Chapter 2 – Airport Inventory

Introduction

As the initial step in the airport planning program, the inventory is a systematic data collection process that provides an understanding of past and present aviation factors associated with Abilene Regional Airport (ABI). A comprehensive inventory, including the following major inventory tasks, is used to form the basis for airport recommendations throughout the Airport Master Plan.

- An on-site inspection on July 11th and 12th, 2017 to inventory of airport facilities, equipment, and services to assess existing physical conditions.
- Discussions with Airport and local officials, airline personnel, Fixed Base Operators (FBO) staff, and other airport tenants regarding recent airport trends, operations, and services.
- The collection of airport activity data, project records, and aeronautical background information; a review of historical airport information, previous airport layout plans, maps, charts, and photographs of airport facilities; and a records search and review of local airport-related ordinances, policies, operating standards, and lease agreements.
- The collection of regional, county, city and airport development information to understand regional economic conditions and to determine the surrounding airport service area characteristics.
- Review of current and planned on and off-airport land use development and property information, including surrounding land use patterns, existing and proposed transportation developments, infrastructure, and utilities.
- The collection of regional climatic information, including predominant winds, cloud and visibility conditions, and precipitation levels.

Airport Ownership

ABI is managed and operated by a division of the City of Abilene Transportation Services Department. The division has 26 staff members in total. The Director of Transportation Services Department reports to an Assistant City Manager and the City Manager for the City of Abilene. All major decisions regarding capital improvements and future development plans for ABI are reviewed and approved by the Airport Development Board and the Abilene City Council.

History of the Airport

The current Abilene Regional Airport was officially activated in November 1953. When it opened, it had two runways:

- Runway 4/22 – 3,679 ft. x 100 ft. (still present on the airfield)
- Runway 18/36 which was 5,400 x 100 ft. (present site of Runway 17R/35L)

The original terminal facility was located along present-day Navajo Circle on the north end of the existing ABI complex. In 1967, the City of Abilene passed a major bond election that funded a number of improvements to the airport including the construction of a portion of the existing terminal building as well as other major improvements to the community such as the Civic Center. ABI has had airline service come and go throughout its history from a number of airlines including American Airlines/American Eagle (currently operating at ABI), Pioneer Airlines, Trans-Texas Airways, and the Frontier Airlines. Prior to the opening of ABI, the City of Abilene and Taylor County were served by a smaller airport just north of ABI called Abilene Municipal Airport. Remnants of the old airport can still be seen on aerial photographs to the north of ABI.

Historic CIP/Current CIP Projects

Table 2-1, *Historic Airport Projects with Funding Assistance*, shows the airport's development history that involved funding assistance through the FAA's Airport Improvement Program (AIP). According to records, since 2005, the airport has received $78,197,510 from the FAA for various improvement and rehabilitation projects.

Table 2-1
Historic Airport Projects with Funding Assistance

Year	AIP Funds	Project Description
2005	$3,892,010	Extend Taxiway, Improve Terminal Building , Rehabilitate Apron, Rehabilitate Apron, Rehabilitate Taxiway
2006	$4,255,076.00	Improve Terminal Building , Rehabilitate Apron, Rehabilitate Apron , Rehabilitate Runway Lighting - 17L/35R
2007	$3,264,795.00	Rehabilitate Runway Lighting - 17L/35R, Rehabilitate Apron
2008	$5,205,547.00	Improve Terminal Building , Rehabilitate Runway Lighting - 17R/35L, Rehabilitate Apron , Rehabilitate Taxiway
2009	$6,199,838.00	Rehabilitate Runway Lighting - 17R/35L, Rehabilitate Apron , Rehabilitate Taxiway
2010	$6,399,652.00	Rehabilitate Airport Beacons, Rehabilitate Taxiway, Acquire Aircraft Rescue & Fire Fighting Vehicle, Rehabilitate Apron, Wildlife Hazard Assessments, SRE Building
2011	$6,562,967	Rehabilitate Taxiway , Rehabilitate Taxiway
2012	$6,336,181	Conduct Miscellaneous Study , Rehabilitate Taxiway
2013	$8,597,558	Rehabilitate Runway 17L/35R , Rehabilitate Taxiway
2014	$8,647,266	Rehabilitate Runway - 17L/35R, Rehabilitate Runway - 17R/35L
2015	$17,602,598	Rehabilitate Runway - 17R/35L
2016	$1,234,022	Rehabilitate Taxiway [Taxiways C, C1, C2, C3, S and T], Rehabilitate Taxiway [Taxiways D, D1, D2 and D3], Rehabilitate Taxiway [Taxiways M, N and P], Security Enhancements, Update Airport Master Plan Study

Source: FAA AIP Database

Airport Role Description

The ABI role is well documented in the FAA's National Plan of Integrated Airport System (NPIAS) and the Texas Airport System Plan (TASP). Highlights include:

- Designated as one of 26 "Primary Commercial Service" airports in the TASP.
- Designated as one of 249 primary commercial service "non-hub" airports in the NPIAS.

The NPIAS defines primary non-hub airports as those that receive less than .05% but more than 10,000 of the annual U.S. commercial enplanements. In 2016, ABI had 84,073 enplanements.

Beyond the NPIAS and the TASP, the FAA identifies design standards for airports and their operating pavements based on FAA Advisory Circular (AC) 150/5300-13 (current edition), *Airport Design*. Pavement categorization is provided for runways through the runway design code (RDC) while taxiway pavements are designated separately through the taxiway design group (TDG). The RDC is defined by three variables: aircraft approach category (AAC), the airplane design group (ADG), and instrument approach procedure (IAP) visibility minimums. Previously, the Airport Reference Code (ARC) and runway design were not classified based on IAP minimum visibilities. **Table 2-2** defines the AAC, **Table 2-3** documents the ADG, and **Table 2-4** describes the various possibilities defining visibility minimums for IAPs.

Table 2-2
Aircraft Approach Category (AAC)

AAC	V_{REF}/Approach Speed [1]
A	Approach speed less than 91 knots
B	Approach speed 91 knots or more but less than 121 knots
C	Approach speed 121 knots or more but less than 141 knots
D	Approach speed 141 knots or more but less than 166 knots
E	Approach speed 166 knots or more

Source: FAA Advisory Circular 150/5300-13 (current edition***),*** *Airport Design*
[1] V_{REF} = Landing Reference Speed or Threshold Crossing Speed

Table 2-3
Airplane Design Group (ADG)

Group #	Tail Height (ft [m])	Wingspan (ft [m])
I	< 20' (< 6 m)	< 49' (< 15 m)
II	20' - < 30' (6 m - < 9 m)	49' - < 79' (15 m - < 24 m)
III	30' - < 45' (9 m - < 13.5 m)	79' - < 118' (24 m - < 36 m)
IV	45' - < 60' (13.5 m - < 18.5 m)	118' - < 171' (36 m - < 52 m)
V	60' - < 66' (18.5 m - < 20 m)	171' - < 214' (52 m - < 65 m)
VI	66' - < 80' (20 m - < 24.5 m)	214' - < 262' (65 m - < 80 m)

Source: FAA Advisory Circular 150/5300-13 (current edition***),*** *Airport Design*

Table 2-4
Visibility Minimums

RVR (ft) *	Instrument Flight Visibility Category (statute mile)
5000	Not lower than 1 mile
4000	Lower than 1 mile but not lower than ¾ mile
2400	Lower than 3/4 mile but not lower than 1/2 mile
1600	Lower than 1/2 mile but not lower than 1/4 mile
1200	Lower than 1/4 mile

Source: FAA Advisory Circular 150/5300-13 (current edition), Airport Design
* Runway Visual Range (RVR) values are not exact equivalents

Based on the application of FAA airport design criteria, a review of the existing facilities, and the current Airport Layout Drawing (ALD), ABI is a Commercial Service Airport with a runway design

code (RDC) of C-IV-2400. This designation is consistent with the types of aircraft using the airfield and the instrument approach procedures (IAP) serving ABI.

Inventory of Existing Airport Facilities

This section provides an overview of ABI's existing facilities in the following areas:

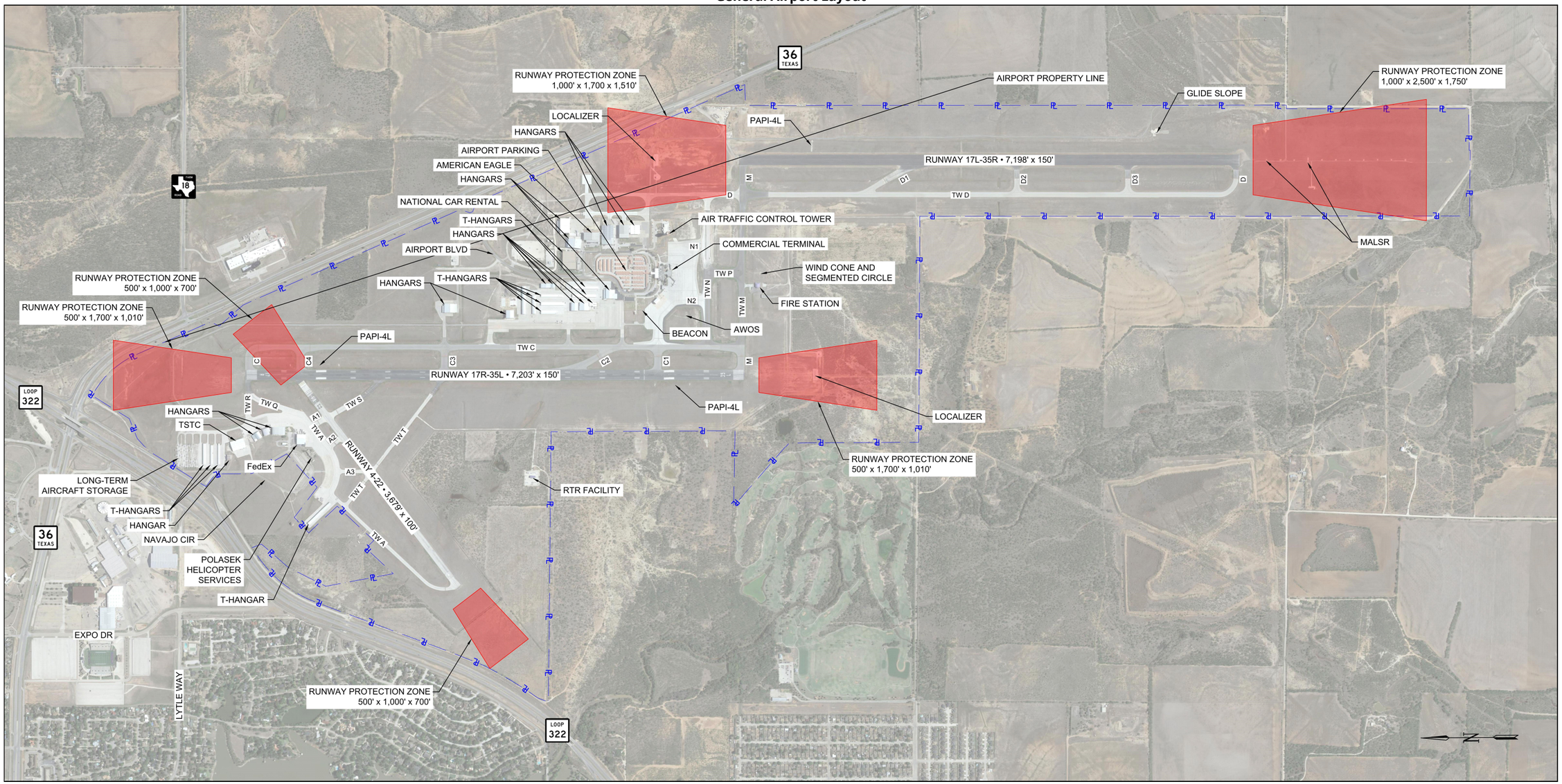
- Airfield
- Terminal
- General Aviation Facilities
- Aircraft Maintenance Facilities
- Cargo Facilities
- Landside Facilities
- Support Facilities
- Potential Future Development Sites

ABI's campus is approximately 1,634 acres in total. As shown in **Figure 2-1**, *General Airport Layout,* ABI currently has 3 runways, a passenger terminal facility, parking facilities, and several large general aviation development areas on the airfield.

Airfield Facilities

Airfield inventory summarizes ABI's existing airfield facilities including the runways, taxiways, ramp/apron areas, Navigational Aids (NAVAIDs), instrument approaches, weather facilities, and airfield marking/lighting/signage. During the Strengths, Weaknesses, Opportunities, and Threats (SWOT) analysis conducted at the beginning of this project, ABI's airfield facilities were highlighted as a major "strength" of the airport.

Figure 2-1
General Airport Layout



Source: Garver, 2017

Runways

ABI has 3 runways. Runway 17L/35R and 17R/35L are parallel runways (3,100 ft. apart) and are both certified for air carrier use. Runway 4/22 is a General Aviation (GA) only runway. **Table 2-5,** *Runway Description,* provides a summary of ABI's runway facilities.

