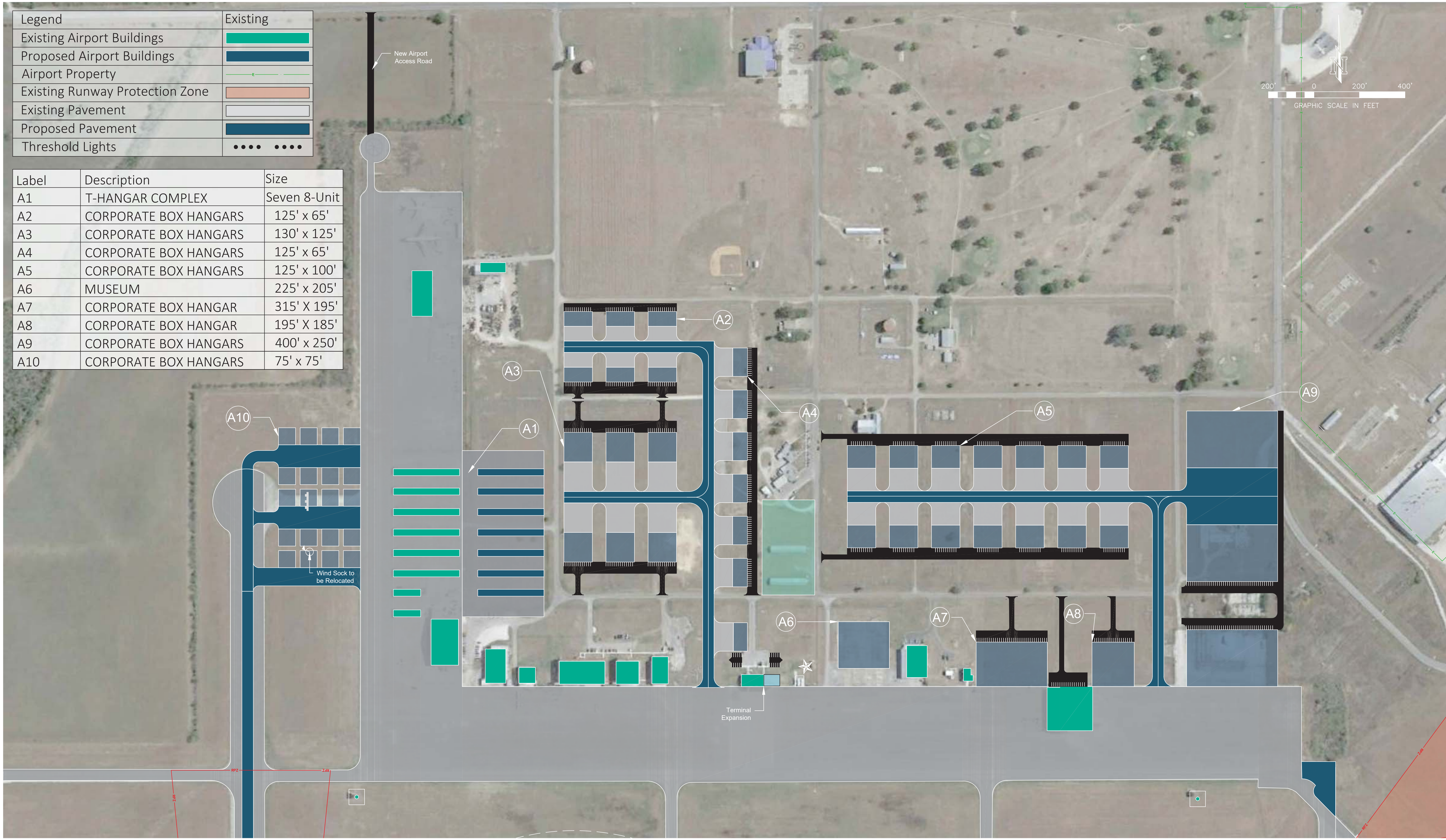
Cons:

- Overall cost for development
- Require a new entrance or access point for west side of airport
- Proposed development exceeds needs of the airport for the life of the planning document

Each of the landside alternatives provides the airport a systematic and logical concept for future development of aircraft and other aviation related facilities and focuses on the "neighborhood" or "zone" approach for future construction. Landside Alternative One primarily retains the small to medium type aircraft within the northern limits of the airfield while the larger aircraft are situated in the southern limits. Conversely, Landside Alternative Two anticipates small to medium aircraft development to be focused on the southern portions of the airport and larger type aircraft situated in the northern section of the airport. Both options provide a mix of various aircraft facilities east of the terminal within the undeveloped portions of airport property. The terminal building is to remain the focal point of the any proposed development and has been retained in its current location throughout the planning effort.

While Alternative Three provides a detail of what could be garnered on the west side of airport property, construction for this type of development is in all likelihood beyond the time frame of this planning project.

Each of the landside alternatives is presented graphically in the following Exhibits 4-3, 4-4, and 4-5.



Legend	Existing
Existing Airport Buildings	
Proposed Airport Buildings	
Airport Property	
Existing Runway Protection Zone	
Existing Pavement	
Proposed Pavement	
Threshold Lights	•••• ••••

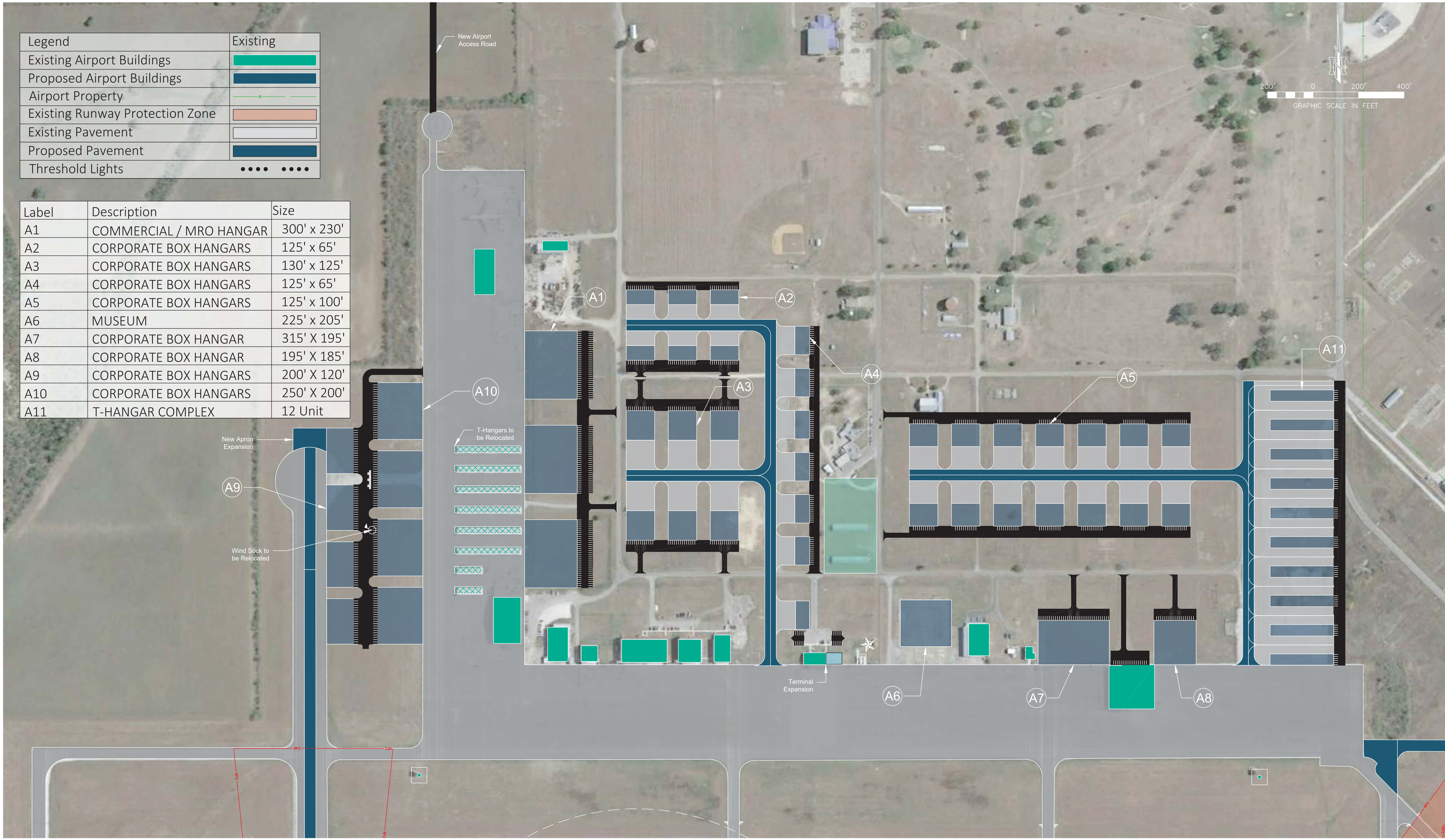
Label	Description	Size
A1	T-HANGAR COMPLEX	Seven 8-Unit
A2	CORPORATE BOX HANGARS	125' x 65'
A3	CORPORATE BOX HANGARS	130' x 125'
A4	CORPORATE BOX HANGARS	125' x 65'
A5	CORPORATE BOX HANGARS	125' x 100'
A6	MUSEUM	225' x 205'
A7	CORPORATE BOX HANGAR	315' X 195'
A8	CORPORATE BOX HANGAR	195' X 185'
A9	CORPORATE BOX HANGARS	400' x 250'
A10	CORPORATE BOX HANGARS	75' x 75'