Table 2-5
Runway Description

Item	Runway 04/22	Runway 17L/35R	Runway 17R/35L
Length (feet)	3,679	7,198	7,203
Width (feet)	100	150	150
Surface Material	Asphalt	Asphalt/GRVD	Asphalt/GRVD
Weight Bearing Capacity (pounds)			
Single Wheel Gear (S)	30,000	85,000	85,000
Dual Wheel Gear (D)	60,000	160,000	160,000
Dual Tandem (2D)	N/A	160,000	160,000
PCN	5 /F/D/X/T	57 /F/C/X/T	61 /F/C/X/T
Markings	Non-Precision Instrument	Precision Instrument	Non-Precision Insturment
Runway Lighting	MIRL	HIRL	HIRL
Approach Lighting Sys.	None	MALSR at 35R end	REILs at 35L end
Vertical Guidance Slope Indicators	None	P4L at 17L end	P4L at both ends
Other Visual Aids	None	Lighted Windcone at RWY 35R end	Lighted Windcone at RWY 17R end
Runway RSA	150 ft. x 300 ft.	500 ft. x 1,000 ft.	500 ft. x 1,000 ft.
Runway OFA	500 ft. x 300 ft.	800 ft. x 1,000 ft	800 ft. x 1,000 ft.
Runway OFZ	400 ft. x 200 ft.	400 ft. x 200 ft.	400 ft. x 200 ft.
Instrument Approach Aids	None	ILS for RWY 35R	LOC for RWY 17R
Weather Reporting Aids	ASOS	ASOS	ASOS
Runway Visual Range (RVR)	None	1 - Touchdown Zone RWY 35R	None
Runway Design Code (RDC)	B-II-5,000	C-IV-2,400	C-IV-5,000

Source: FAA 5010 Form for ABI, AC 150/5300-13, Instrument Approach Charts

Runway 17R/35L

Runway 17R/35L is ABI's primary air carrier runway as it is the most frequently used runway. The runway is 7,203 ft. x 150 ft. and is constructed of asphalt. A Localizer (LOC) based Instrument Approach Procedure (IAP) exists to Runway 17R. No other IAPs are published for the

runway but ABI does have a VOR/GPS-A approach that can be utilized. The current RDC for the runway is C-IV-5,000. A major rehabilitation project was completed on the runway in 2017. The pavement is in good condition. The RPZ dimensions for the Runway 17R approach are 1,700 ft. x 500 ft. x 1,010 ft. The RPZ dimensions for the Runway 35R approach are 1,700 ft. x 500 ft. x 1,010 ft. A portion of the RPZ for Runway 17R is outside of ABI's existing property limits.

Runway 17L/35R

Runway 17L/35R is ABI's secondary air carrier runway. The runway is 7,198 ft. x 150 ft. and is constructed of asphalt. It is ABI's only runway with an ILS approach (Runway 35R) and has the lowest visibility minimums (1/2 mile) of any runway on the airport. The current RDC for the runway is C-IV-2,400. A major rehabilitation project was just completed on the runway in 2015. The pavement is in good condition. The RPZ dimensions for the Runway 17L approach are 1,700 ft. x 1,000 ft. x 1,510 ft. The RPZ dimensions for the Runway 35R approach are 2,500 ft. x 1,000 ft. x 1,750 ft. A portion of each of the RPZs is outside of ABI's existing property limits.

Runway 4/22

Runway 4/22 is a small general aviation only runway that is part of the original ABI facility when it was constructed in 1953. The runway is 3,679 ft. x 100 ft. and is constructed of asphalt. A RNAV (GPS) approach exists for Runway 22. No other IAPs are published for the runway but ABI does have a VOR/GPS-A approach that can be utilized. The current RDC for the runway is B-II-5000. The runway pavement is in fair condition. The RPZ dimensions for the Runway 4 approach are 1,000 ft. x 500 ft. x 700 ft. The RPZ dimensions for the Runway 22 approach are 1,000 ft. x 500 ft. x 700 ft. Both RPZs are completely on airport property. A portion of the Runway 4/22 Runway Safety Area and RPZ intersect Runway 17R/35L and Taxiway Charlie. Runway hold position markings and signs are located on Taxiway Charlie to prevent unauthorized entry into this area. ABI staff and ATCT staff have reported no runway incursion issues at this location.

Magnetic Variation and Runway Designations

The current magnetic variation at ABI as shown on the FAA published airfield diagram is 5.3^{O} East with a 0.1^{O} West annual change. Currently, the established magnetic heading for each runway is shown below:

- Runway 17R/35L – 174.5 ^{O} and 354.5 ^{O}
- Runway 17L/35R– 174.5 ^{O} and 354.5 ^{O}
- Runway 4/22 – 47 ^{O} and 227 ^{O}

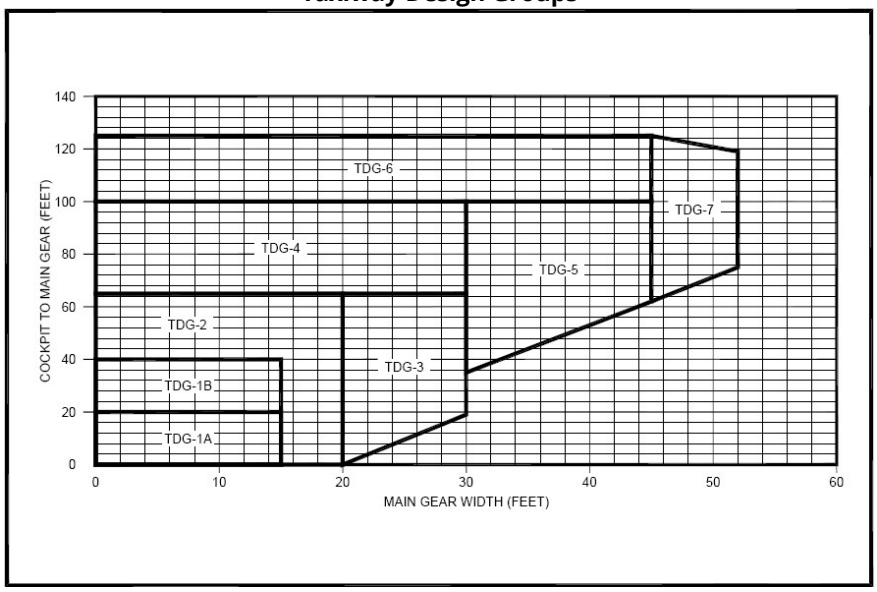
Based on the established annual rate of change, in approximately 5 years Runways 17R/35L and 17L/35R will have magnetic headings of 175 ^{O} and 355 ^{O} and will continue to move closer to magnetic headings that would be more in alignment with Runway 18/36 designations. ABI should discuss the timing of the impending runway designation change with FAA soon as

possible as re-designating runways is a lengthy process that requires extensive coordination. Runway 4/22 is already at a point where it could be re-designated to Runway 5/23.

Taxiways

Airport operations are coordinated from the runway to the businesses/hangars on the airfield through the establishment of taxiways and taxilanes. Each taxiway is designated with a unique name and designed to accommodate anticipated aircraft operations based on a Taxiway Design Group (TDG). The TDG is a classification system for taxiways based on an airplane's landing gear dimensions, namely the outer to outer main gear width and the cockpit to main gear distance. The TDG is identified by the use of **Figure 2-2,** then application of the specific safety parameters outlined in AC 150/5300-13 (current edition). **Table 2-6** provides an overview of the taxiway facilities at ABI. Currently, the largest aircraft that operates at ABI on a daily basis is the Embraer Regional Jet (ERJ) 145 which is in the TDG-2 category. Aircraft with higher TDGs operate out of ABI but not on a daily basis.

Figure 2-2
Taxiway Design Groups



Source: FAA AC 150/5300-13 (current edition), Airport Design

In the current Airport Certification Manual (ACM), ABI lists the following taxiways as available for air carrier use: Taxiways C, C1, C2, C3, C4, D, D1, D2, D3, M, N, N1, N2, and P. The ACM states that the established Taxiway Safety Area (TSA) for all air carrier taxiways is a 150 ft. in width which is non-standard. A standard Group III TSA is 118 ft. and a standard Group IV TSA is 171 ft. The current TSA being utilized for air carrier taxiways at ABI is in-between those standards. Based on a review of taxiway design drawings, it appears that all air carrier taxiways at ABI have been designed to Group IV standards and that a full-size Group IV TSA should be considered for all of ABI's air carrier taxiways. This will be investigated further in the facility requirements chapter. Taxiways A, A2, A2, A3, R, Q, T, and S are not available for air carrier use.

The majority of the taxiways associated with the air carrier runways have been through major rehabilitation projects since 2011. The taxiways that have been rehabilitated since 2011 include taxiways C, C1, C2, C3, M, N, N1, N2, P and small portions of taxiways R, S, and T that are associated with Runway 17R/35L.

ABI utilizes two of its taxiways as a "hot cargo" area when they need to locate an aircraft away from the terminal and other operational areas because of concerns regarding items onboard the aircraft. The two designated hot cargo areas are; Taxiway N east of the Taxiway N1 intersection and Taxiway D south of the Taxiway M intersection.

Additionally, ABI has some designated taxilanes that are associated with the Eagle Aviation Services, Inc. (EASI) facility. These taxilanes are described in **Table 2-7**, Taxilane Facilities.

Table 2-6
Taxiway Facilities

Taxiway	Width (ft.)	TSA (ft.)	TOFA (ft.)	Pavement Type	Pavement Condition
A	50	118	186	Asphalt	Poor
A1	75	171	259	Asphalt	Poor
A2	50	118	186	Asphalt	Poor
A3	50	118	186	Asphalt	Poor
C	75	150	259	Asphalt	Good
C1	100	150	259	Asphalt	Good
C2	85	150	259	Asphalt	Good
C3	100	150	259	Asphalt	Good
C4	100	150	259	Asphalt	Good
D (south of TWY M)	75	150	259	Asphalt	Good
D1	80	150	259	Asphalt	Good
D2	75	150	259	Asphalt	Good
D3	75	150	259	Asphalt	Good
M	75	150	259	Asphalt	Good
N	75	150	259	Asphalt	Good
N1	145	150	259	Asphalt	Good
N2	145	150	259	Asphalt	Good
P	95	150	259	Asphalt	Good
Q	75	171	259	Asphalt	Poor
R	75	171	259	Asphalt	Poor
S	75	171	259	Asphalt	Good
T	50	118	186	Asphalt	Good

Source: *ABI ACM, Garver, 2017*

Table 2-7
Taxilane Facilities

Taxilane	Width (ft.)	TSA (ft.)	TOFA (ft.)	Pavement Type	Pavement Condition
D (north of TWY M)	50	118	162	Concrete	Good
EA	50	118	162	Concrete	Good
EB	50	118	162	Concrete	Good
EASI	50	118	162	Concrete	Good

Source: *Garver, 2017*

Aircraft Circulation

There are two primary operational configurations for aircraft takeoff and landings at ABI.

Runway 17R and 17L Flow

When the winds are from the south, which they are for the majority of the year, aircraft will typically land on Runway 17R and takeoff on Runway 17L or Runway 17R. When utilizing this configuration aircraft will typically takeoff from the runway that is closest to their parking location. Consequently, most air carrier aircraft will takeoff on Runway 17L because it is closer to the terminal ramp area and many aircraft from Abilene Aero will depart on Runway 17R because it is closer to the Abilene Aero ramp.

Runway 35R and 35L Flow

When winds are from the north aircraft will typically land on Runway 35R and Runway 35L will be used for takeoffs. This configuration is common during the winter and early spring months. This is also the period of the year where Instrument Metrological Conditions (IMC) conditions are more prevalent.

General Airfield Circulation Constraints and Runway 4/22

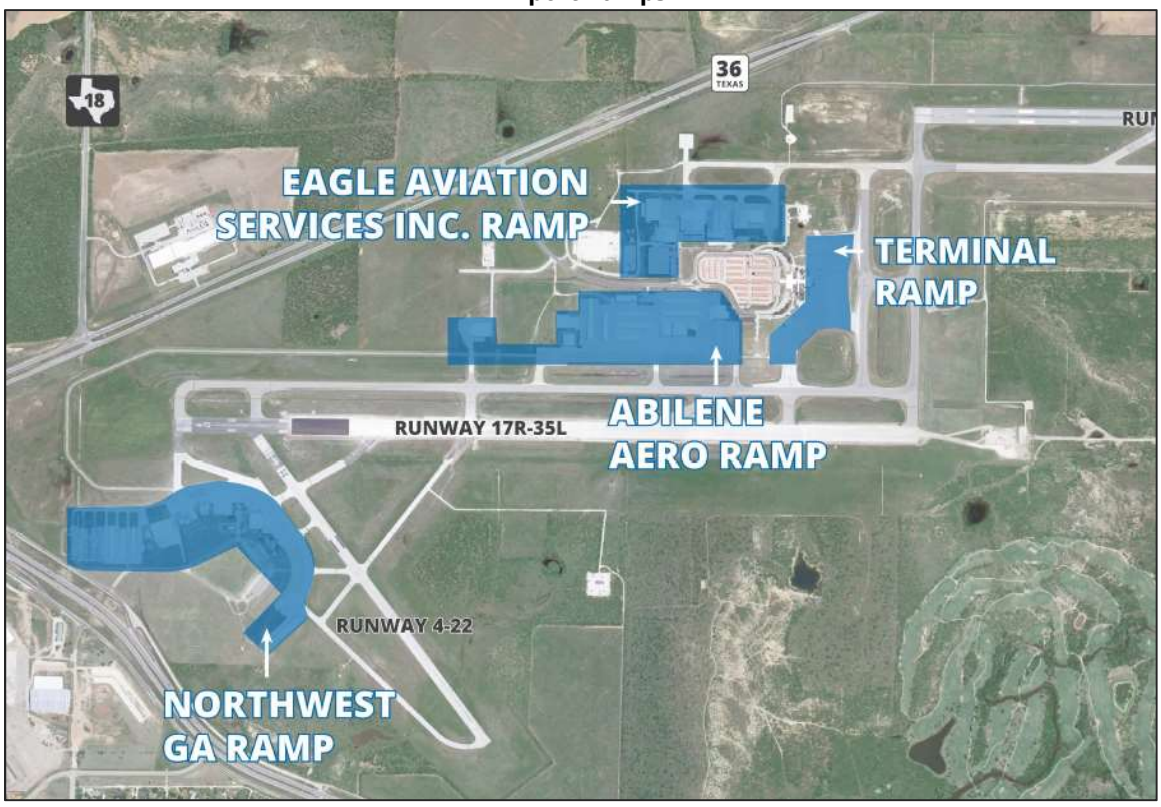
Both runways have full-length parallel taxiway systems and there are multiple entrances to most ramp areas, so no aircraft circulation issues exist. Runway 4/22 is the least utilized of the 3 runways at ABI. It is primarily utilized by small aircraft when crosswinds on the primary runway exceed the capabilities of some smaller aircraft. This primarily occurs in the months of February, March, September, and October.