South Texas Regional Airport at Hondo

Landside Alternative 1

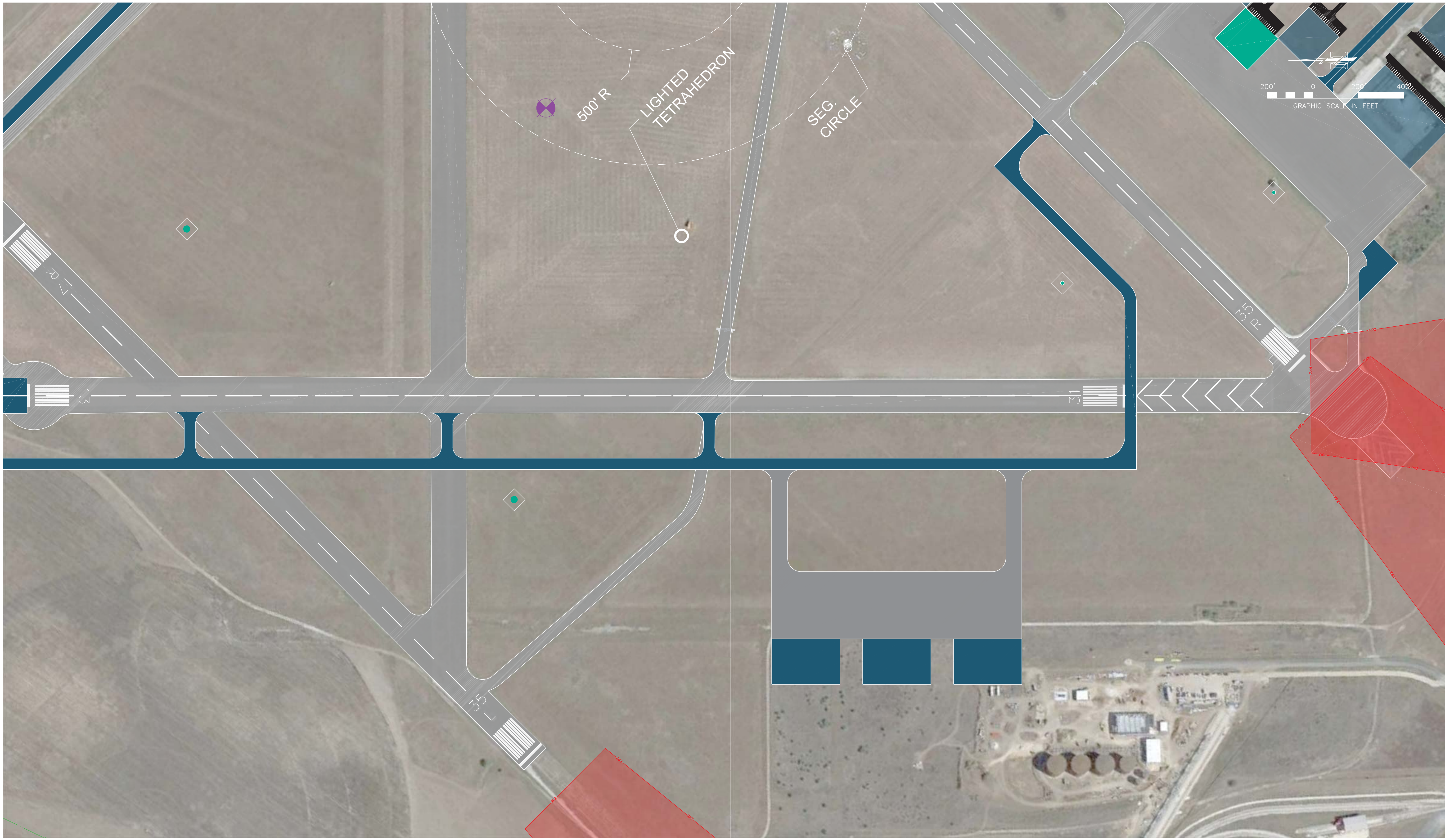
Legend	Existing
Existing Airport Buildings	
Proposed Airport Buildings	
Airport Property	
Existing Runway Protection Zone	
Existing Pavement	
Proposed Pavement	
Threshold Lights	•••• ••••

Label	Description	Size
A1	COMMERCIAL / MRO HANGAR	300' x 230'
A2	CORPORATE BOX HANGARS	125' x 65'
A3	CORPORATE BOX HANGARS	130' x 125'
A4	CORPORATE BOX HANGARS	125' x 65'
A5	CORPORATE BOX HANGARS	125' x 100'
A6	MUSEUM	225' x 205'
A7	CORPORATE BOX HANGAR	315' X 195'
A8	CORPORATE BOX HANGAR	195' X 185'
A9	CORPORATE BOX HANGARS	200' X 120'
A10	CORPORATE BOX HANGARS	250' X 200'
A11	T-HANGAR COMPLEX	12 Unit



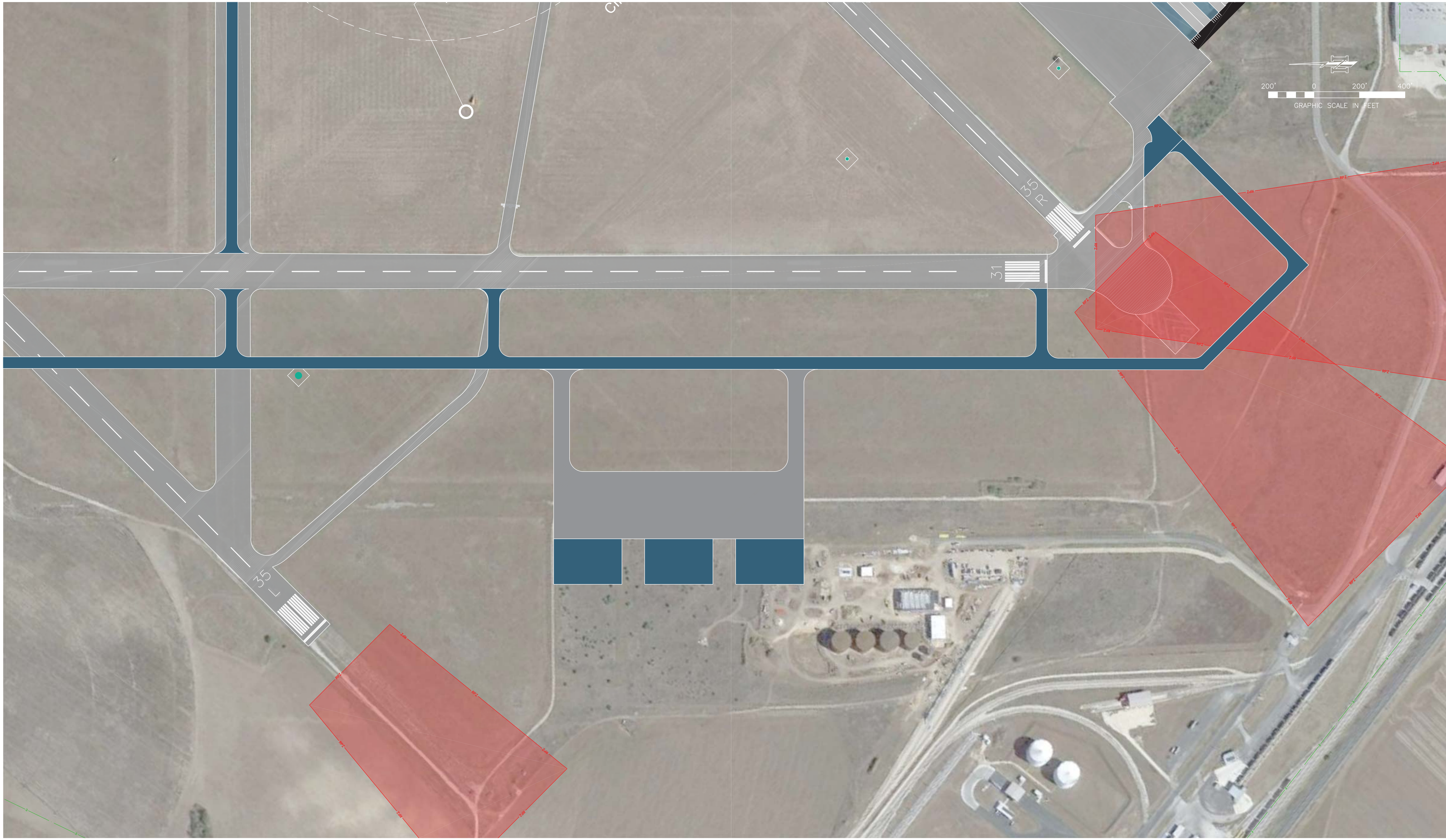
South Texas Regional Airport at Hondo

Landside Alternative 2



South Texas Regional Airport at Hondo

West Landside Alternative 1



South Texas Regional Airport at Hondo
West Landside Alternative 2

4.4 Recommended Development Plan

During this planning effort, the alternative concepts presented above were created as options for development at the Hondo – South Texas Regional Airport. Because the airport has an abundance of developable area and already meets a majority of the needs of its user, these concepts mostly evaluated various improvements for aircraft storage and runway/taxiway improvements. Using input from stakeholders, a recommended development plan was selected from the alternatives presented.

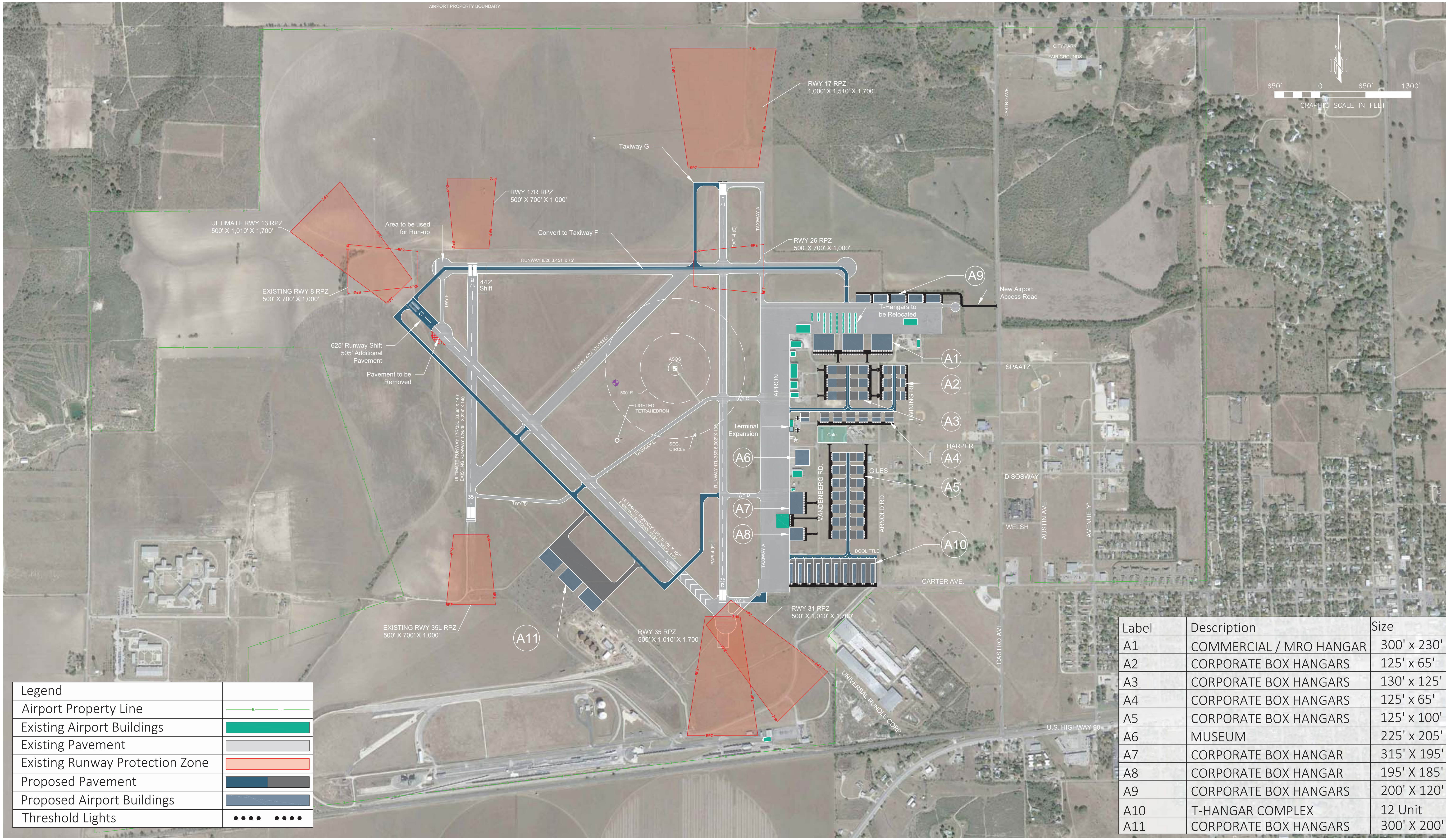
After additional discussion with stakeholders, the final recommended plan was developed based on a combination of Airside Alternative One (1) and Landside Alternative Two (2). The layout shown in Exhibit 4-6 graphically illustrates the recommended plan that will be incorporated into the Airport Layout Plan (ALP) and provides the following improvements:

- New north side airport entrance road
- Conversion of Runway 8 /26 into a taxiway
- Shifts Runway 13 / 31 to the northwest and incorporates a 505-foot extension
- Connector taxiway to the new Runway 31 threshold
- Connector taxiway from the new Runway 13 end to the Runway 8 / 26 converted taxiway
- Re-capture 442 feet of pavement to Runway 17R / 35L
- Construct a new Taxiway "G" to the Runway 17L end
- T-Hangar construction
- Various sized box hangar construction
- Future parallel taxiway and hangar development area west side of Runway 13 / 31

4.5 Summary

The proposed development alternatives for Hondo – South Texas Regional Airport are intended to present the airport with a variety of options for future facility expansion and culminate with the airport solidifying an overall Recommended Development Plan. As previously mentioned, the ultimate build-out or initial construction of the development areas will be demand driven and would not be constructed until the market dictates the need for additional aircraft facilities. The following chapter, *Capital Improvement Program*, will evaluate the individual projects at the airport over the 20-year time frame and associate a proposed cost and funding source.

KSA



Legend	
Airport Property Line	
Existing Airport Buildings	
Existing Pavement	
Existing Runway Protection Zone	
Proposed Pavement	
Proposed Airport Buildings	
Threshold Lights	•••• ••••

Label	Description	Size
A1	COMMERCIAL / MRO HANGAR	300' x 230'
A2	CORPORATE BOX HANGARS	125' x 65'
A3	CORPORATE BOX HANGARS	130' x 125'
A4	CORPORATE BOX HANGARS	125' x 65'
A5	CORPORATE BOX HANGARS	125' x 100'
A6	MUSEUM	225' x 205'
A7	CORPORATE BOX HANGAR	315' X 195'
A8	CORPORATE BOX HANGAR	195' X 185'
A9	CORPORATE BOX HANGARS	200' X 120'
A10	T-HANGAR COMPLEX	12 Unit
A11	CORPORATE BOX HANGARS	300' X 200'

South Texas Regional Airport at Hondo
Recommended Development

5. Implementation Plan

With the selection of the Recommended Development Plan, this chapter presents a summary of the airport improvements identified in the master plan capital improvement program (CIP), its anticipated phasing and funding sources. The analysis provides estimates of the local share of project costs and the total amount of capital investment that may be required from the airport sponsor over the planning period. These costs and associated funding sources are for planning purposes and may change at the time of implementation based on current construction costs, bidding, and project scope.

Additionally, the phasing and timing for future projects is important and will be subject to funding availability, sponsor contributions, and needs of the users of the airport. Projects may be chosen from this plan and implemented accordingly based on dynamic market conditions and needs. The chapter is intended to be a guide for implementing the recommended development and may be flexible based on real word factors and conditions.

5.1 Capital Improvement Program

The Capital Improvement Program (CIP) identifies improvement projects that are recommended for an airport over a specific period of time, estimates the order in which the projects are to take place, and calculates the total costs and funding sources of the projects. As the CIP progresses from projects planned in the current year to those planned in future years, it becomes less detailed and more flexible. Additionally, the CIP is typically modified on an annual basis as new projects are identified or as projects and priorities change. Table 5-1 summarizes projects for this plan.

Table 5-1: Airport Development Summary

Runway	• Shift Runway 13/31 625' to the northwest • Extend Runway 31 505 feet • Re-capture 442' of additional length to Runway 17R35L by shifting threshold north and re-marking/re-striping • Close Runway 8/26
Taxiway	• Extend Taxiway "D" west to provide new access to Runway 31 • Ultimate full parallel taxiway construction on west side of Runway 13/31 • Convert partial parallel Taxiway "G" from Runway 8/26 (Taxiway "F") • Square up Taxiway "A" from aircraft apron and Runway 35R
Apron	• No projects proposed for the existing east side apron • New west side apron development area
Hangars	• Redevelopment of T-Hangars on south side of airport • Add various sized corporate hangars on west side to coincide with proposed west side apron area
Lighting and Maintenance	• Maintain existing Beacon, AWOS, etc. • Enhance runway and taxiway lighting system
Fuel Storage	• No additional fuel tanks are necessary during the planning period
Automobile Parking	• Add and expand existing parking commensurate with terminal expansion
Ground Access	• Repair and improve east side access roads • Construct new north access road off Castro Avenue

COST ESTIMATES

Projects presented in the Recommended Development Plan involve many variables and phases. Costs associated with these projects usually include preliminary engineering, design, construction, and administration oversight. The lifecycle of east project will be determined by the type and associated complexity of each project. For instance, runway projects may involve many phases and detailed engineering plans will be scoped and estimated at the time of project implementation. Due to these variables, most estimates of costs are on a scale comparable to airports with similar types of projects and requirements. However, for planning purposes, these estimates are usually conservative to allow for adequate budgeting in future years.

In addition to raw material costs – other factors are usually rolled in to each project to give a total estimated cost to include the following:

- Preliminary Engineering Reports
- Design (usually estimated at 10% of construction costs)
- Construction including mobilization costs for contractors
- Construction Administration (usually estimates at 2% of construction costs)

Given the uncertainty of future material costs and other variables, most estimates also include 10% contingency buffer. When planning for projects as far as 20 years in the future this will help offset any errors or changes in pricing. Table 5-2 describes estimated total costs for projects included in the CIP. It should be noted the large FBO/MRO type hangars and west side development area have been included in the cost estimates for information purposes only. These hangars will most likely be built with private monies and exceeds the needs of the airport for this planning effort.

Table 5-2: Cost Estimates

Project Description	Design (10%)	Construction Admin (12%)	Construction	Total Construction	Total Project
Taxiway "D" Extension (connector between RWY 13/31 and RWY 17L/35R)	$154,865	$185,838	$1,548,646	$1,734,484	$1,889,348
Restripe/Remark RWY 17R	$6,924	$8,309	$69,240	$77,549	$84,473
Runway 13/31 extension and construct connecting Taxiway	$244,963	$293,955	$2,449,628	$2,743,583	$2,988,546
Convert RWY 8/26 to Taxiway "F"	$25,318	$30,382	$253,180	$283,562	$308,880
Square up southside of Taxiway "A"	$43,723	$52,468	$437,239	$489,707	$533,430
Construct Taxiway "G"	$167,131	$200,557	$1,671,312	$1,871,869	$2,039,001
Construct new northside airport entrance road	$68,000	$80,000	$680,000	$760,000	$830,000
RWY 13/31 Parallel Taxiway	$556,568	$667,882	$5,565,681	$6,233,563	$6,790,131
Construct southside 12-unit T-Hangar and associated roadway	$118,344	$142,013	$1,183,440	$1,325,453	$1,443,797
Access Taxiway for T-Hangar and Box Hangar Complex	$232,686	$279,223	$2,326,857	$2,606,080	$2,838,766
Construct Southside Corporate Box Hangar (120' x 125')	$282,071	$338,486	$2,820,713	$3,159,199	$3,441,270
Construct Mid-Field Corporate Hangar (65' x 125') and Associated Roadway	$273,958	$328,749	$2,739,578	$3,068,327	$3,342,285
Access Taxiway for Corporate Hangars	$236,001	$283,201	$$2,360,011	$2,643,212	$2,879,213
Construct Northside Corporate hangar (230' x 300') and associated roadway	$1,113,207	$1,335,848	$11,132,069	$12,467,917	$13,581,124
Construct Northside Corporate Hangar (195' x 180') and associated taxiway	$581,918	$698,302	$5,819,181	$6,517,483	$7,099,401
Construct Southside Corporate Hangar (315' x 195') and associated taxiway	$984,370	$1,181,244	$9,843,696	$11,024,940	$12,009,309
Construct Southside Corporate Hangar (205' x 225') and associated roadway	$732,487	$878,984	$7,324,867	$8,203,851	$8,936,338
Corporate Hangar Development Area	$3,948,900	$4,738,680	$30,801,420	$35,540,100	$39,489,000

PROJECT SCHEDULE

As detailed in the cost estimates, the anticipated funding needed to enact the airport master plan development will be substantial. This is not expected to be completed in a singular time frame and is included in a schedule and phased implementation. With a total of over $63 million in improvements, these must be done incrementally to remain financially feasible. Projects are broken down into phases below to help airport and municipal staff prioritize projects and plan accordingly. Certain projects may be shifted into other phases as needed depending on funding priority and user needs over the duration of the planning period.

Short Term – (Current to 5 years):

Projects listed in this phase are considered high priority and will need to be addressed soon after the adoption of the plan. As previously mentioned, this is dependent on funding levels. Access to the Runway 31 end is confusing and conflicts with the starting point for Runway 35R threshold. Shifting the Runway 31 end to the northwest along with a coinciding extension and new connector taxiway should help to eliminate further conflict. Changing the parameters of Runway 13-31 provides an ultimate length of 6,170 feet of usable runway compared to the existing footprint of 5,545 feet. Additionally, closing Runway 8-26 and converting it to a functional taxiway eliminates the need for aircraft to taxi on an active runway for access to Runway 17R or the Runway 13 ends. Based on the category change of Runway 8-26, the additional pavement associated with Runway 17R can be re-captured and utilized for extra take-off length to the south and landing length to the north. Overall length would increase from 3,224 feet to 3,666 feet. One key planning consideration is to note routine pavement and maintenance funding assistance from TxDOT Aviation is relegated to only two (2) runways at an airport. Any number over two (2) is the sole responsibility of the airport sponsor. Thus, it is important the airport decide which runways are most important to the operators of the airfield. The following projects are expected to occur in this planning period:

- Taxiway "D" Extension and Connector Taxiway
- Shift Runway 13-31 625' northwest; extend Runway 505 feet; Construct connecting taxiway
- Restripe / Remark Runway 17R
- Convert Runway 8-26 to Taxiway "F"
- Construct one (1) Southside 12-unit T-Hangar
- Access Taxiway for T-Hangar development

Mid-Term – (6 to 10 years):

This phase of the plan is usually the most difficult to project. Projects that do not get funded as planned in the first phase can fall into this timeline quite often. However, it is important to keep these in mind as development progresses on the airport to ensure proper sequential development. The squaring up of Taxiway "A" on the southside and construction of a new T-hangar within the new southside hangar development area should be a priority for the airport in this term. These projects solicit a need for Federal, State, and local dollar. Additionally, general routine pavement maintenance and lighting enhancements should be programmed on a 5-year basis to help ensure pavement and safety features are intact and up to date.

The following projects are expected to occur in this planning period:

- Square up southside of Taxiway "A"
- Construct Taxiway "G"
- Construct one (1) Southside 12-unit T-hangar

Long-Term – (11 to 20 years)

These projects are lumped into a ten-year period in the last part of the master plan horizon. These projects tend to be large scale and will include more development given the expected timeline. However, inherently, these projects also provide for the most flexibility as they are far into the future of the airport. Long-term capacity enhancements and development are shown and will be dependent on forecasted demand in the future. Airport pavement maintenance will continue to be provided, along with the addition of the full length parallel taxiway on the west side Runway 13-31, and the construction of various sized corporate type hangars. It should be noted that while most of the large hangars will be constructed with private or city funds, they are integral component in attracting operators and / or businesses to the field and provide a much-needed revenue source.

The following projects are expected to occur in this planning period:

- Continuous Routine Pavement Rehabilitation (runways, taxiways, and apron areas)
- Construct Parallel Taxiway to Runway 13-31
- Construct Northside Airport Entrance Road
- Construct one (1) Southside 12-unit T-hangar

Routine Maintenance Projects:

As airport infrastructure ages, routine maintenance will be required throughout the 20-year planning period including on-going pavement, lighting, NAVAID, and other projects. For runway, taxiway, and apron areas this includes pavement crack and seal or rehabilitation projects necessary to maintain a safe environment for aircraft operations. The airport will need to routinely assess the condition of the pavement and airside operational requirements such as marking and lighting to ensure sound operational condition. It has been identified in this master plan that the runways and taxiways will need rehabilitation during the planning period along with enhanced lighting, marking and signage. This will need to be rolled into in the CIP along with new capital projects.

The runways, taxiways and apron areas at Hondo are a vast undertaking to maintain. It will be important the airport stay active in the TxDOT Aviation Pavement Management Programs to help assist with managing the pavement and keeping track of airport pavement conditions. The Airport should take advantage of state grants in order to gain as much funding assistance for routine airport pavement maintenance as well as minor capital improvement projects.

Beyond Master Plan Horizon:

Certain development has been identified in future phases that may be included in subsequent master planning efforts. These phases are not expected to be completed in the 20-year planning horizon, however have been detailed to examine ultimate build-out potential of both the east and west side of the airfield. Development shown is largely hangar based that may be funded in part by local/private developers and could be expanded independently from the rest of the airport as required.

As previously mentioned, it is important to keep this long-range development in the plan as it may influence how development is expanded in the near team. Space will need to be preserved to allow for access taxiways that lead to the ultimate proposed development. Hangar development previously identified in the alternatives chapter and labeled on the Recommended Development Plan will include large hangar development areas with subsequent apron space.

5.2 Funding Sources

This section describes sources and eligibility criteria for funding programs the Airport may take advantage of to aid in the funding of future development projects. It is not guaranteed all funding sources will be available and used on airport projects, however lists the general options and funding criteria. During financial implementation of projects at the airport, all funding sources should be evaluated and coordinated with the appropriate funding source for eligibility.

FAA FUNDING

To promote the development of airports a comprehensive program was established to provide grants for airport under what is now the Airport Improvement Program (AIP). Established by the Airport and Airway Improvement Act of 1982, initial AIP provided funding legislation through fiscal year 1992. Since then, the AIP has been authorized and appropriated on a yearly basis. Funding for this program is generated from a tax on airline tickets, freight waybills, international departure fees, and a tax on aviation fuel. Currently, the approved funding level for AIP is approximately $3.35 Billion.

The FAA issues and administers AIP grants through its regional offices and airport district offices. The AIP provides up to 90 percent funding for AIP eligible project costs, with the airport sponsors being responsible for the remaining 10 percent share. AIP funding must be spent on FAA eligible projects as defined in FAA Order 5100.38 “Airport Improvement Program (AIP) Handbook.” In general, the handbook states:

- An airport must be in the currently approved National Plan of Integrated Airport Systems (NPIAS),
- AIP provides up to 90 percent federal funding for most eligible public-use airport improvements, and
- General aviation terminal buildings, T-hangars, and corporate hangars and other private-use facilities are not eligible for federal funding.

In addition, most revenue-producing items are not typically eligible for federal funding, and all eligible projects must be depicted on an FAA-approved Airport Layout Plan. Other sources of FAA funding include Facilities and Equipment (F&E) funding for facilities such as air traffic control towers and some runway instrumentation. This funding is separate from the AIP program and typically requires no local match.

STATE FUNDING

The Texas Department of Transportation (TxDOT) Aviation Division oversees grant funding for General Aviation and Reliever Airports in the state of Texas, known as a block grant state. Texas is one of 10 Block Grant states that allocate funding on behalf of the FAA. Funding is eligible for cities and counties to obtain and disburse federal and state funds for these airports included in the 300-airport Texas Airport System Plan (TASP).

AVIATION CAPITAL IMPROVEMENT PROGRAM (CIP)

The ACIP is a plan for general aviation airport development in Texas. This program details anticipated airport projects based on the projected funding levels of the FAA AIP program and the Texas Aviation Facilities Development Program. This multi-year program is amended annually and designed to give airport sponsors, the FAA, and TxDOT a realistic plan for potential projects including scope, cost, and schedule. However, inclusion of a project in the Aviation CIP is not a commitment for future funding; and will not guarantee that the project will be implemented during the year it is programmed. Continued justification and local sponsor cost share are determining factors in the timely implementation of these projects. Projects identified in the current year will go before the Texas Transportation Commission for approval prior to going out for proposals and funding. Most grant items funded through this program are a 90/10 cost share.

This program will fund the largest share of the airport's capital improvement needs over the duration of the master plan. Airport sponsors should consistently engage TxDOT Aviation staff on airport project needs for consideration in the ACIP.

RAMP PROGRAM

TxDOT Aviation Division also administers the Routine Airport Maintenance Program (RAMP), which matches local government grants (50/50) up to $50,000 for basic improvements such as parking lots, fencing, and other airside and landside needs. This program is aimed at assisting airports continue to provide quality services and infrastructure through an annual maintenance basis. Projects that may not be eligible under other funding sources may be used here after other obligations are met. The local government match is 50% of actual costs plus any excess of $100,000 total costs.

This program includes smaller budget airside and landside airport improvements such as:

- construction of airport entrance roads
- pavement of airport public parking lots
- installation of security fencing
- replacement of rotating beacon

TxDOT determines the eligibility of specific items and insists that airside improvements are secure before requesting assistance with landside maintenance and improvements.

TERMINAL PROGRAM

One additional program that TxDOT Aviation provides is specific to general aviation terminal buildings. Many airports across the state are in need of upgrading or new terminal facilities for pilot lounges, FBO facilities, and airport staff administration. This program assists airport sponsors with funding these buildings with a local share of 50% up to a state maximum contribution of $500,000.

SPONSOR FUNDING

The City of Hondo has a dedicated enterprise fund for the airport. The Airport Fund is approved annually through the city's budgeting process and funds are allocated to account for airport facilities operations and all activities necessary to provide services at the airport. As such, revenues collected by the airport such as lease rental income and other services are used to match expenses and match grant requirements. It is important to maximize revenues in order to continue to fund such activities with directly revenue generate from the airport. This fund will be critical to maintain in order to match future large capital improvement projects.

ALTERNATIVE FUNDING SOURCES

Often when traditional aviation funding sources are not eligible or have been expended, other local and alternative funding options should be considered. Innovative financial strategies can be evaluated with the support of local elected officials and the general public. In addition to traditional municipal debt services such as general bond elections, other funding sources may be applicable.

Texas Enterprise Fund - The Texas Enterprise Fund (TEF) is the largest fund of its kind in the nation. The fund is used as a final incentive tool for projects that offer significant projected job creation and capital investment and where a single Texas site is competing with another viable out-of-state option. This may be useful in attracting aeronautical companies to the airport from other states that will significantly impact the local and state economy.

State Financing - Texas is committed to facilitating funding for companies and communities with expansion and relocation projects in the state. Asset-based loans for companies, leveraged loans to communities, and tax-exempt bond financing are just a few means of obtaining the capital necessary for a successful project.

Tax Incentives – The state also offers a variety of tax incentives and innovative solutions for businesses expanding in or relocating to Texas. Programs include Enterprise Zone sales tax refunds, manufacturing sales tax exemptions, property tax value limitation, and “freeport” inventory tax exemptions.

In addition to possible funding sources mentioned above, there are federal programs that assist with workforce and job creation along with research and innovation. Partnerships with area universities and junior colleges may be an exciting way to involve education in the airports development goals.

5.3 Capital Improvement Program Summary

This program will not be solely funded by the airport sponsor. The cost estimates previously presented are broken down by phase and give an estimated cost share based on eligibility. Subject to approval and funding, the following cost estimates by project type are listed in Table 5.3.