Ramps/Aprons

Aircraft ramps/apron areas are commonly utilized for the parking, storage, and maneuvering of aircraft outside of the control of ATCT. ABI has four primary ramp areas shown in **Figure 2-3**, *Airport Ramps* and described in **Table 2-8**, *Ramp Description*. The north GA Ramp includes a site in front of the Polasek Helicopter hangar that is primarily utilized for helicopter operations. The

EASI Ramp includes a compass calibration pad that is utilized by general aviation aircraft and Eagle Aviation Services as part of their maintenance operation.

Figure 2-3
Airport Ramps



Source: *Garver, 2017*

Table 2-8
Ramp Description

Ramp Area	Square Yards	Primary Use	Pavement Type	Pavement Condition
Terminal Ramp	55,722	Movement of air carrier aircraft.	Concrete	Good
Northwest GA Ramp	65,011	Small aircraft and helicopter operations.	Aspahlt w/one concrete area	Poor
FBO Ramp	94,111	Recreational, corporate, and military aircraft.	Concrete	Good
EASI Ramp*	41,411	Air carrier aircraft maintenance by Eagle Aviation Services.	Concrete	Good

Source: *Garver, 2017*
*Includes associated taxilanes utilized by EASI for maneuvering aircraft.

Airfield Signage/Lighting

Sufficient airfield lighting is an important part of maintaining the airfield's operational status during night and inclement weather conditions. **Table 2-5**, on page 8, outline the various airfield lighting systems associated with the runways at ABI. In addition to the runway lighting systems, ABI is also equipped with an airfield signage system, taxiway edge lights, a rotating beacon, and a lighted windsock with a segmented circle.

Rotating Beacon

At night or during poor weather, pilots identify an airport by locating the rotating beacon, a lighting feature designed to provide alternating white and green lights, as it rotates and can be seen for up to ten miles from the airfield. ABI's beacon is located on north of the Terminal Ramp and west of the existing terminal building. The rotating beacon is in good condition.

Wind Indicators

ABI's centerfield windsock is located approximately 200 ft south of the intersection of Taxiway M and P adjacent to the Airport Rescue and Fire Fighting (ARFF) station. The windsock structure and the segmented circle are in good condition. ABI also has supplemental lighted windsocks at the approach ends of Runway 35R and 17R (close to the intersection with Runway 4/22). Both windsocks are in good condition. An unlit windsock is present at the approach end of Runway 35L.

Airfield Signage

ABI has an airfield signage system that provides guidance to aircraft operators regarding their location on the airfield and the location of significant facilities. ABI has an FAA-approved Airfield Signage and Marking Diagram that is part of their Airport Certification Manual (ACM). The airfield signage at ABI is in good condition. ABI staff have not received any inquiries from pilots stating that a portion of the existing signage system is confusing or misleading. There have been no reported runway incursions were airfield signage was listed as a contributing factor.

Airfield Lighting

The runway lighting systems for each runway at ABI are depicted in **Table 2-5**, *Runway Descriptions*. All runway lighting systems are in good condition with the exception of the runway edge lighting system for Runway 4/22 which is out of service. The runway edge lighting systems and supplemental windsocks are maintained by ABI staff. The runway edge lighting system for Runway 17L/35R was rehabilitated in 2007 and the edge lighting system for Runway 17R/35L was rehabilitated in 2009. The edge lighting systems are a "can and conduit" design. All approach lighting systems (e.g. REILs, MALSR, PAPIs, etc.) are maintained by the FAA. Taxiways C, C1, C2, C3, C4, D, D1, D2, D3, R, M, N, N1, N2, and P are illuminated by medium intensity

taxiway edge lights. The taxiway edge light circuits have a mixture of LED and incandescent fixtures. The taxiway edge light circuits appear to be in good condition. Taxiways A, A1, A2, A3, Q, S, and T are all unlit, but these taxiways do have taxiway centerline reflectors. All taxiway lighting systems and reflectors are maintained by ABI staff. The regulators for all the airfield lighting systems maintained by ABI staff. With the exception of the regulator for the Runway 4/22 edge lighting system, all lighting regulators are housed in the lighting vault located adjacent to the ABI terminal building. The regulator for Runway 4/22 is located adjacent to the AvFuel office building on the Northwest GA ramp, however, the regulator is inoperative.

Airfield Markings

Accurate and visible airfield markings are essential to ensure the safe operation of aircraft. A description of ABI's runway marking layout is contained in **Table 2-5.**

Runway 17L/35R has precision instrument runway markings. The markings are in good condition. Runway 17R/35L has non-precision instrument runway markings. The markings are in good condition. Runway 4/22 has non-precision instrument runway markings. These markings are in poor condition. The threshold of Runway 22 was previously relocated and the outline of the old markings can still be seen.

All taxiways have taxiway centerline markings and enhanced taxiway centerline markings where required. These markings all appear to be in good condition. Surface painted runway hold position signs are painted on all runway/taxiway intersections. These markings are in good condition with the exception of the surface painted signs along Runway 4/22 which are faded and are in fair condition.

Runway hold position markings are also painted at all runway/taxiway intersections. These markings are in good condition. In accordance with AC 150/5300-13A, *Airport Design*, the runway hold position markings should be located 268 ft. from the runway centerline on Runway 17R/35L and Runway 17L/35R and 200 ft. from the runway centerline on Runway 4/22. Based on a geometric analysis of these markings it appears that none of the runway hold position markings on the taxiways intersecting Runway 4/22 are located 200 ft. away from the Runway 4/22 centerline. The majority of these markings are located approximately 153 ft. to 167 ft. from the runway centerline. If these markings are relocated, all associated airfield signage (runway hold position signs) and markings (surface painted runway hold position signs) will need to be relocated as well.

Movement Area boundary markings are also present on all ramp areas to delineate the movement from the non-movement area. These markings are in good condition. Taxiway edge markings are present along the terminal ramp area and along portions of Taxiway N, N1, N2, and C to delineate usable from non-usable pavement. These markings are in good condition.

NAVAIDs

NAVAIDs, located on the field or at other locations in the region, are specialized equipment that provide pilots with electronic guidance and visual references in an effort to execute instrument approaches and point-to-point navigation. ABI has a number of NAVAIDs located on the field including:

- 3 – 4 Light Precision Approach Path Indicator (PAPI) system. Located at the approach end of Runway 17L, 17R, and 35L.
- 1 – Instrument Landing System (ILS). The system is composed of a glideslope and a localizer. The ILS is for instrument approaches to Runway 35R.
- 1 – Localizer System (LOC). Located at the departure end of Runway 17R. The LOC is for instrument approaches to Runway 17R.

The location of these NAVAIDs are identified in **Figure 2-1**, *General Airport Layout Diagram*.

ABI users also utilize some NAVAIDS located off airport property. The primary NAVAIDs utilized by pilots that are located off property are:

- Abilene VORTAC – The Abilene VORTAC is located approximately 9.3 NM northwest of ABI. It is utilized for the VOR – A approach, the ILS approach for Runway 35R, and the LOC approach for Runway 17R.
- Tuscola VOR/DME – The Tuscola VOR/DME is located approximately 13 NM southwest of ABI. It is utilized for the ILS approach for Runway 35R and the LOC approach for Runway 17R.

Modifications to Standards

ABI currently does not have any airside facilities that are authorized under an FAA approved Modification to Standards.

Weather Observation System

ABI has an Automated Surface Observation System (ASOS) that is the primary source of wind direction, velocity, and altimeter data for weather observation purposes for the airport. The ASOS, which is owned and maintained by the National Weather Service (NWS), is an automated sensor suite that reports weather conditions over a discrete radio frequency for pilots to receive real-time weather information. The ABI ASOS information can be received by tuning to the ATIS frequency 118.25 MHZ or by calling 325-201-9467.

Instrument Approach Procedures (IAP)

Currently, there are 6 published straight-in or circling instrument approach procedures at ABI. Details for these approaches are in **Table 2-9.**

Table 2-9
Instrument Approach Procedures

Runway End	Approach Type	Visibility Minimums	Ceiling Minimum
Runway 17L	RNAV/GPS	LPV DA: Categories A, B, C, D, & E - 3/4 mile LNAV/VNAV DA: Categories A, B, C, D, & E - 1 1/4 miles LNAV MDA: Categories A & B - 1 mile Categories C, D, & E - 1 3/8 miles Circling: Category A - 1 mile Category B - 1 mile Category C - 1 3/4 miles Category D - 2 miles Category E - 2 miles	2,041' MSL/250' AGL 2,171' MSL/380' AGL 2,240' MSL/449' AGL 2,240' MSL/449' AGL 2,300' MSL/509' AGL 2,320' MSL/529' AGL 2,420' MSL/629' AGL 2,460' MSL/669' AGL 2620' MSL/829' AGL
Runway 17R	LOC	S-17R: Category A & B - 1-mile Category C, D, & E - 1 3/8 miles Circling: Category A - 1 mile Category B - 1 mile Category C - 1 3/4 miles Category D - 2 miles Category E - 3 miles	2,280' MSL/509' AGL 2,280' MSL/509' AGL 2,300' MSL/509' AGL 2,320' MSL/529' AGL 2,420' MSL/629' AGL 2,460' MSL/669' AGL 2,620' MSL/829' AGL
Runway 22	RNAV/GPS	LNAV MDA: Categories A & B - 1 mile Categories C, D, & E - 1 1/8 miles Circling: Category A - 1 mile Category B - 1 mile Category C - 1 3/4 miles Category D - 2 miles	2,180' MSL/416' AGL 2,180' MSL/416' AGL 2,300' MSL/509' AGL 2,320' MSL/529' AGL 2,420' MSL/629' AGL 2,460' MSL/669' AGL
Runway 35R	RNAV/GPS	LPV DA: Categories A, B, C, D, & E - 1/2 mile LNAV/VNAV DA: Categories A, B, C, D, & E - 1 mile LNAV MDA: Categories A & B - 1/2 mile Categories C, D, & E - 1 mile Circling: Category A - 1 mile Category B - 1 mile Category C - 1 3/4 miles Category D - 2 miles Category E - 3 miles	1,976' MSL/200' AGL 2,189' MSL/400' AGL 2,260' MSL/484' AGL 2,260' MSL/484' AGL 2,300' MSL/509' AGL 2,320' MSL/529' AGL 2,420' MSL/629' AGL 2,460' MSL/669' AGL 2,620' MSL/829' AGL
Runway 35R	ILS/LOC	S-ILS: Categories A, B, C, D, & E - 1/2 mile S-LOC: Categories A & B - 1/2 mile Categories C, D, & E - 1 mile Circling: Category A - 1 mile Category B - 1 mile Category C - 1 3/4 miles Category D - 2 miles Category E - 3 miles	1,976' MSL/200' AGL 2,260' MSL/484' AGL 2,260' MSL/484' AGL 2,300' MSL/509' AGL 2,320' MSL/529' AGL 2,420' MSL/629' AGL 2,460' MSL/669' AGL 2,620' MSL/829' AGL
Circling	VOR or GPS-A	Circling: Category A & B - 1 mile Category C - 1 1/2 miles Category D - 2 miles	2,300' MSL/510' AGL 2,360' MSL/570' AGL 2,360' MSL/570' AGL

Source: Garver 2017

Landside Facilities

Landside facilities include the airport access roads, curbside areas and parking facilities that accommodate passenger movement, vehicle parking and ground transportation services such as car rental, shuttle, cab and/or transportation network companies (TNC). ABI currently does not have any dedicated functional areas for shuttles. **Figure 2-4** shows the existing terminal area that includes the landside access roads and parking facilities.

Automobile Access/Circulation and Parking Facilities

The passenger terminal at ABI can be accessed via Airport Boulevard coming off state highway TX-36. Upon approaching the terminal, departing passengers experience a mid-century modern terminal building that highlights the exposed aggregate material and use of flare columns. The recently renovated canopy covering the landside parking area adds a modern element with its use of a PVC membrane roof structure.

Roadway Access

The entrance to the terminal area is located on TX-36 north of the terminal building. It is a T-intersection with dedicated turning lanes on the highway to enter Airport Boulevard. A stop sign is present for vehicles approaching TX-36 from Airport Boulevard, to merge onto the highway.

As shown in **Figure 2-4,** Airport Boulevard, going south towards the terminal, allows two-way traffic with a single lane on either side. It turns into Airport Parking Circle as it loops around the parking area located north of the terminal, providing access and exits for parking and the terminal curbside. Airport Parking Circle also provides access to surrounding tenant areas such as Abilene Aero to the west and Eagle Aviation Services, Inc. (EASI) to the east. Access to Abilene Aero is provided through a short driveway that branches out to the west from Airport Parking Circle. Access to the EASI buildings on the east and the Air Traffic Control Tower is provided through Lance Drive that branches out towards the east from Airport Boulevard and runs parallel to the Airport Parking Circle. On approaching the terminal, one smaller access drive branches out from Airport Parking Circle – West Access Drive to the west providing access to the terminal building for service vehicles such as garbage trucks.

Figure 2-4
Existing Terminal Area

Source: Corgan 2017

The Airport Parking Circle splits in two as it reaches the terminal building as shown in **Figure 2-5**. One branch serves the curbside on the lower level providing access to rental car return and baggage claim whereas the other branch goes up to the upper level serving curbside drop-off/pick-up shown in **Figure 2-6.** The curb on the lower level measures 281' linear feet and the curb on upper level measures 340'. No vehicular congestion is observed on the curb on a regular basis. There is no active curbside management except for chartered flights carrying a large numbers of passengers. TNC operations are infrequent.

The access and circulation roads at ABI are made of asphalt and are in good condition and devoid of potholes. However, the curvilinear geometry of the roads creates a limited sight distance for vehicles circulating within the landside area. Signage is provided at several locations along the access roads to guide traffic. However, these signs are not consistent in terms of color, size and overall visual style. Additionally, the location of each sign varies as some are located on the left side of the road while others are located on the right side of the road.

Approaching the Airport Boulevard from TX-36, two signs indicate a turn for merging onto Airport Boulevard; one for vehicles coming from north and one for south. Proceeding south towards the terminal on Airport Boulevard and further onto Airport Parking Circle, multiple signs with plain arrows (as shown in **Figure 2-7 a**nd **Figure 2-8**) can be found for access and exit for terminal, parking area, rental car return, and Abilene Aero.

Figure *2*-5
Upper & Lower Level Access Roads

Source: Corgan 2017

Figure *2*-6
Upper Level Curb

Source: Corgan 2017

Figure 2-7
Access Road Signage

Source: Corgan 2017

Figure 2-8
Exit Signage

Source: Corgan 2017

Parking Facilities

The central covered parking area consists of 732 parking spots. **Figure 2-9** presents the central parking area layout. Out of 732 spots, 103 in the southeast section of the area are reserved for rental car companies as a return lot. The remaining 629 parking spots provide long and short-term public parking. Approximately 200 out of these 629 spots are used by airport employees and EASI employees. The parking rate for passengers is $9/day. The parking revenue has been observed to be consistent in the past. Separate dedicated parking lots exist for Abilene Aero, the ATCT and EASI buildings. There are reserved spots for military personnel and those physically handicapped on the southern edge of the parking area, parallel and close to the terminal building. A crosswalk connects the parking area to the lower level curb. An escalator and two staircases, one on each side of the escalator, connect the lower level curb to the upper level curb as shown in **Figure 2-10**. An ongoing plan aims to replace the existing inactive escalator with an elevator.

The central parking area, seen in **Figure 2-9**, measures a total of 267,619 sq. ft. It consists of concrete pavement for parking spots and asphalt pavement for vehicular circulation. Parking islands split the parking area into multiple sections. A central covered parking island, running north-south through the middle of the parking area, serves as a pedestrian walkway towards the terminal. The canopy covering the parking area, shown in **Figure 2-11**, was replaced in 2014 due to hailstorm damage. It has a life expectancy of 15 years. The covered parking area was noted as a major strength of ABI's facilities during the SWOT analysis conducted at the beginning of this project. The grass area between Lance Drive and Airport Parking Circle, just north of the existing parking facility, will be developed into a parking lot if the existing parking facilities utilization nears capacity. The area measures approximately 31,590 sq. ft.

Figure 2-9
Landside Parking

Source: Corgan 2017

Figure 2-10
Landside Escalator

Source: Corgan 2017

Figure 2-11
Central Parking Area

Source: Corgan 2017

The entrance to passenger parking is located on the west side of the parking area along Airport Parking Circle. The entrance for the rental car return area is located on the south of the parking area near the lower level curb. There are exits with barrier gates for both passenger parking and rental cars located on the east side of the parking area. These exits, located very close to each other, merge onto a single-lane road creating a three-way conflict with oncoming traffic from terminal. The gate for the passenger parking exit is operated from a pay booth as shown in **Figure 2-12.**

The parking area is divided into sections for easy wayfinding. There are signs, consisting of white text on blue background, on the canopy poles that uniquely identify parking sections. However, these signs are small in size and aren't easily noticeable. **Figure 2-13** shows a typical parking sign for section 'B5'.

Figure 2-12
Passenger Parking Exit

Source: Corgan 2017

Figure 2-13
Signage for Parking Sections

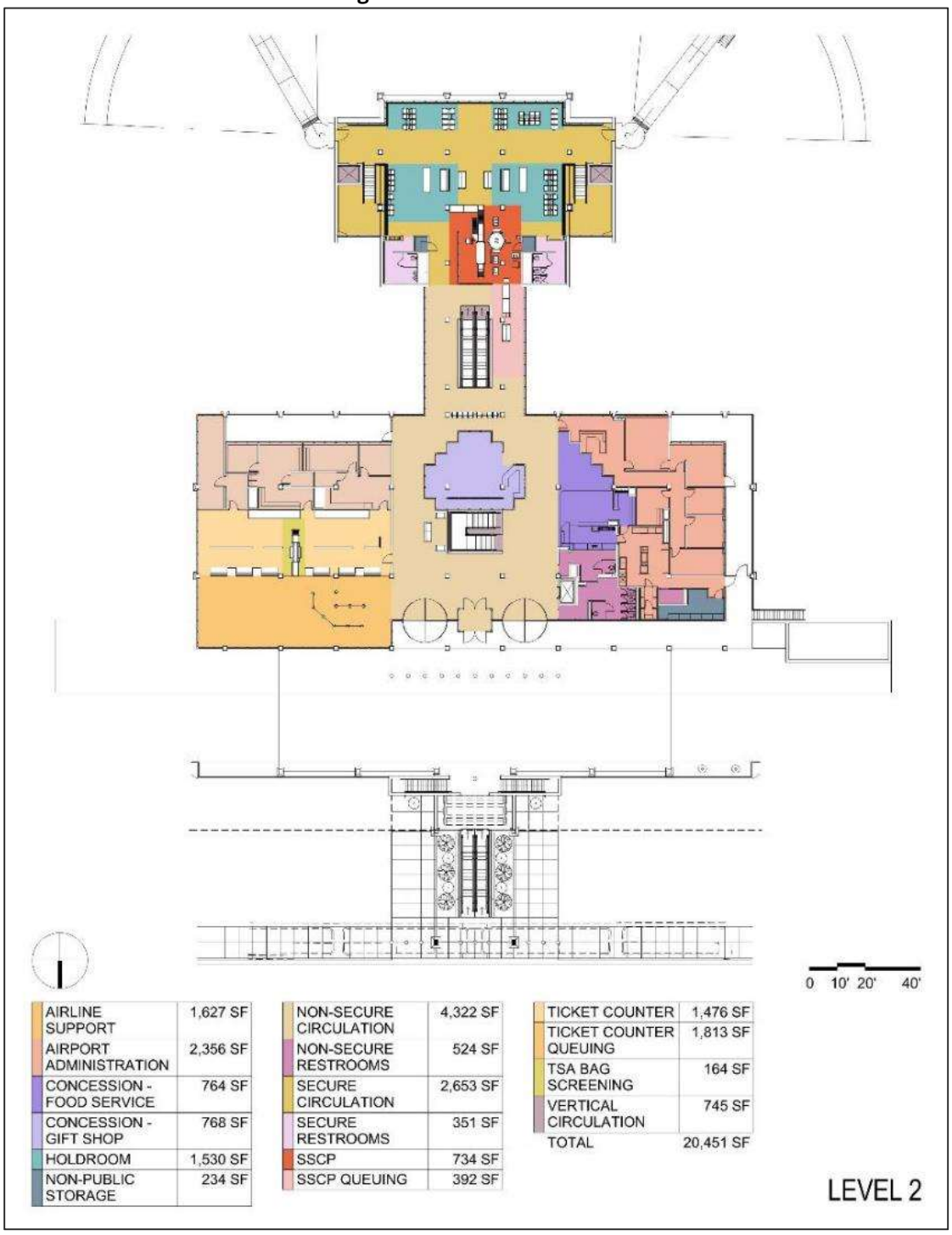
Source: Corgan 2017

Terminal Facilities

The existing passenger terminal at ABI is located centrally between the airport's two parallel runways 17R/35L and 17L/35R. The terminal building has two levels and has a total floor area of 40,060 sq. ft. The terminal has sheltered 600 passengers on one occasion when diverted aircraft from DFW had to deplane passengers into the terminal.

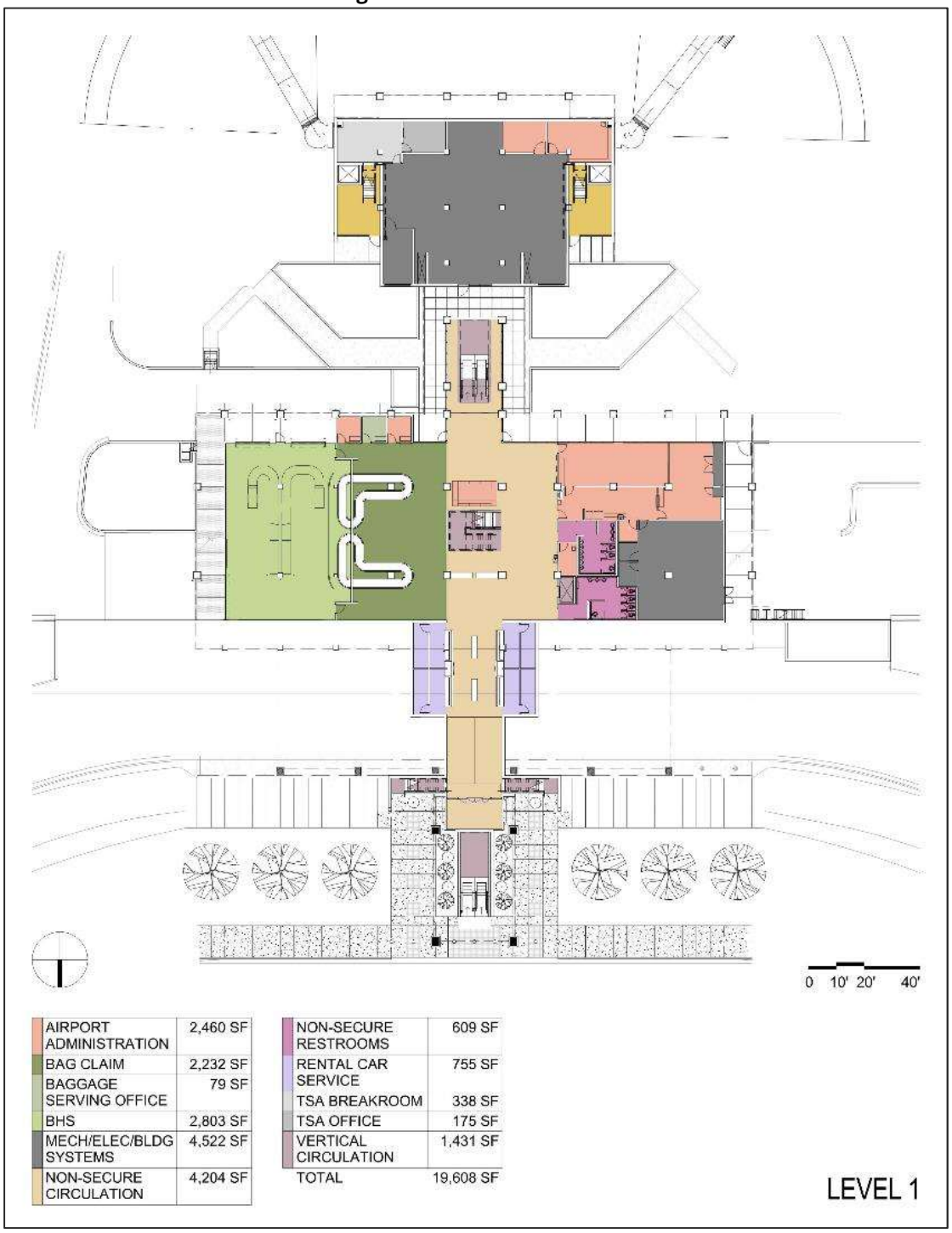
Inside the terminal, passengers experience exposed aggregate material and flare columns that frame a pan-formed ceiling. Strategically placed skylights allow natural light into the building. However, both the levels within the building are not sufficiently lit and may need improvements in lighting. There is terrazzo flooring in the ticketing lobby, concession and central terminal area; it also extends to the TSA checkpoint. The lower level terrazzo floor is divided by the carpet in the baggage claim. **Figure 2-14** and **Figure 2-15** show various functional areas on the two levels of existing terminal and present existing square footage for each functional area.