Table 5-3: Project Cost Summary

Project Description	Total	Federal / State Share	Local / Private Share
Taxiway "D" Extension (connector between RWY 13/31 and RWY 17L/35R)	$1,889,400	$1,700,460	$188,940
Restripe/Remark RWY 17R	$84,500	$76,050	$8,450
Runway 13/31 extension and construct connecting Taxiway	$2,988,500	$2,689,650	$298,850
TXDOT RAMP	$100,000	$50,000	$50,000
Access Taxiway to T-Hangar Development Area	$2,938,800	$2,644,920	$293,880
Construct Southside 12-unit T-Hangar and associated roadway	$1,443,800	$1,299,420	$144,380
Convert RWY 8/26 to Taxiway "F"	$308,880	$277,992	$30,888
Short-Term Subtotal	$9,753,880	$8,738,492	$1,015,388
Square up Southside of Taxiwat "A"	$533,400	$480,060	$53,340
Construct Taxiway "G"	$2,039,000	$1,835,100	$203,900
Construct Southside 12-unit T-hangar and associated roadway	$1,443,800	$1,299,420	$144,380
TXDOT RAMP	$100,000	$50,000	$50,000
Intermediate-Term Subtotal	$4,116,200	$3,664,580	$451,620
Construct Northside Corporate hangar (230' x 300') and associated roadway	$6,790,100	$6,111,090	$679,010
Construct Northside Corporate Hangar (195' x 180') and associated taxiway	$1,443,800	$1,299,420	$144,380
Construct Southside Corporate Hangar (315' x 195') and associated taxiway	$100,000	$50,000	$50,000
Construct Southside Corporate Hangar (205' x 225') and associated roadway	$830,000	$747,000	$83,000
Corporate Hangar Development Area	$39,489,000	$35,540,100	$3,948,900
Long-Term Subtotal	$48,652,900	$43,747,610	$4,905,290
TOTAL	$62,522,980	$56,150,682	$6,372,298

SOURCE: KSA
Note: Estimates are rounded

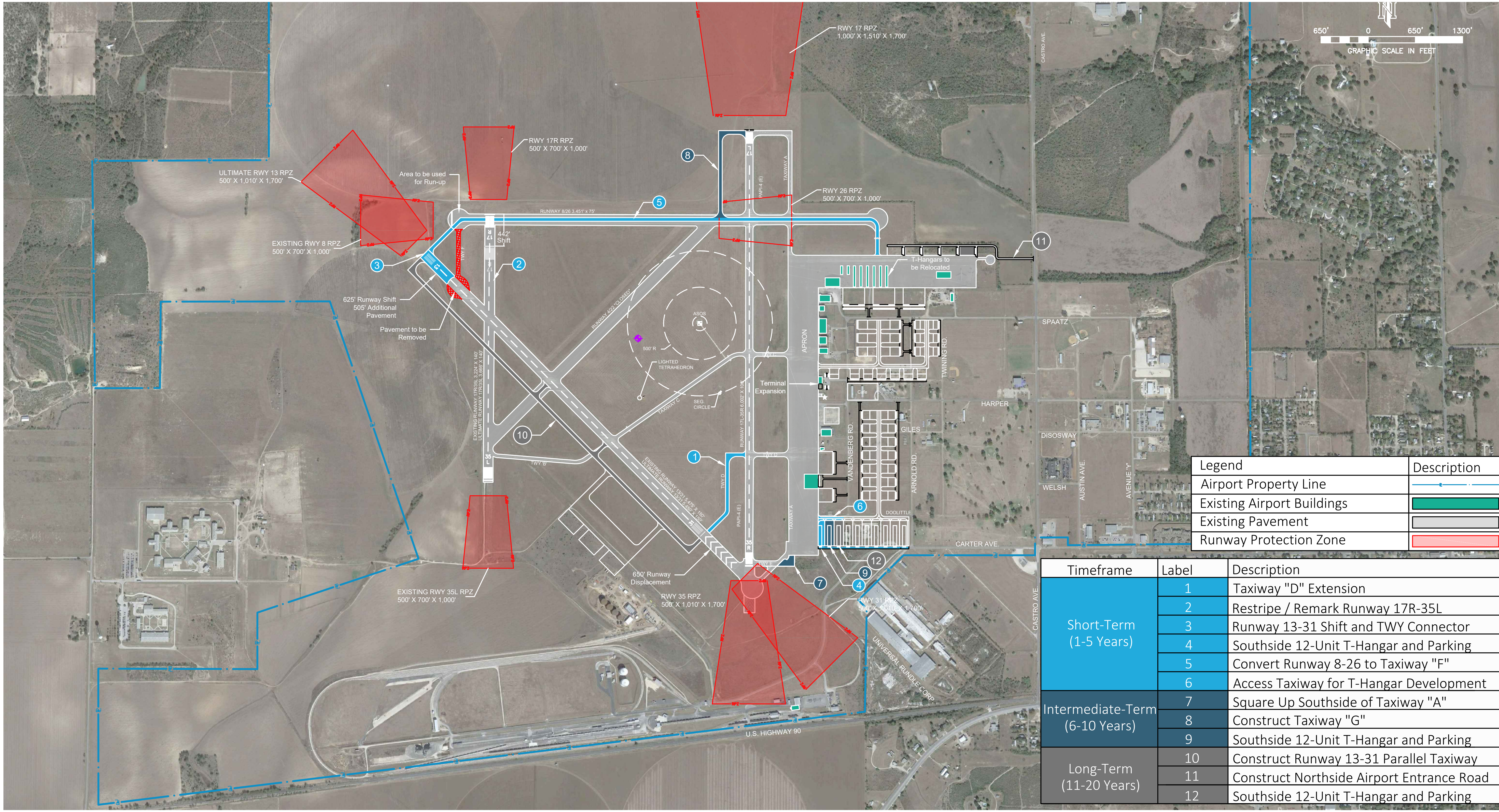
Of the local share, approximately $1 million is required during the short-term period, $451,000 during the intermediate-time period, and $4.9 million during the long-term period. Conversely, the federal / state share of projects is approximately $9.7 million in the short-term, $4.1 million in the intermediate time period, and $48 million in the long-term.

5.4 Phasing Plan

The cost estimates indicate the suggested phasing for projects during the short-, intermediate-, and long-range planning periods. The proposed improvements for each phase are illustrated graphically by time period. These are suggested schedules and variance from them will almost certainly be likely, particularly during latter time frames. Attention has been given to the first five years as being most critical, and the scheduled projects outlined in this time frame should be adhered to as much as possible. The demand for certain facilities and the economic feasibility of their development are the prime factors influencing the timing of individual project implementation. Care must be taken to provide for adequate lead-time for detailed planning and construction of facilities in an effort to meet aviation demands. Table 5-4 and Exhibit 5-1 presents the phasing plan.

Table 5-4: Phasing Plan

		Project Description	Justification	Total Cost
Short-Term (0-5 Years)	1	Taxiway "D" Extension (connector between RWY 13/31 and RWY 17L/35R)	$1,889,400	$1,700,460
	2	Restripe/Remark RWY 17R	$84,500	$76,050
	3	Runway 13/31 extension and construct connecting Taxiway	$2,988,500	$2,689,650
	4	Construct Southside 12-unit T-Hangar and associated roadway	$100,000	$50,000
	5	Access Taxiway for T-Hangar Development	$2,938,800	$2,644,920
	6	Convert RWY 8/26 to Taxiway "F"	$1,443,800	$1,299,420
Mid-Term (6-10 Years)	7	Square up southside of Taxiway "A"	$308,880	$277,992
	8	Construct Taxiway "G"	$9,753,880	$8,738,492
	9	Construct Southside 12-unit T-Hangar and associated roadway	$533,400	$480,060
Long-Term (11-20 Years)	10	Construct Taxiway "G"	$2,039,000	$1,835,100
	11	Construct Southside 12-unit T-hangar and associated roadway	$1,443,800	$1,299,420
	12	TXDOT RAMP	$100,000	$50,000



Legend	Description
Airport Property Line	
Existing Airport Buildings	
Existing Pavement	
Runway Protection Zone	

Timeframe	Label	Description
Short-Term (1-5 Years)	1	Taxiway "D" Extension
	2	Restripe / Remark Runway 17R-35L
	3	Runway 13-31 Shift and TWY Connector
	4	Southside 12-Unit T-Hangar and Parking
	5	Convert Runway 8-26 to Taxiway "F"
	6	Access Taxiway for T-Hangar Development
Intermediate-Term (6-10 Years)	7	Square Up Southside of Taxiway "A"
	8	Construct Taxiway "G"
	9	Southside 12-Unit T-Hangar and Parking
Long-Term (11-20 Years)	10	Construct Runway 13-31 Parallel Taxiway
	11	Construct Northside Airport Entrance Road
	12	Southside 12-Unit T-Hangar and Parking

South Texas Regional Airport at Hondo

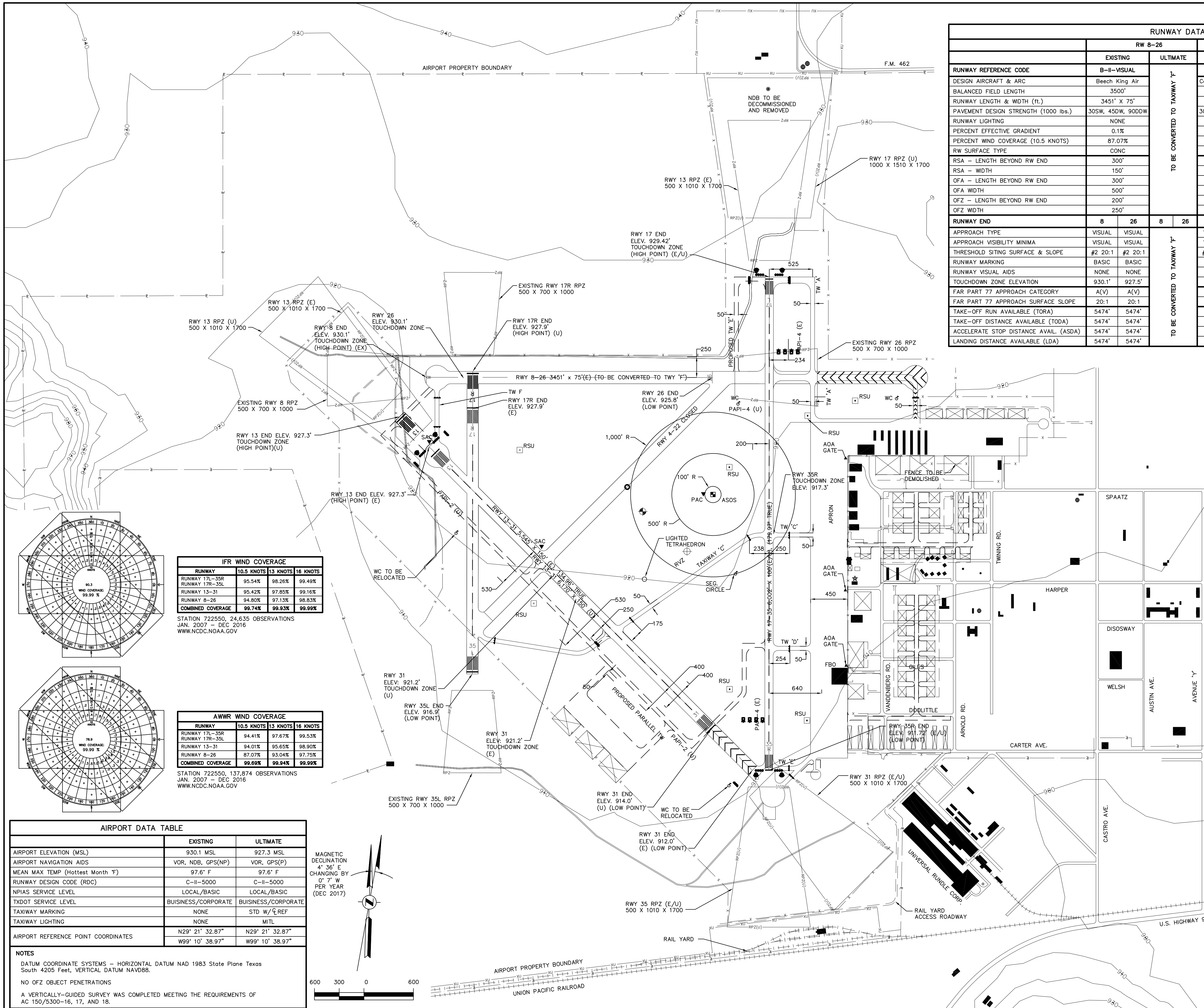
CIP Phasing Plan

6. Airport Layout Plan

As required by the FAA and TxDOT, an Airport Layout Plan (ALP) is prepared to graphically depict the airport environment and the subsequent recommendations for development described in the Airport Development Plan. Recommendations for airfield geometry and landside development are described in the following plan sheets:

1. Airport Layout Drawing
2. Terminal Area Drawing

These drawings were prepared in accordance with FAA Advisory Circular 150/5070-6B, FAA SOP 2.0, and TxDOT Aviation Standards.