Figure 2-14
Existing Terminal Floor Plan – Level 2



Source: Corgan 2017

Figure 2-15
Existing Terminal Floor Plan – Level 1



Source: Corgan 2017

Passenger Access Areas

Overview/Passenger Flow

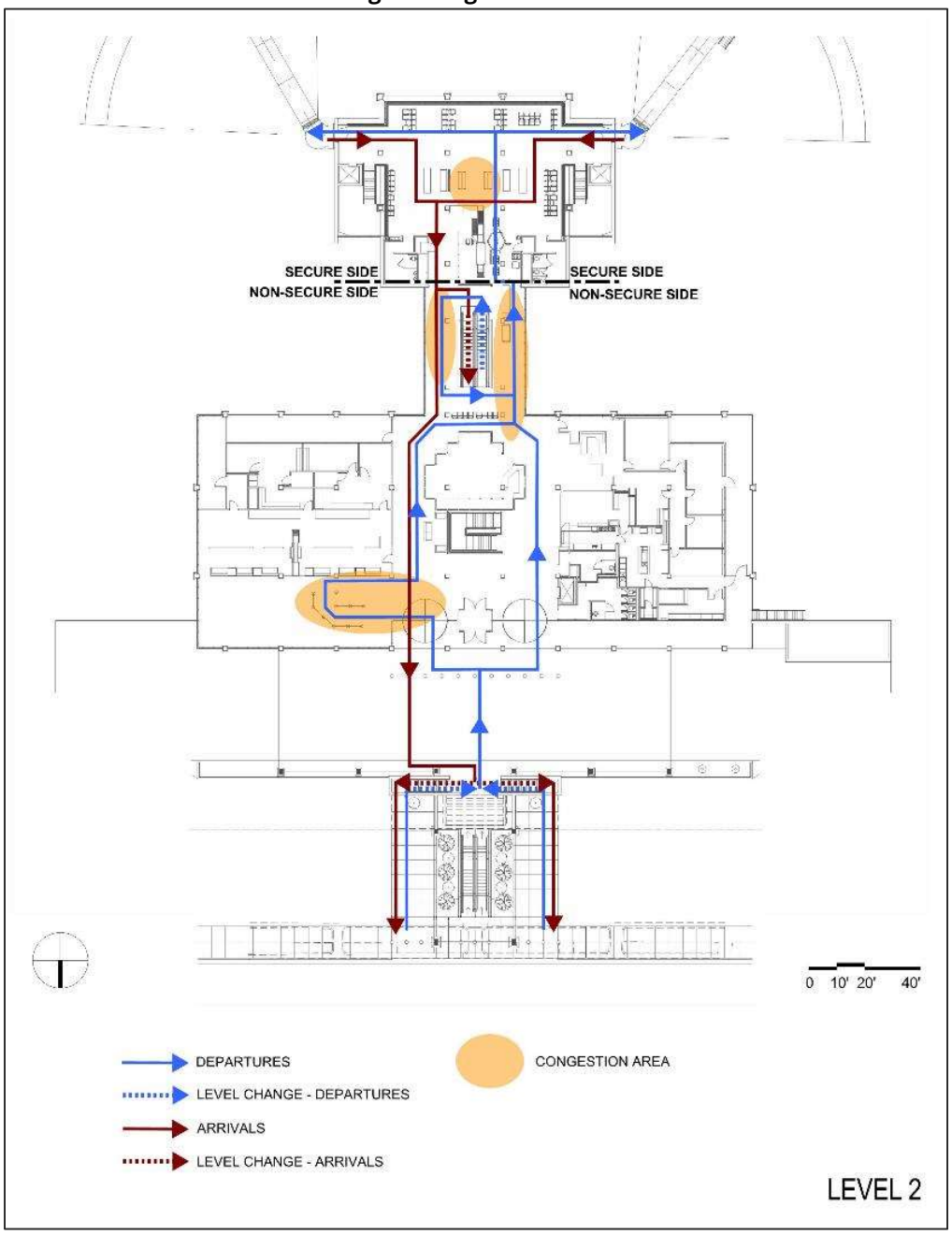
Passenger access areas are the functional areas of the terminal that are accessible to the public. The passenger access areas within ABI terminal include ticketing, security screening checkpoint (SSCP), concessions, holdrooms, restrooms, passenger boarding bridges, baggage claim and rental car counters. The secure areas are in the southern section of the building and the non-secure areas are in the northern section of the building. The two sides are connected by a 35 ft wide corridor that houses a non-secure escalator. The upper level of the terminal accommodates areas serving mostly departing passengers - ticketing, SSCP, concessions, holdrooms and restrooms. The lower level accommodates areas mostly serving arriving passengers - baggage claim and rental car counters.

Figure 2-16 and **Figure 2-17** show typical flows of departing and arriving passengers along with areas where congestion was observed. Departing passengers enter the terminal from the upper level through two revolving doors on either side of a centrally located vestibule on the northern end of the building. They turn left for check-in/baggage drop or head straight to the SSCP by going around the gift shop located to the south of the terminal entrance and dwell on the west side of the connector corridor to queue up for SSCP. Departing passengers may also enter the terminal from the lower level and take the non-secure escalator to the upper level. They can also go to the upper level using the stairway located in the center of non-secure area or the non-secure elevator located on the west side of the terminal, near the non-secure restrooms. After going through the SSCP, they enter directly into the holdroom area.

Arriving passengers deplane into the holdroom area and take the exit lane adjacent to the SSCP to leave the secure side. To access baggage claim, they can take the non-secure escalator down to the lower level or the stairway located in the middle of the non-secure area. If the passengers are unable to or prefer not to use the escalator or stairs, they can take the non-secure elevator down to the lower level. The passengers can exit the building from the lower level walking past the rental car counters, or they can exit the terminal from the upper level walking past the non-secure escalator using the eastern side of the connector corridor and leave the building through the revolving doors or the main entrance vestibule.

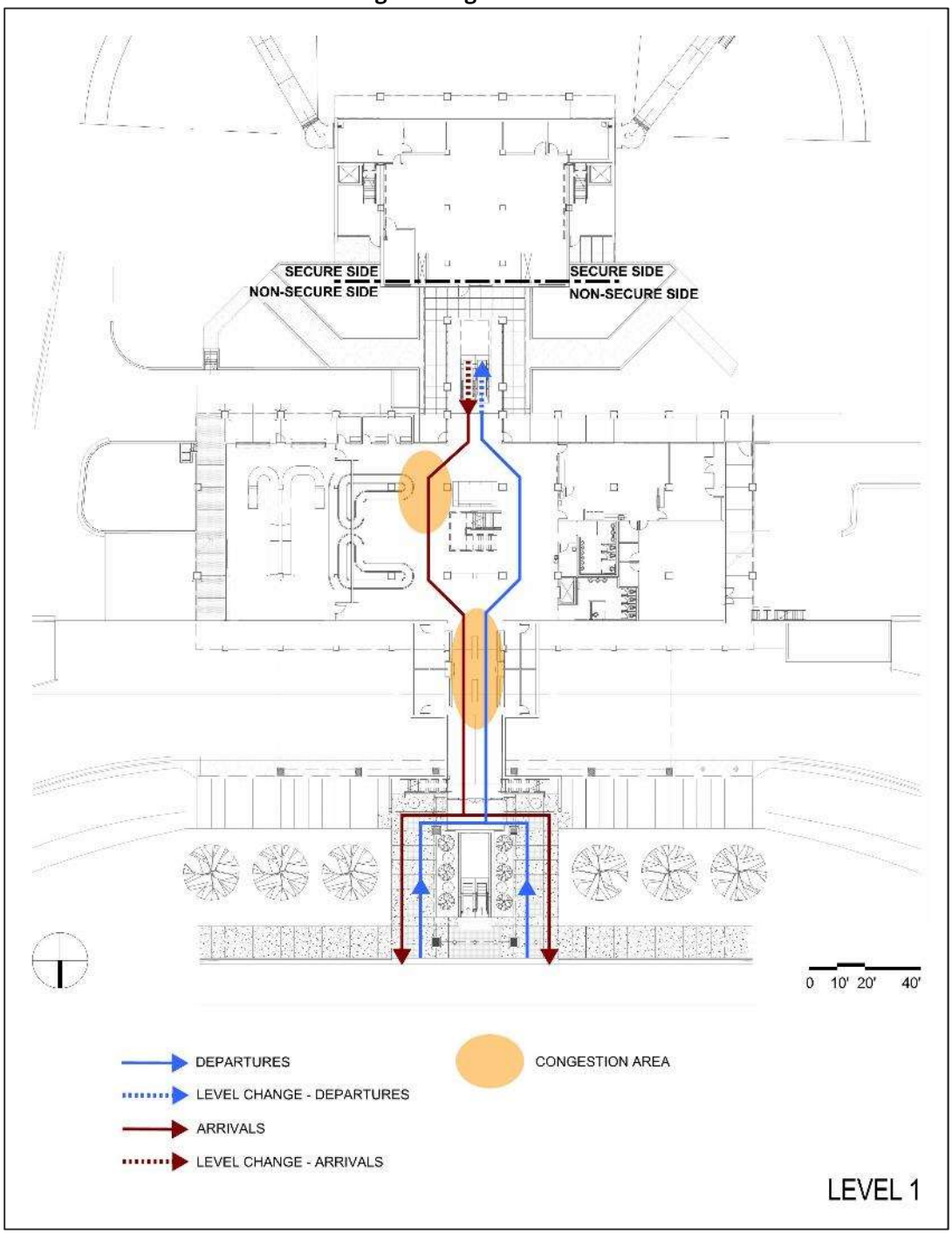
Signage is provided in various areas of the terminal building to guide passengers through the terminal. Most of it is clustered on rectangular boards suspended from the ceiling that follow a consistent visual style of white text, pictograms, and arrows on a blue background as shown in **Figure 2-18**. Nevertheless, the signage is difficult to follow due to various reasons. The arrows do not clearly direct towards the actual location of the functional areas. Several signs are not easily noticeable. In some instances, same color and style for multiple signs makes it difficult to differentiate them.

Figure 2-16
Existing Passenger Flow – Level 2



Source: Corgan 2017

Figure 2-17
Existing Passenger Flow – Level 1



Source: Corgan 2017

Figure 2-18
Terminal Signage

Source: Corgan 2017

Ticketing/Lobby Area

Passengers enter the terminal building through a double-door vestibule and two revolving doors on either side of the vestibule as shown in **Figure 2-19**. They face the lobby area housing art installation which includes a vintage airplane model on display hung from the ceiling as shown in **Figure 2-20** and **Figure 2-21**. A staircase is located below the airplane going down to lower level.

There are restrooms located directly to the west of terminal entrance. The men's restroom covers 171 sq. ft. and the women's restroom covers 306 sq. ft. An elevator situated between the restrooms allows non-secure vertical circulation between the upper and lower levels. **Figure 2-22** shows the elevator in between the two restroom entrances. It can be used by physically handicapped passengers to access baggage claim and the rental car counters on the lower level from the non-secure side. However, the location of the elevator makes it difficult to find and the existing signage does not provide clear direction towards the elevator.

The ticketing area is located in the north-east section of the terminal building, situated to the left as departing passengers enter the upper level of the terminal. It consists of six check-in counters. The counters measure 52 linear feet and the area behind them measures 1,636 sq. ft. The circulation area in front of the counters covers 1,813 sq. ft. The three check-in counters closest to the terminal entrance are active and occupied by American Airlines. A dedicated queuing area is provided in front of the active American Airlines counters utilizing retractable-belt stanchions as shown in **Figure 2-23**. The remaining three counters, shown in **Figure 2-24**, are used for charter flights. The queuing area gets crowded when a regularly scheduled flight and a chartered flight depart around the same time. Due to similar departure times, passengers on both flights check in at the same time creating longer queues that spill into the circulation area directly in front of the terminal entrance vestibule. A Flight Information Display (FID) hangs on the wall west of ticketing counters. It is not easily visible when entering or existing the ticketing area.

One CT-80 explosive detection systems device for TSA bag screening is located between two central check-in counters as seen in **Figure 2-25.** It is operated by the TSA staff as shown in **Figure 2-26**. When the device is not working, the TSA staff resorts to hand inspection for checked baggage. The CT-80 device has a manufacturer's hourly throughput capacity of 226 bags. ABI has processed up to 220 check-in bags in a single day using the machine.

Figure 2-19
Curbside Terminal Entrance

Source: Corgan 2017

Figure 2-20
Lobby Area

Source: Corgan 2017

Figure 2-21
Vintage Airplane Model on Display

Source: Corgan 2017

Figure 2-22
Non-secure Elevator

Source: Corgan 2017

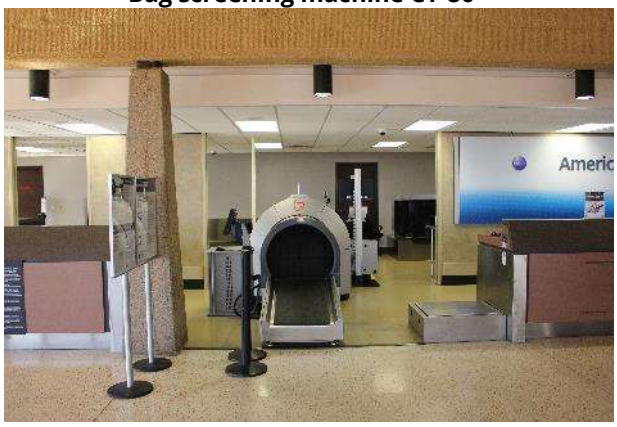
Figure 2-23
American Airlines Check-in Counters

Source: Corgan 2017

Figure 2-24
Inactive Check-in Counters

Source: Corgan 2017

Figure 2-25
Bag screening machine CT-80



Source: Corgan 2017

Figure 2-26
TSA operating the CT-80 machine

Source: Corgan 2017

Concessions

Concessions at ABI include a gift shop and a restaurant both located on the upper level in the non-secure area of the terminal. **Figure 2-27** and **Figure 2-28** show the gift shop and the restaurant. There are no concessions on the secure side of the terminal. However, vending machines are present.

The gift shop is located south of the terminal entrance and measures 768 sq. ft. It is enclosed by glass walls with shelves mostly covering the glass wall on the inside of the shop. The northern wall of the gift shop blocks the line of sight towards the SSCP when entering the building through the main terminal entrance north of the gift shop.
The restaurant, Moose's Café, is located in the north-west section of the upper level of the terminal building, west of the gift shop. It offers a variety of snacks and beverages. It has open floor seating area and comprises a total of 764 sq. ft.

Figure 2-27
Concessions - Gift shop

Source: Corgan 2017

Figure 2-28
Concessions - Restaurant

Source: Corgan 2017

TSA Security Screening Checkpoint

The SSCP at ABI is in the southern section of the upper level of the building, just north of the holdroom area. The area for the SSCP measures 393 sq. ft. The area north of the checkpoint and to the west of the escalator is allocated for SSCP queuing, as shown in **Figure 2-29**. It queuing area is 392 sq. ft. **Figure 2-30** shows the SSCP layout as seen from the holdroom area.

The SSCP consists of a single hybrid screening lane used by both PreCheck and standard passengers. The lane is equipped with an X-ray machine for carry-on baggage and a Pro Vision 2 people scanner manufactured by L3 Security & Detection Systems. The SSCP layout is not traditional as the divestation table is perpendicular to the conveyor belt for carry-on baggage screening. Also, there is no separate private screening lane or a private screening room adjacent to the SSCP.

50% of passengers processed at ABI are PreCheck. The Pro Vision 2 people scanner has a manufacturer's throughput capacity of 200-300 people per hour depending on application. The existing SSCP at ABI has processed up to 324 passengers in a single day. However, throughput capacity is exceeded when capacity charter flight and a regularly scheduled flight are departing close to the same time. Since the queuing area for SSCP is limited in a confined space next to the escalator, it is unable to accommodate long queues without spilling out into the airport lobby.

The SSCP is generally open from 5 am to 7 pm. The hours of operations change based on flight schedules. There are currently thirteen TSA staff members. Typically, four staff members work at a time – three at the SSCP and one for bag screening at check-in. The SSCP opens for passengers one and a half hours before the first departing flight of the day. There are instances when passengers have to wait in the non-secure area of the terminal when the SSCP isn't open. Seating is provided on the non-secure side for the waiting passengers.

A revestation area is provided just south of the SSCP that contains two benches. One of the two benches can be seen in **Figure 2-30.** There is an exit lane parallel to the SSCP that allows arriving passengers to exit the secure side. The exit lane has motion detectors to prevent unauthorized entry into the secure area. Additionally, the TSA staff members operating the SSCP do not face the exit lane when screening passengers and therefore, are unable to monitor the lane.

Figure 2-29
SSCP Queueing Area

Source: Corgan 2017

Figure 2-30
SSCP As Seen From Holdroom

Source: Corgan 2017

Passenger Holdrooms

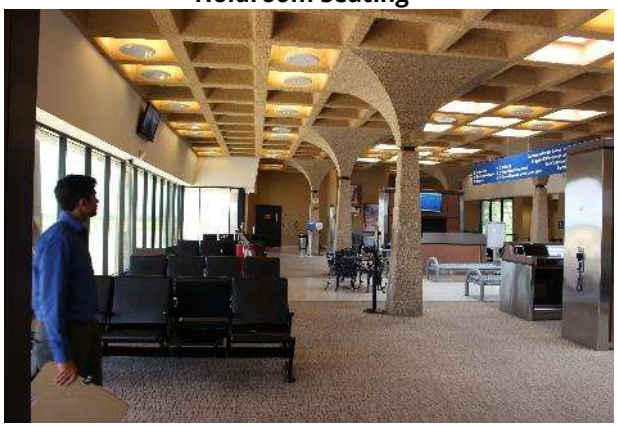
The secure side of the terminal on the upper level consists of holdrooms, passenger circulation areas and restrooms. The existing holdroom area at ABI measures 1,530 sq. ft. with 53 seats. The airport intends to replace the seating with new furniture in 2018. **Figure 2-31** and **Figure 2-32** show the existing furniture for seating. The holdroom overlooks the airfield through the glass curtain wall on the south side presenting views of distant hills. There are two gate-agent counters located in the center of the holdroom area. The two benches provided for revestation are located just in front of the counters, leaving little room for accessing or queuing at the counters. Both counters have lofty storage cabinets behind them as seen in **Figure 2-33**. The cabinets obstruct the line of sight towards the exit from holdroom area and hinder the natural flow of circulation. They also reduce the sense of openness of the area.

There are two doors that lead to the jet bridges used for loading and unloading passengers A ticket podium is next to each door. The doors are situated on the south-east and south-west corners of the holdroom area. **Figure 2-34** shows one of the doors along with the ticket podium. A stairway and an elevator are provided next to each door providing access to the apron level below. They also facilitate ground loading of passengers if needed, by serving as a means of vertical circulation from the upper level holdroom area to the apron level below. Signage is provided to direct passengers down to the apron level as seen in **Figure 2-34**. The total area for circulation on the secure side measures 2,653 sq. ft.

A covered walkway on the apron level extends from the west face of the terminal building and to the former ARFF station building located west of terminal. It can facilitate ground loading of passengers if needed.

There are two secure restrooms located east and west of the SSCP and both measure 175 sq. ft. Existing fixtures in the restrooms were installed in late 90's.

Figure 2-31
Holdroom Seating



Source: Corgan 2017

Figure 2-32
Holdroom Circulation

Source: Corgan 2017

Figure 2-33
Gate-agent Counter

Source: Corgan 2017

Figure 2-34
Contact Gate Door and Podium

Source: Corgan 2017

Baggage Claim/Rental Car Area

The baggage claim area is located on the lower level of the terminal in the northern section of the building. **Figure 2-Figure 2-35** shows the bag claim hall. Entering the bag claim hall from the non-secure escalator, passengers face a visitor information booth (currently inactive), shown in **Figure 2-36**, located just south of the central non-secure stairway. Arriving passengers do not have a clear line of sight towards the terminal exit because of the information booth and the

stairway. The bag claim hall measures 2,232 sq. ft. and consists of two L-shaped flat-plate baggage claim devices, providing a linear frontage of 58 feet. Seating is provided near the devices for passengers awaiting bags. Vending machines and advertising boards are also present on the walls of the bag claim hall.

Non-secure restrooms are provided on the west side of the baggage claim hall. The men's restroom measure 293 sq. ft. and the women's restrooms measure 317 sq. ft. Three baggage service offices are located south of the baggage claim devices each measuring 79 sq. ft. Currently, one of three offices are used by the airport administration as a space to operate the 'Badge and ID' office.

Rental car counters are located north of the baggage claim hall. There are four service counters available – two on both sides of the exit lobby; each measuring a total of 188 sq ft. Currently, three rental car companies operate at ABI: Hertz, Enterprise and Avis, each occupying one office. **Figure 2-37** shows the rental car counters and **Figure 2-38** shows the circulation space and queuing area in front of the counters. Congestion is observed in this area as it is too narrow to accommodate multiple rental counter queues and the queues also mix with the crossflow of passengers exiting or entering the building through the same area.

Figure 2-35
Bag Claim Hall

Source: Corgan 2017

Figure 2-36
Visitor Information Booth

Source: Corgan 2017

Figure 2-37
Rental Car Counters

Source: Corgan 2017

Figure 2-38
Rental Car Counter Queuing Area

Source: Corgan 2017

Non-passenger Access Areas

Overview

Non-passenger access areas are functional areas of terminal inaccessible to passengers. They include baggage make-up areas, office spaces, breakrooms for airline staff, airport administration and TSA, non-public storage spaces, mechanical and electrical rooms.

Baggage Make-up

Baggage make-up includes manual or automated make-up units for outbound and inbound baggage handling, cart staging areas, baggage tug/cart (baggage train) maneuvering lanes and related support areas. The baggage make-up room at ABI sits on a level below the apron and is located below the ticketing area and airline offices in the north-east section of the building. **Figure 2-39** and **Figure 2-40** show the existing baggage make-up room.

The room serves both inbound and outbound baggage. The total square footage of the existing baggage make-up room is 2,803 sq. ft. The western side of the room functions as staging area for dropping off inbound baggage onto the bag claim devices. It allows two carts to stage simultaneously, one behind the other. However, there is no by-pass lane. The claim devices provide a total of 20 lineal ft. for cart staging and are fed by hand.

The eastern part of the room serves outbound baggage. Outbound baggage is fed to the room from two parallel conveyor belts coming in from the ticketing area on upper level. The parallel belts allow two bag carts to be staged and loaded simultaneously, one staged to the east and the other to the west. Oversized baggage is usually transferred utilizing the non-secure elevator located near the terminal entrance. The space inside the elevator is not sufficient to conveniently move oversized baggage.

Baggage carts enter the make-up room from a roadway coming in from the east and sloping downwards, as shown in **Figure 2-41**. The exit for the carts is located on the south side of the room. It slopes up away from the room. The exit roadway requires carts leaving the room to make a sharp left turn when exiting the facility, creating a tight turning radius. Additionally, there are columns situated just in front of the exit door obstructing the path of the carts. Bollards surround these columns for protection. **Figure 2-42** shows the exit for baggage carts from the baggage make-up room. The sloping roadways cause stormwater coming from apron pavement and terminal rooftops to drain into the room.

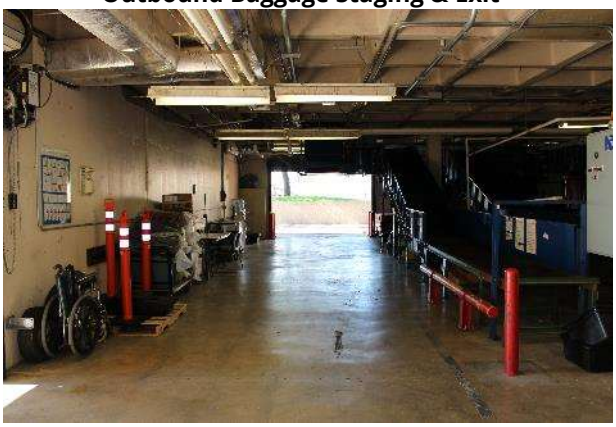
Office Areas

The three major office spaces within the terminal - are the airport administration, airlines and TSA offices. The airport administration office space is primarily located on the upper level in the north-west section of terminal. It consists of four offices overlooking the airfield, a conference room and some ancillary spaces such as reception area, conference room, kitchen, storage room and restroom. The lower level houses a large conference room, break room and communication room. The overall floor area for airport administration totals 4,816 sq. ft.
The airline office space is on the upper level in the north-east section of the building, behind the ticketing counters. Some of the offices get a view of the airfield. The total area for the airline office space is 1,627 sq. ft. The storage space in the airlines offices is not sufficient as some of it is used for IT equipment.

Figure 2-39
Inbound Baggage Cart Staging

Source: Corgan 2017

Figure 2-40
Outbound Baggage Staging & Exit



Source: Corgan 2017

Figure 2-41
Inbound Baggage Entrance Roadway

Source: Corgan 2017

Figure 2-42
Outbound Baggage Exit Roadway

Source: Corgan 2017

A TSA office and breakroom are located on the lower level below the holdroom area. The office measures 175 sq. ft. and the breakroom measures 338 sq. ft. A remote TSA office is located off the airport site on East South 11th Street.

The lower level also houses mechanical and storage functions. The mechanical space covers a total 4,697 sq. ft.

Apron

The terminal apron is the interface between the terminal building and the airfield. It facilitates aircraft gating/parking for commercial flights as well as ground servicing function. The apron area of the ABI terminal consists of two contact gates and four remain overnight (RON) positions that are designed to accommodate EMB 145s. The parking positions for airline gates are positioned so that the gated aircraft do not block the view from the holdroom area looking south. A 25' wide tail stand service road runs parallel to the apron-edge taxilane. The apron area, just south of the terminal and between the two airline gates, is utilized for the staging of ground service equipment (GSE) as shown in **Figure 2-43** and **Figure 2-44.**

The apron can accommodate nine aircraft at once – four EMB 145s on RON positions, three 737-800s along the south edge of the apron and two regional jets at the contact gates. These positions accommodate diverted flights or flights requiring ground loading of passengers.