RUNWAY DATA TABLE

	RW 8-26		RW 13-31		RW 17L-35R		RW 17R-35L	
	EXISTING	ULTIMATE	EXISTING	ULTIMATE	EXISTING	ULTIMATE	EXISTING	ULTIMATE
RUNWAY REFERENCE CODE	B-II-VISUAL	TO BE CONVERTED TO TAXIWAY "F"	C-II-VISUAL	C-II-VISUAL	C-II-5000	C-II-4000	B-II-VISUAL	B-II-4000
DESIGN AIRCRAFT & ARC	Beech King Air		Cessna Citation 560	Cessna Citation 560	Cessna Citation X	Cessna Citation X	Beech King Air	Beech King Air
BALANCED FIELD LENGTH	3500'		5169'	5169'	6000'	6000'	3500'	3500'
RUNWAY LENGTH & WIDTH (ft.)	3451' X 75'		5545' X 150'	6170' X 150'	6002' X 100'	6002' X 100'	3224' X 140'	3666' X 140'
PAVEMENT DESIGN STRENGTH (1000 lbs.)	30SW, 45DW, 90DDW		30SW, 45DW, 90DDW	30SW, 45DW, 90DDW	30SW, 45DW, 90DDW	30SW, 45DW, 90DDW	30SW, 45DW, 90DDW	30SW, 45DW, 90DDW
RUNWAY LIGHTING	NONE		NONE	MIRL	MIRL	MIRL	MIRL	MIRL
PERCENT EFFECTIVE GRADIENT	0.1%		0.3%	0.3%	0.3%	0.3%	0.3%	0.3%
PERCENT WIND COVERAGE (10.5 KNOTS)	87.07%		94.01%	94.01%	94.41%	94.41%	94.41%	94.41%
RW SURFACE TYPE	CONC		CONC	CONC	ASPH	ASPH	ASPH	ASPH
RSA - LENGTH BEYOND RW END	300'		1000'	1000'	1000'	1000'	300'	300'
RSA - WIDTH	150'		500'	500'	500'	500'	150'	150'
OFA - LENGTH BEYOND RW END	300'		1000'	1000'	1000'	1000'	300'	300'
OFA WIDTH	500'		800'	800'	800'	800'	500'	500'
OFZ - LENGTH BEYOND RW END	200'		200'	200'	200'	200'	200'	200'
OFZ WIDTH	250'		400'	400'	400'	400'	250'	400'

RUNWAY END	8	26	8	26	13	31	13	31	17	35	17	35	17	35	17	35
APPROACH TYPE	VISUAL	VISUAL	TO BE CONVERTED TO TAXIWAY "F"		VISUAL	VISUAL	VISUAL	VISUAL	GPS	GPS	GPS	GPS	VISUAL	VISUAL	VISUAL	VISUAL
APPROACH VISIBILITY MINIMA	VISUAL	VISUAL			VISUAL	VISUAL	VISUAL	VISUAL	VISUAL	VISUAL	VISUAL	VISUAL	VISUAL	VISUAL	VISUAL	VISUAL
THRESHOLD SITING SURFACE & SLOPE	#2 20:1	#2 20:1			#3 20:1	#3 20:1	#3 20:1	#3 20:1	#5 20:1	#5 20:1	#5 20:1	#5 20:1	#2 20:1	#2 20:1	#2 20:1	#2 20:1
RUNWAY MARKING	BASIC	BASIC			NPI	NPI	NPI	NPI	NPI	NPI	NPI	NPI	NPI	NPI	NPI	NPI
RUNWAY VISUAL AIDS	NONE	NONE			NONE	NONE	NONE	NONE	PAPI-4	PAPI-4	PAPI-4	PAPI-4	NONE	NONE	NONE	NONE
TOUCHDOWN ZONE ELEVATION	930.1'	927.5'			927.2'	921.2'	921.2'	921.2'	929.4'	917.3'	917.3'	917.3'	927.9'	927.6'	927.6'	927.6'
FAR PART 77 APPROACH CATEGORY	A(V)	A(V)			B(V)	B(V)	B(V)	B(V)	C	C	C	C	A(V)	A(V)	A(V)	A(V)
FAR PART 77 APPROACH SURFACE SLOPE	20:1	20:1			20:1	20:1	20:1	20:1	34:1	34:1	34:1	34:1	20:1	20:1	20:1	20:1
TAKE-OFF RUN AVAILABLE (TORA)	5474'	5474'			5545'	5545'	6170'	6170'	6002'	6002'	6002'	6002'	3224'	3224'	3666'	3666'
TAKE-OFF DISTANCE AVAILABLE (TODA)	5474'	5474'			5545'	5545'	6170'	6170'	6002'	6002'	6002'	6002'	3224'	3224'	3666'	3666'
ACCELERATE STOP DISTANCE AVAIL. (ASDA)	5474'	5474'			5545'	5545'	6170'	6170'	6002'	6002'	6002'	6002'	3224'	3224'	3666'	3666'
LANDING DISTANCE AVAILABLE (LDA)	5474'	5474'			5545'	5545'	6170'	6170'	6002'	6002'	6002'	6002'	3224'	3224'	3666'	3666'

RUNWAY END COORDINATES AND ELEVATIONS

RUNWAY END	LATITUDE	LONGITUDE	ELEVATION
EXISTING END OF RWY 8	29°21'50.53" N	99°11'05.70" W	930.10'
EXISTING END OF RWY 26	29°21'50.55" N	99°10'26.70" W	926.00'
EXISTING END OF RWY 13	29°21'42.18" N	99°11'05.83" W	927.30'
ULTIMATE END OF RWY 13	29°21'45.76" N	99°11'09.98" W	930.00'
EXISTING END OF RWY 31	29°21'03.39" N	99°10'21.50" W	912.00'
ULTIMATE END OF RWY 31	29°21'08.29" N	99°10'27.23" W	914.00'
EXISTING END OF RWY 17L	29°22'02.80" N	99°10'19.27" W	929.40'
EXISTING END OF RWY 35R	29°21'03.38" N	99°10'19.24" W	911.70'
EXISTING END OF RWY 17R	29°21'46.84" N	99°10'59.88" W	927.90'
ULTIMATE END OF RWY 17R	29°21'51.22" N	99°10'59.97" W	927.90'
EXISTING END OF RWY 35L	29°21'14.92" N	99°10'59.87" W	916.90'

LEGEND

	EXISTING	ULTIMATE
RUNWAY/TAXIWAY OUTLINE		
BUILDINGS/FACILITIES		
AIRPORT PROPERTY LINE		
AIRPORT PROPERTY LINE with FENCE		
AIRPORT REFERENCE POINT (ARP)		
WIND CONE AND SEGMENTED CIRCLE		
THRESHOLD LIGHTS		
C&G BEACON		
FENCE LINE		
TELEPHONE/POWER POLE LINE		
NONDIRECTIONAL BEACON (NDB)		
RWY END IDENTIFIER LIGHTS (REILS)		
PAPI		
BUILDING RESTRICTION LINE (BRL)		
GROUND CONTOURS		
SIGNIFICANT OBJECT LOCATION		
TREES/BRUSH		
ASOS		
HOLD POSITION AND SIGN		
SURVEY MARKERS		

IFR WIND COVERAGE

RUNWAY	10.5 KNOTS	13 KNOTS	16 KNOTS
RUNWAY 17L-35R RUNWAY 17R-35L	95.54%	98.26%	99.49%
RUNWAY 13-31	95.42%	97.85%	99.16%
RUNWAY 8-26	94.80%	97.13%	98.83%
COMBINED COVERAGE	**99.74%**	**99.93%**	**99.99%**

STATION 722550, 24,635 OBSERVATIONS
JAN. 2007 – DEC 2016
WWW.NCDC.NOAA.GOV

AWWR WIND COVERAGE

RUNWAY	10.5 KNOTS	13 KNOTS	16 KNOTS
RUNWAY 17L-35R RUNWAY 17R-35L	94.41%	97.67%	99.53%
RUNWAY 13-31	94.01%	95.65%	98.90%
RUNWAY 8-26	87.07%	93.04%	97.75%
COMBINED COVERAGE	**99.69%**	**99.94%**	**99.99%**

STATION 722550, 137,874 OBSERVATIONS
JAN. 2007 – DEC 2016
WWW.NCDC.NOAA.GOV

AIRPORT DATA TABLE

	EXISTING	ULTIMATE
AIRPORT ELEVATION (MSL)	930.1 MSL	927.3 MSL
AIRPORT NAVIGATION AIDS	VOR, NDB, GPS(NP)	VOR, GPS(P)
MEAN MAX TEMP (Hottest Month °F)	97.6° F	97.6° F
RUNWAY DESIGN CODE (RDC)	C-II-5000	C-II-5000
NPIAS SERVICE LEVEL	LOCAL/BASIC	LOCAL/BASIC
TXDOT SERVICE LEVEL	BUISINESS/CORPORATE	BUISINESS/CORPORATE
TAXIWAY MARKING	NONE	STD W/ ℄ REF
TAXIWAY LIGHTING	NONE	MITL
AIRPORT REFERENCE POINT COORDINATES	N29° 21' 32.87"	N29° 21' 32.87"
	W99° 10' 38.97"	W99° 10' 38.97"

NOTES

DATUM COORDINATE SYSTEMS – HORIZONTAL DATUM NAD 1983 State Plane Texas South 4205 Feet, VERTICAL DATUM NAVD88.