During times when Dallas-Fort Worth International Airport (DFW) experiences closures or delays, ABI frequently receives diverted American Airlines regional and mainline aircraft which can quickly fill up the terminal ramp. When this occurs, additional diversions have to be parked on taxiways. Currently, no aircraft Remain Over Night (RON) on the terminal ramp as all overnight aircraft are towed to the Eagle Aviation Services, Inc. (EASI) facility each night for maintenance. The existing terminal ramp area is in good condition and is sufficient to accommodate normal operations. The ramp also has a building that houses ABI's snow removal

equipment and the old Airport Rescue and Firefighting (ARFF) station building that is used for general storage.

Figure 2-43
View of Airfield from Holdroom

Source: Corgan 2017

Figure 2-44
GSE Staged on the Apron

Source: Corgan 2017

Passenger Boarding Bridges

The terminal is equipped with two passenger boarding bridges (PBB) with rotundas located at the contact gate doors on the south-eastern and south-western corners of the terminal building. Both were manufactured by JBT and installed in 2002. The PBBs can serve small regional jets up to B757. **Figure 2-45** shows the existing gate layout at Gate 3. The existing gate layout for Gate 1 presents a challenge for maneuvering large narrow-body aircraft. When a large narrow-body aircraft powers out of the parking position, it is marshalled by ground handling crew to ensure that the left wing of the aircraft does not collide with the light pole shown in **Figure 2-46**.

Deicing

There are no dedicated de-icing pads at ABI. De-icing is usually done after the aircraft pushes back from the contact gate. The aircraft may also be escorted by a de-icing truck down to the approach end of the runway to de-ice if needed.

Figure 2-45
PBB at Gate 3 serving a regional jet

Source: Corgan 2017

Figure 2-46
Light pole at Gate 1 parking position

Source: Corgan 2017

General Aviation Facilities

This section provides an overview of the Fixed Base Operator (FBO) and General Aviation (GA) facilities established at ABI including their layout, condition, utilization, and existing issues. ABIA has two GA developments on property:

- Abilene Aero Development
- Northwest GA Ramp Development

These areas are depicted on **Figure 2-47**, *ABI General Aviation Developments.*

Figure 2-47
ABI General Aviation Developments

Source: Garver, 2017

Abilene Aero Development

Abilene Aero is the only Fix Based Operator (FBO) at ABI. Their primary location is along Airport Boulevard, northwest of the existing passenger terminal and parking facilities. The Abilene Aero complex along Airport Boulevard consists of a GA terminal building, 7 T-hangar buildings, and 6 box hangars. Abilene Aero also has one additional T-hangar facility and one additional box hangar facility on the Northwest GA Ramp. Those facilities will be discussed in the Northwest GA ramp discussion later in this chapter. Abilene Aero offers a full array of FBO services including aircraft storage, fueling, maintenance, avionics, aircraft sales, meetings rooms, aircraft charter services, and flight instruction. The terminal facility is approximately 8,000 square feet and is in excellent conditions.

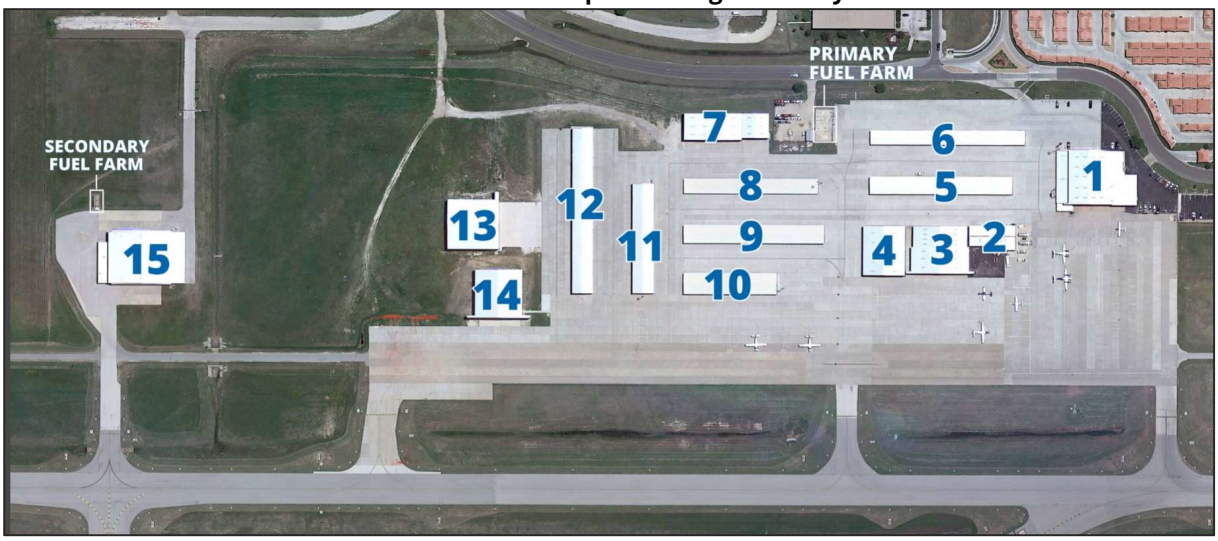
Roadway Access and Vehicle Parking

Abilene Aero has excellent roadway access as it is located along Airport Blvd. The parking lot has 64 parking spots and sufficiently accommodates the existing demand.

Hangar Facilities

Figure 2-48 and **Table 2-10** show and describe the existing hangar space in the area. Abilene Aero has approximately 220,000 sq. ft. of box hangar space and 80 T-hangar bays in total. Currently, they have approximately 36,000 sq. ft. of box hangar space that is vacant and eight T-hangars that are vacant. No waiting list exists for t-hangar or box hangar space.

Figure 2-48
Abilene Aero Ramp – Building Inventory



Source: Garver, 2017

Table 2-10
Abilene Aero Ramp – Building Inventory

Building #	Leaseholder	Primary Function	Dimensions (ft.)	Sq. Footage	Condition
1	Abilene Aero	FBO Terminal	180 x 135	24,334	Good
2	Abilene Aero	Maintenance Hangar	114 x 59	6,120	Good
3	Abilene Aero	Box Hangar	140 x 115	15,802	Good
4	Abilene Aero	Box Hangar	120 x 100	12,078	Good
5	Abilene Aero	T-Hangar	347 x 42	14,570	Good
6	Abilene Aero	T-Hangar	377 x 35	12,977	Good
7	Abilene Aero	Box Hangar	206 x 66	14,052	Good
8	Abilene Aero	T-Hangar	326 x 38	12,448	Good
9	Abilene Aero	T-Hangar	342 x 44	15,011	Good
10	Abilene Aero	T-Hangar	227 x 50	11,343	Good
11	Abilene Aero	T-Hangar	267 x 52	13,817	Good
12	Abilene Aero	T-Hangar	402 x 49	19,524	Good
13	Abilene Aero	Box Hangar	118 x 115	13,570	Good
14	Abilene Aero	Box Hangar	115 x 115	13,465	Good
15	Abilene Aero	Box Hangar	212 x 126	25,917	Good

Source: Garver, 2017

Fuel Farm Facilities

Abilene Aero also has two aircraft fuel farm facilities located within the boundaries of their current facility. The primary facility consists of the following tanks and is located along Airport Blvd adjacent to the existing Hertz rental car service lot:

- 3 – Jet A Tanks
  - 2 - 12,000-gallon underground Jet A tanks
  - 1 – 10,000-gallon underground Jet A tank
- 2 – 10,000-gallon underground 100L tanks.

Additionally, a 500-gallon 100LL self-fueling facility was added in late 2017 at the west end of Hangar 11 shown in **Figure 2-48**.

They also have an additional 15,000-gallon Jet A tank located at a hangar north of their primary ramp across from the current airport maintenance facility. The location of these fuel farms is noted in **Figure 2-48**. The fuel farm facilities are in good condition and have sufficient capacity to meet existing demand. Abilene Aero handles the fueling for ABI's airline operations and has a Department of Defense contract for fueling military aircraft. The only time Abilene Aero has difficulty fueling aircraft quickly is during major airline diversion events when they have

multiple airline aircraft to fuel at the same time. Currently, Abilene Aero only offers full-service fueling services.

Ramp

As discussed in the airside section of this chapter, the pavement along the Abilene Aero ramp is in good condition. The weight bearing capacity of the ramp has not been officially established and needs to be determined to ensure the pavement isn't overly stressed. ABI has plans to conduct a pavement study to investigate the weight bearing capacity of the ramp in the near future.

Texas Forestry Service Facility

The Texas Forestry Service has a small tank facility located on the northern portion of the Abilene Aero ramp that is utilized to store the fire suppression agent they use for aerial firefighting applications.

Northwest GA Ramp Development

The northwest GA ramp development is located on the northwest end of the airport and was part of the original ABI footprint when it was constructed in the early 1950s. The area contains a number of airport tenants. The primary tenants in the area are FedEx, Polasek Helicopters, AvFuel, Texas State Technical College (TSTC), the Abilene Experimental Aircraft Association (EAA) Chapter 471, and Abilene Aero.

Hangars

Figure 2-49 and **Table 2-12** show and describe the existing hangar space in the area. The area has four t-hangar buildings, one office building, and six box hangar facilities. All the facilities are in good condition with the exception of two of the older t-hangar buildings that are located on the northern end of the ramp.

Figure 2-49
Northwest GA Ramp – Building Inventory

Source: Garver, 2017

Table 2-12
Northwest GA Ramp – Building Inventory

Building #	Leaseholder	Primary Function	Dimensions (ft.)	Sq. Footage	Condition
1	Abilene Aero	T-Hangar	305 x 36	10,908	Good
2	EAA	T-Hangar	281 x 31	8,724	Fair
3	EAA	T-Hangar	307 x 30	9,031	Fair
4	Saddle Ramp Land & Cattle	Box Hangar	52 x 35	3,276	Fair
5	TSTC	Box Hangar/Offices	200 x 150	30,148	Good
6	EAA	Box Hangar	120 x 100	12,282	Good
7	Polasek Helicopters	Box Hangar	103 x 100	9,630	Good
8	Abilene Aero	Box Hangar	185 x 123	22,677	Good
9	FedEx	Cargo Facility	145 x 130	18,390	Good
10	AvFuel	Office Building	134 x 49	7,401	Good
11	AvFuel	T-Hangar	436 x 35	15,190	Good

Source: Garver, 2017

Roadway Access and Vehicle Parking

Access to the Northwest GA Ramp is via Navajo Circle and Navajo Trail which connects to the Loop 322 frontage road. Roadways access into the area is currently sufficient and vehicle parking is sufficient. Due to the TSTC development occurring adjacent to this area, TXDOT is planning some roadway realignments in the next two to five years. The exact alignment changes that will be made are still being evaluated.

Ramp

The ramp in the area is in fair condition. ABI is currently planning a pavement rehabilitation project to improve the pavement in the area. Additionally, there are concerns regarding whether the ramp lighting is accurate in the area to safely accommodate nighttime operations. There is a fleet of out-of-service SAAB 340 aircraft that are currently parked north of the northern most T-hangar development. These aircraft are being removed and the pavement in the area may eventually be replaced.

TSTC Development

ABI recently completed a land release and sold approximately 52 acres of property adjacent to the Northwest GA Ramp to TSTC to develop a new Abilene campus. Construction on the campus is already underway and is expected to be completed in increments over the next 12 to 15 years. When fully completed, the new facility will be composed of numerous buildings (9 are currently estimated) and will have the capacity to accommodate approximately 3,000 students. With the development of this facility, roadway access and vehicle congestion could potentially become an issue in this area in the future.

Abilene Fire Department Maintenance Facility

The Abilene Fire Department (AFD) recently opened a new fire maintenance facility in the area that will handle the maintenance of all the AFD fire equipment. This is a non-aeronautical facility and does not have direct access to the airfield.

FedEx Facility

ABI has a small FedEx Cargo facility on the Northwest GA Ramp. The building includes a distribution facility that sorts shipments for delivery or truck transfer. Currently, FedEx only operates Cessna Caravans at ABI. As was mentioned in the “opportunities” section of the SWOT analysis, recently there has been a nationwide increase in direct-to-consumer purchasing and online retail. Consequently, the demand for small package shipping has increased. If this trend continues, expanded cargo facilities might be needed at ABI.

Aircraft Maintenance Facilities

Eagle Aviation Services Development

Eagle Aviation Services, Inc. (EASI) is a subsidiary of Envoy Airlines which operates numerous regional jets under the American Eagle brand. EASI is one of two major maintenance stations for Envoy Airlines and they are responsible for regular and heavy maintenance checks on Envoy's Embraer Regional Jet (ERJ) 140 and 145 fleet. EASI is the largest employer at ABI with close to 500 personnel and they are a FAR Part 145 certified aircraft repair station. They operate 365 days a year, 24 hours per day, 7 days a week. In addition to EASI, there is a corporate tenant in the area called Zee Jet that has a small private fuel farm and occupies a hangar. The location of the EASI Ramp is shown in **Figure 2-50**.