NO OFZ OBJECT PENETRATIONS

A VERTICALLY-GUIDED SURVEY WAS COMPLETED MEETING THE REQUIREMENTS OF AC 150/5300-16, 17, AND 18.

REV	DESCRIPTION	DATE	APPROVED

TEXAS DEPARTMENT OF TRANSPORTATION AVIATION DIVISION

ALP APPROVED ACCORDING TO FAA AC 150/5300-13 CHANGE 16 PLUS THE REQUIREMENTS OF A FAVORABLE ENVIRONMENTAL FINDING AND FAA NRA STUDY PRIOR TO THE START OF ANY LAND ACQUISITION OR CONSTRUCTION ON AIRPORT PROPERTY.

DAVID FULTON, DIRECTOR, AVIATION DIVISION — DATE

AIRPORT SPONSOR

CURRENT AND FUTURE DEVELOPMENT DEPICTED ON THIS ALP IS APPROVED AND SUPPORTED BY AIRPORT SPONSOR

SPONSOR ACKNOWLEDGES APPROVAL OF ALP BY TXDOT DOES NOT CONSTITUTE A COMMITMENT TO FUNDING.

SIGNATURE — DATE

TITLE, AIRPORT SPONSOR'S REPRESENTATIVE

PREPARED BY:
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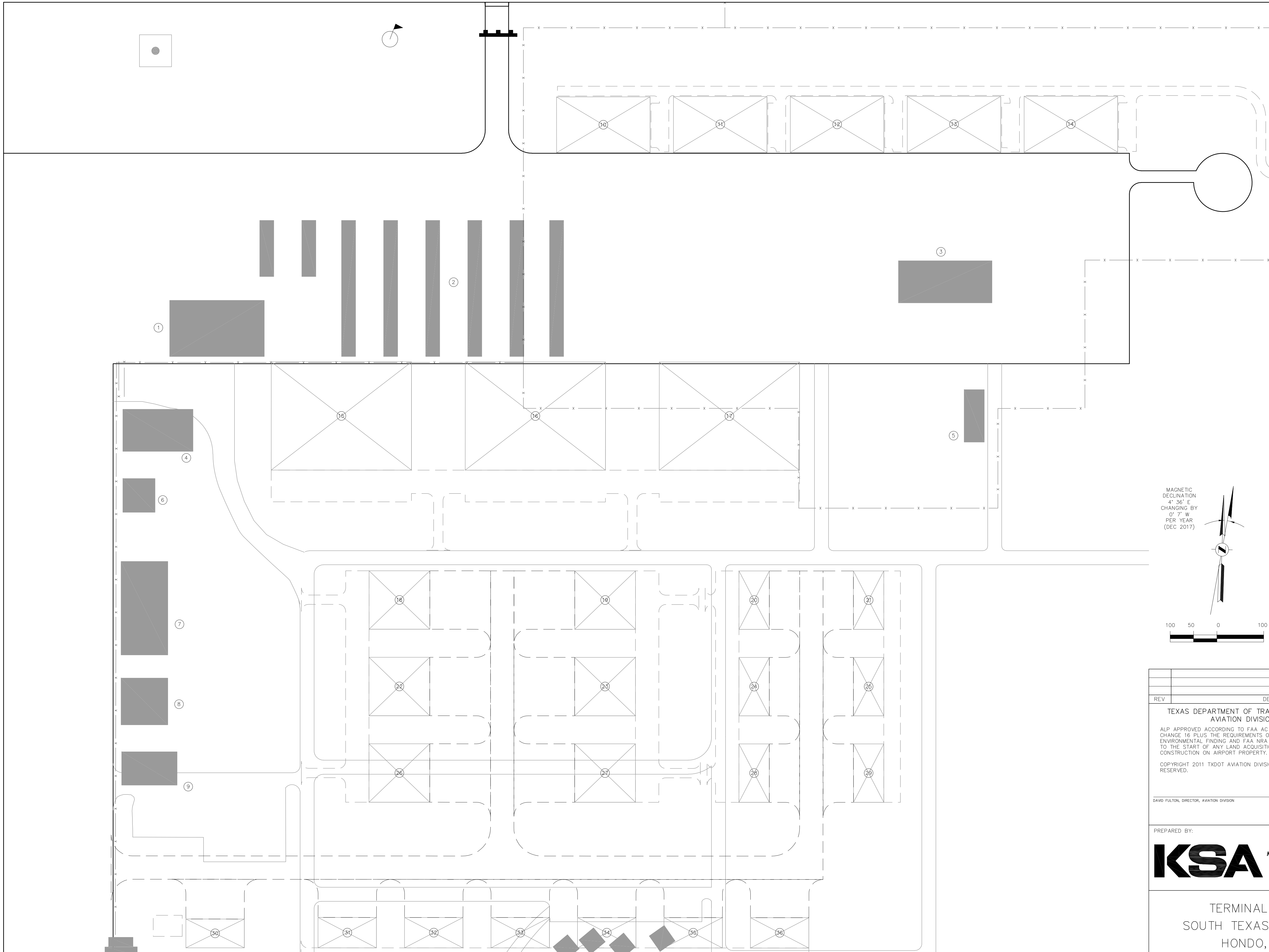
F.972-542-6750
www.ksaeng.com

M MALLONEE — SEPTEMBER 2017
DESIGNED BY — DATE

C MOERI — SEPTEMBER 2017
DRAWN BY — DATE

AIRPORT LAYOUT DRAWING
SOUTH TEXAS REGIONAL AIRPORT
HONDO, TEXAS (HDO)

Texas Department of Transportation
Aviation Division



BUILDING TABLE			
BUILDING NUMBER	DESCRIPTION: EXISTING	DESCRIPTION: ULTIMATE	TOP ELEVATION
1	–	–	0'
2	T-HANGARS	–	0'
3	–	–	0'
4	–	–	0'
5	–	–	0'
6	–	–	0'
7	–	–	0'
8	–	–	0'
9	–	–	0'
10	–	CORPORATE BOX HANGAR	0'
11	–	CORPORATE BOX HANGAR	0'
12	–	CORPORATE BOX HANGAR	0'
13	–	CORPORATE BOX HANGAR	0'
14	–	CORPORATE BOX HANGAR	0'
15	–	COMMERCIAL/MRO HANGAR	0'
16	–	COMMERCIAL/MRO HANGAR	0'
17	–	COMMERCIAL/MRO HANGAR	0'
18	–	CORPORATE BOX HANGAR	0'
19	–	CORPORATE BOX HANGAR	0'
20	–	CORPORATE BOX HANGAR	0'
21	–	CORPORATE BOX HANGAR	0'
22	–	CORPORATE BOX HANGAR	0'
23	–	CORPORATE BOX HANGAR	0'
24	–	CORPORATE BOX HANGAR	0'
25	–	CORPORATE BOX HANGAR	0'
26	–	CORPORATE BOX HANGAR	0'
27	–	CORPORATE BOX HANGAR	0'
28	–	CORPORATE BOX HANGAR	0'
29	–	CORPORATE BOX HANGAR	0'
30	–	CORPORATE BOX HANGAR	0'
31	–	CORPORATE BOX HANGAR	0'
32	–	CORPORATE BOX HANGAR	0'
33	–	CORPORATE BOX HANGAR	0'
34	–	CORPORATE BOX HANGAR	0'
35	–	CORPORATE BOX HANGAR	0'
36	–	CORPORATE BOX HANGAR	0'

REV	DESCRIPTION	DATE	APPROVED

TEXAS DEPARTMENT OF TRANSPORTATION AVIATION DIVISION

ALP APPROVED ACCORDING TO FAA AC 150/5300-13 CHANGE 16 PLUS THE REQUIREMENTS OF A FAVORABLE ENVIRONMENTAL FINDING AND FAA NRA STUDY PRIOR TO THE START OF ANY LAND ACQUISITION OR CONSTRUCTION ON AIRPORT PROPERTY.

DAVID FULTON, DIRECTOR, AVIATION DIVISION — DATE

AIRPORT SPONSOR

CURRENT AND FUTURE DEVELOPMENT DEPICTED ON THIS ALP IS APPROVED AND SUPPORTED BY AIRPORT SPONSOR

SPONSOR ACKNOWLEDGES APPROVAL OF ALP BY TXDOT DOES NOT CONSTITUTE A COMMITMENT TO FUNDING.

SIGNATURE — DATE

TITLE, AIRPORT SPONSOR'S REPRESENTATIVE

PREPARED BY:

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McKinney, Texas 75070
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F.972-542-6750
www.ksaeng.com

M MALLONEE — SEPTEMBER 2017
DESIGNED BY — DATE

C MOERI — SEPTEMBER 2017
DRAWN BY — DATE

TERMINAL AREA DRAWING
SOUTH TEXAS REGIONAL AIRPORT
HONDO, TEXAS (HDO)

Texas Department of Transportation
Aviation Division

APPENDIX A: SWOT ANALYSIS

City of Hondo
1600 Avenue M., Hondo Texas 78861
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APPENDIX A: SWOT Analysis

A key component at the outset of the airport development plan is a Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis. The SWOT analysis is performed to determine the internal and external influences on the operation and management of the airport as well as factors that may affect how the development plan is driven. This exercise will help determine areas of focus and identify the vision for the South Texas Regional Airport in the future, forming the framework for the development planning process.

Understanding the primary objective of the SWOT is important to produce tangible, identifiable, focus areas for the airport objectives. In this case, it applies to improving the airport's services, development areas, and key market drivers. As previously mentioned, SWOT stands for strengths, weaknesses, opportunities and threats. In order to accurately determine how to apply factors in each category, we must first understand each factor.

Internal Factors: These factors are the most easily understood in most SWOT analysis because they are internal to the business/entity. The airport can (even if indirectly) control most of these factors and are directly related to the airport. When determining initial action items related to a SWOT, these internal factors can be prioritized and easily influenced by direct airport action. For example, if an airport has identified that airport staffing levels are a weakness they may be able to directly change the factor by adding staff.

- Strengths: These are the characteristics of the airport that give it an advantage over others or are perceived by customers as a positive asset. We must first understand what gives the airport an advantage.

- Weaknesses: Similar to strengths, these are the characteristics that may be limiting the success of the airport. These may be perceived as negative aspects or areas of needed improvement compared to others. These may be one of the most important aspects of creating a successful SWOT analysis and are usually the basis for improvement moving forward.

External Factors: It is important to note that these external factors present the environment for which the airport is operating within. Therefore, many of these factors can't be directly changed by the airport but influence how the objectives of the airport may be impacted.

- Opportunities: After clearly identifying what the airport's strengths and weaknesses are, the sponsor must identify opportunities that can help growth the success of the airport. These factors serve as a catalyst to improve upon the airport and help realize future goals.

- Threats: The last element in the analysis is the potential pitfalls or competitive disadvantages that may arise in the implementation of previously identified opportunities. This will ensure a reality based business approach for achieving the goals set forth in the analysis.

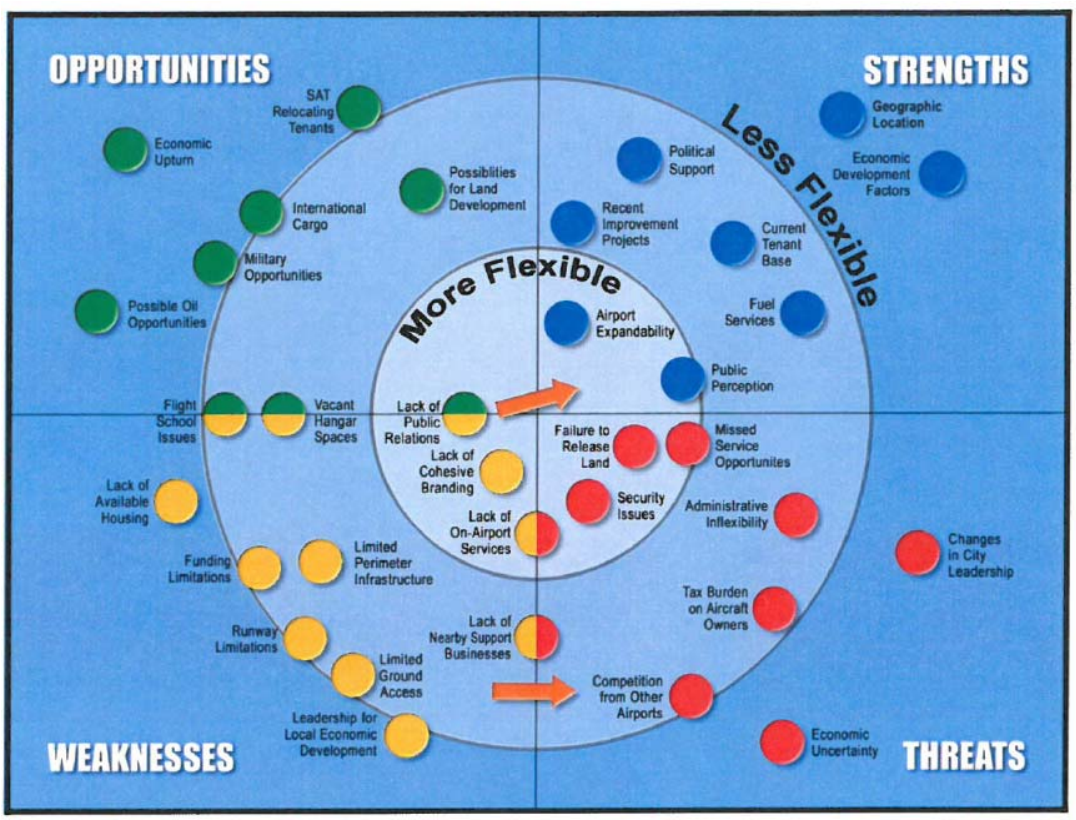
Identifying SWOT factors is extremely important and can be applied to airports just as with any other business enterprise. In fact, most municipally owned and operated airports greatly benefit if the management and governance of the airport is influenced by business approaches such as a SWOT analysis. Often, new revenue streams, market opportunities, and partnership are realized by results of a SWOT. When combined with an airport planning exercise, the results of a SWOT can expedite the implementation of the plan.

1.1 Previous SWOT Analysis

The airport last undertook a SWOT analysis in 2012 during the development of the Airport Business Plan. For this exercise, the participants provided a new perspective and benchmarked results against the previous analysis. By comparing the two results over a period of time the airport can gauge how well it has performed in recent years to influence change based in the input from the previous SWOT.

The results of the previous SWOT are in the Exhibit below.

Exhibit A-1: 2012 SWOT Results



1.2 SWOT Framework

There is no right or wrong way to conduct a SWOT analysis. The goal is to be engaging, diverse, and thorough. Brainstorming issues in each key area is a positive way to get thoughts and ideas down on paper that can be put in perspective. In this exercise, participants are encouraged to come up with as many ideas as possible even though they may apply in multiple areas in the SWOT.

This analysis was conducted by participants in the Planning Advisory Committee from the outset of the development plan timeline. The project team intends to use this information as a baseline for moving ahead with the development plan recommendations.

Once ideas are documented, A SWOT diagram can be made in various shapes and sizes to help articulate the thoughts of the exercise. This diagram is helpful in organizing thoughts and visualizing the strengths, weaknesses, opportunities, and threats. Only after quantifying these and putting them into the diagram can focus and priority be given to improvement and capitalizing on these. When adding strengths and weaknesses, one must always keep in mind that they are internal factors that are generally easy to identify. Factors can vary significantly depending on the purpose of the business venture and consequent SWOT analysis.

1.2.1 MISSION/VISION STATEMENTS

Part of the SWOT analysis for the airport development plan will be to create a mission and vision statement for South Texas Regional Airport. This is a complimentary component and is derived as a result of identifying factors of the SWOT. It is helpful for defining goals and objectives while better understanding the current role of the airport. In order to best define these, we need to understand the difference and intent in each statement.

Mission Statement. Mission statements should define the airport's current role and services. What is the airport dedicated to providing? What do you want customers to know about South Texas Regional Airport? Characteristics of the mission statement include:

- Purpose – this should clearly define the purpose of the entity
- Target Market – define who the airport is intended to serve
- Services – clearly communicate the services the airport provides and how this may be attractive to the target market

The following Mission Statement was adopted as part of the 2012 Business Plan:

Mission Statement: It is the mission of South Texas Regional Airport to serve as an engine for economic development in the Hondo area, providing operational safety; outstanding service; and a secure environment for aircraft owners, operators, and the flying public.

Vision statement. Vision statements are intended to set goals and objectives for the airport while visualizing the future of the facility. Also one sentence statements, they should focus on attainable and tangible goals that will embody the hopes of the airport sponsor. Ideally, a vision statement should help lead decision making processes along the way and focus internal direction toward the vision. Typical characteristics of the vision statement should be:

- Concise - this will help resonate and stick with audience
- Understandable - defines a clear and understood goal
- Forward Focused - focused on action in the future, not current conditions
- Motivational - inspires staff and drives innovation
- Challenging - not easily achieved in order to provide high expectations
- Abstract - broad in nature to encompass a majority of the business objectives and services

Example Vision Statement: In 2040, South Texas Regional Airport will be the premier general aviation facility in Greater San Antonio dedicated to serving the needs of a diverse and growing aeronautical market.

1.3 SWOT Results Matrix

The following results were compiled from stakeholders on the Planning Advisory Committee conducted on June 7, 2017. These are intended to be a list of the most applicable factors in each of the SWOT areas and not an exhaustive list of all possible factors.

Figure A.2: SWOT Results Matrix

Positive | *Negative*

Internal

Strengths

- Available Land and Dev. Property
- Multiple Runways
- Instrument Approach Capability
- State Funding Support
- Active EDC
- Terminal Building
- Automated Weather (ASOS)
- Supportive City Council
- Airport Staff and Management
- Comptetive Fuel Prices
- Recent Policy Documents

Weaknesses

- Lack of available cash/revenue
- Aginng underground utilities
- Lack of full perimeter fencing and security
- Terminal building location, size,
- No FBO or other major services
- Lack of runway length for jet aircraft

External

Opportunties

- Proximity to San Antonio Market
- MRO/Avionics Speciality
- Hangar Wait List (Demand)
- Overflight Fuel Stops
- Airport Events (STOL Roundup)
- Cross Marketing with EDC
- P3 Partnerships
- Niche On-Demand Air Service

Threats

- ATC Privatization
- Land Release Pressure
- Public Perception
- Funding Uncertainty
- Competition from San Antonio Market Airports
- Political Turnover/Change
- Drone Usage/Conflicts

APPENDIX B: BUILDING INVENTORY

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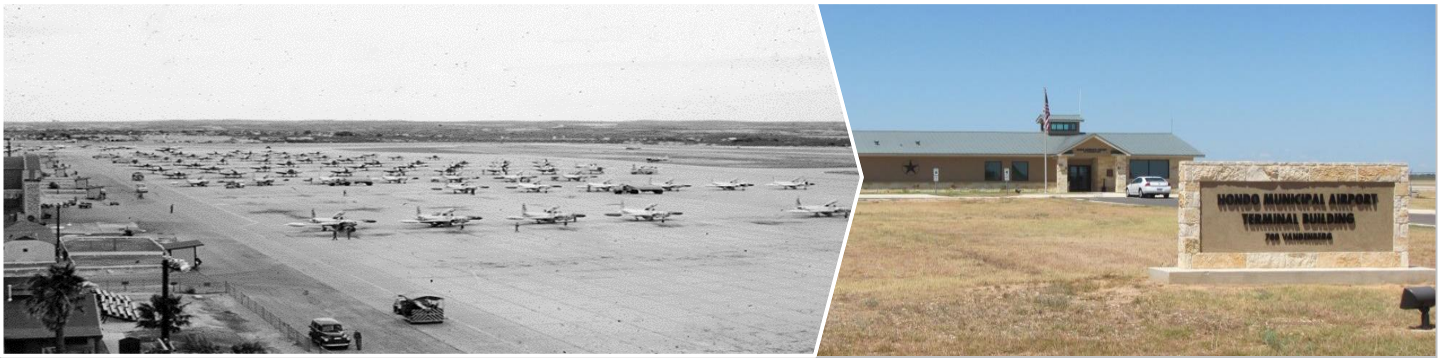

APPENDIX B: Building Inventory

	BLDG. NUMBER	DETAIL	CONDITION	APPROX. SQ. FT.
	A1	T-Hangar	Fair	8,730
	A2	T-Hangar	Fair	8,730
	A3	Share Hangar	Fair	8,730
	A4	T-Hangar	Fair	8,730
	A5	T-Hangar	Fair	8,730

	A6	T-Hangar	Fair	8,730
	A7	Shade Hangar	Fair	3,600
	A8	T-Hangar	Fair	3,600
	A9	Hondo Aerospace	Good	24,275
	A10	Corporate/Box Hangar	Good	13,500
	A11	Private Box Hangar	Good	5,000
	A12 & A13	Corrigan Air Center	Good	20,000 & 10,000

	A14	Box Hangar	Good	8,500
	A15	General Aviation Terminal	Good	5,160
	A16	Rizojet Avionics	Fair	12,600
	A17	Rayneke Aviation	Fair	2,075
	A18	Large MRO Hangar	Fair	38,600
	A19 & A20	MRO Hangar Facility	Fair	18,000 & 4,825