Figure 2-50
EASI Ramp – Building Inventory

Ramp and Hangars

EASI currently has 5 large box hangars in their complex. **Figure 2-51** and **Table 2-11** show and describe the existing hangar space in the area. The existing hangar space is sufficient to accommodate EASI's current demand and is adequate to handle a small increase in demand, if needed. EASI currently has 6 maintenance lines in their existing hangar facilities and they have the ability, without additional expansion, to grow to 8 maintenance lines if demand dictates. The primary infrastructure issue they are facing is the adequacy of the roof on some of their existing hangars. ABI endured a major hailstorm in 2014 that damaged several hangar roofs and the facilities have had water leakage issues ever since. Additionally, EASI believes that they may need to expand their "parts hangar" where they store their spare aircraft parts if they start receiving larger aircraft such as the ERJ 175 or if the number of aircraft they need to perform

maintenance on at one time increases. In addition to their ramp area, EASI has a compass calibration pad located to the east of their hangars.

Figure 2-51
EASI Ramp – Building Inventory

Source: Garver, 2017

Table 2-11
EASI Ramp – Building Inventory

Building #	Leaseholder	Primary Function	Dimensions (ft.)	Sq. Footage	Condition
1	Zee Jet, Inc.	Corporate Hangar	150 x 135	19,939	Good
2	Eagle Aviation Services, Inc.	Maintenance Hangar	186 x 154	29,681	Good
3	Eagle Aviation Services, Inc.	Maintenance Hangar	275 x 169	46,211	Good
4	Eagle Aviation Services, Inc.	Maintenance Hangar	230 x 142	31,260	Good
5	Eagle Aviation Services, Inc.	Maintenance Hangar	216 x 132	28,583	Good
6	Eagle Aviation Services, Inc.	Maintenance Hangar	230 x 182	37,120	Good
7	Eagle Aviation Services, Inc.	Office Building	260 x 200	52,640	Good

Source: Garver, 2017

Roadway Access and Vehicle Parking

EASI currently has good roadway access on Lance Drive which connects to Airport Boulevard. EASI has limited parking in front of their facilities so approximately 200 staff members park in

the ABI public parking lot that is located on the opposite side of Lance Drive. ABI and EASI staff have agreed that if public parking demand ever reaches a point where the public parking lot will be at capacity, then the grass area located between Lance Drive and Airport Parking Circle will be developed into a parking lot for EASI staff.

Recent and Future Growth

EASI has expanded in recent years, adding two new hangars, due to the growth of passenger traffic nationwide and the demand for more aircraft which has increased the demand for aircraft maintenance. Consequently, it is expected that as Envoy Airlines expands their fleet, EASI will see a demand to expand their facility at ABI at a commiserate rate. It should be noted that Envoy Airlines currently has orders for 45 more ERJ aircraft and that they are bringing older ERJ 140 aircraft out of retirement to be placed into service. The restoration of the ERJ 140 fleet was the catalyst for EASI recently adding an additional maintenance line at their facility. Additional expansion to the EASI facility appears probable in the future.

Support Facilities

Having adequate support facilities is an important part of operating an airport efficiently. While these facilities aren't typically accessed by the traveling public or other airport users, they play a critical role in the Airport's daily operation and maintenance.

Utilities

ABI has electrical, water, sewer, and telecommunications infrastructure to all the airport's existing facilities. At this time, ABI staff does not have any concerns regarding the condition, location, or capacity of the existing utility infrastructure. However, a drainage issue does exist along Lance Drive close to the EASI facility. During periods of heavy rain, the drive along Airport Blvd north of Lance Drive and the grass area between the EASI facility and Lance Drive will flood. Additionally, there is a small area on the terminal ramp at the entrance to the baggage make-up/claim facility that will also flood during periods of heavy rain.

ARFF Facility

The existing ARFF facility is located south of the intersection of Taxiway M and P close to the terminal ramp. The facility is occupied 24 hours a day, 7 days a week, 365 days a year. There are 4 firefighters assigned to each shift and 13 on staff in total. The facility currently houses two 1,500-gallon ARFF trucks. ABI is currently an ARFF Index B facility but has the capacity to move up to Index C, if needed. The existing ARFF truck bays in the facility are too short to adequately accommodate newer ARFF trucks. Consequently, an expansion of the existing station is planned that will build out the existing facility an additional 20+ feet to the north. The existing facility is in fair condition.

Airport Maintenance Facility

The ABI maintenance facility is located on Bonanza Drive, close to the intersection of Bonanza Drive and Airport Blvd. The facility consists of a single small building (approximately 2,000 sq. ft.) and a laydown yard (approximately 28,000 sq. ft.) that is used for the storage of various equipment and materials. ABI would like to be expand this facility in the future to provide covered parking for vehicles/equipment and a larger enclosed storage/maintenance area.

Rental Car Services Facilities

Hertz and Avis have light vehicle maintenance/service centers located on airport property away from the terminal and public parking facilities. Enterprise has a facility that is located off airport property.

Hertz Facility

The Hertz facility is located on Airport Blvd. adjacent to Abilene Aero. The facility is approximately 10,000 sq. ft. in total and includes a vehicle parking area and a small facility (approximately 580 sq. ft.) to wash vehicles. Hertz has indicated that they would like to add a heater to the existing wash bay.

Avis Facility

The Avis facility is located along an unnamed road that connects to Airport Boulevard close to the intersection of Airport Boulevard and Bonanza Drive. The facility is approximately 30,000 sq. ft. in total and includes a vehicle parking area and a small facility to wash vehicles (approximately 1,300 sq. ft.).

Future Consolidated Facility

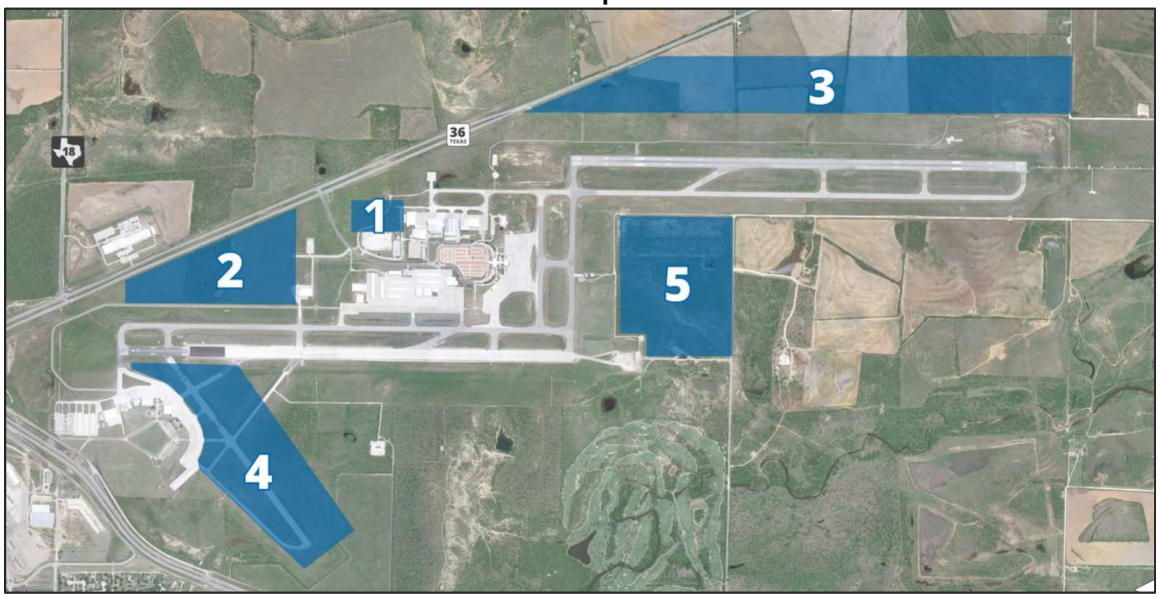
ABI is currently collecting a Customer Facility Charge (CFC) to fund the development of a consolidated rental car services facility that could be utilized by all three rental car agencies. There has also been discussion on whether the facility should be utilized for rental car returns and passengers to alleviate the current congestion in the rental car return lot next to the terminal facility. The exact location of the consolidated rental car facility will be explored in the alternatives section of this Master Plan.

Potential Future Development Sites

As part of the SWOT Analysis conducted at the beginning of this Master Planning project, a number of the “strengths” and “opportunities” that were identified related to ABI being well integrated in local and regional economic development efforts, having available land at ABI that could be utilized for future development, and the availability of non-airport owned land around

ABI that could be purchased for development. Consequently, as part of the Existing Conditions chapter of this Master Plan it is prudent to highlight areas that have been considered for future aeronautical or non-aeronautical development. **Figure 2-52** and **Table 2-13** provide an overview of some potential development sites that have been considered. Additional development will increase lease revenue for ABI which will improve its self-sufficiency which was mentioned as a "weakness" during the SWOT analysis. The development and potential layout of these sites will be discussed later in this Master Plan.

Figure 2-52
Potential Development Areas



Source: Garver, 2017

Table 2-13
Potential Development Areas

Development Area	Acreage	Potential Use	Owned by ABI (Y/N)	Location Description
#1	21	Aeronautical	Yes	North of existing EASI Facility and South of Airport Blvd.
#2	66	Aeronautical and Non-aeronautical	Yes	Area north of Airport Blvd and west of HWY 36
#3	100	Aeronautical	No	Area east of Runway 17L/35R
#4	87	Aeronautical	Yes	Runway 4/22 Area
#5	85	Non-aeronautical	No	Area south of ARFF Station

***Source**: Garver, 2017*

Recycling, Reuse, and Waste Reduction Programs

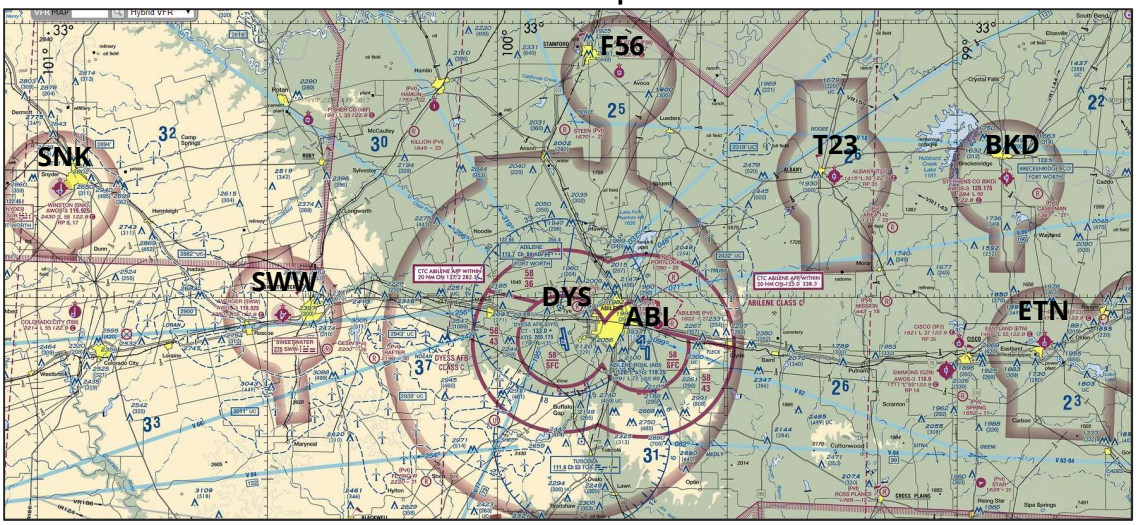
As airports continue to grow and develop their environmental impact has the potential to increase. Consequently, it will be very important that airports consider their environmental

impact and take steps to ensure they are being good environmental partners with the communities in which they reside. The City of Abilene has a recycling program, and there is a recycling center just north of ABI in Grover Nelson Park. ABI currently does not have recycling containers placed in the terminals, but they are available in the ABI administrative office areas for staff to use. In addition to recycling, ABI staff is encouraged to minimize waste (e.g. paper, etc.) and to be conscious of electrical and water consumption to reduce waste.

Area Airspace and Air Traffic Control

ABI operates in a moderately complex airspace environment. There are several small private airports less than 10 NM from ABI, and Dyess Air Force Base is approximately 9 NM to the west of ABI. Due to their close proximity to each other, Dyess AFB and ABI have conjoined Class C airspace. However, operations at each airport have minimal impact on each other because the runways at each facility have a similar alignment. Consequently, the approach and departure paths for the runways at each facility do not cross. Outside of ABI's Class C airspace there are a number of small GA airports within a 50-mile radius but none of them have an impact on operations in ABI's airspace. ABI is approximately 25 NM north of the Brownwood Military Operations Areas (MOAs) that are utilized for military training activities. **Figure 2-53** shows ABI's airspace and the surrounding area.

Figure 2-53
ABI Area Airspace



Source: FAA VFR Sectional Chart, July 2017

ABI has an FAA operated Air Traffic Control Tower (ATCT) that is open 24 hours a day, 7 days a week, 365 days per year. The tower was constructed in 2012 and is in good condition. ATC controllers have good visibility to all movement area facilities at ABI. The ATCT is located west of the passenger terminal along the terminal ramp.

Airport Service Area/Commercial Catchment Area

An airport's general aviation service area and commercial catchment area can generally be defined as the geographic region the airport serves for general aviation users and commercial passengers, respectively. Numerous factors influence the boundaries of each of these areas including economic trends, demographics, socioeconomic factors, airport services/facilities, competing airport services/facilities, and local/regional/national trends. Once established these areas can be used to identify other factors which influence aviation demand at an airport.

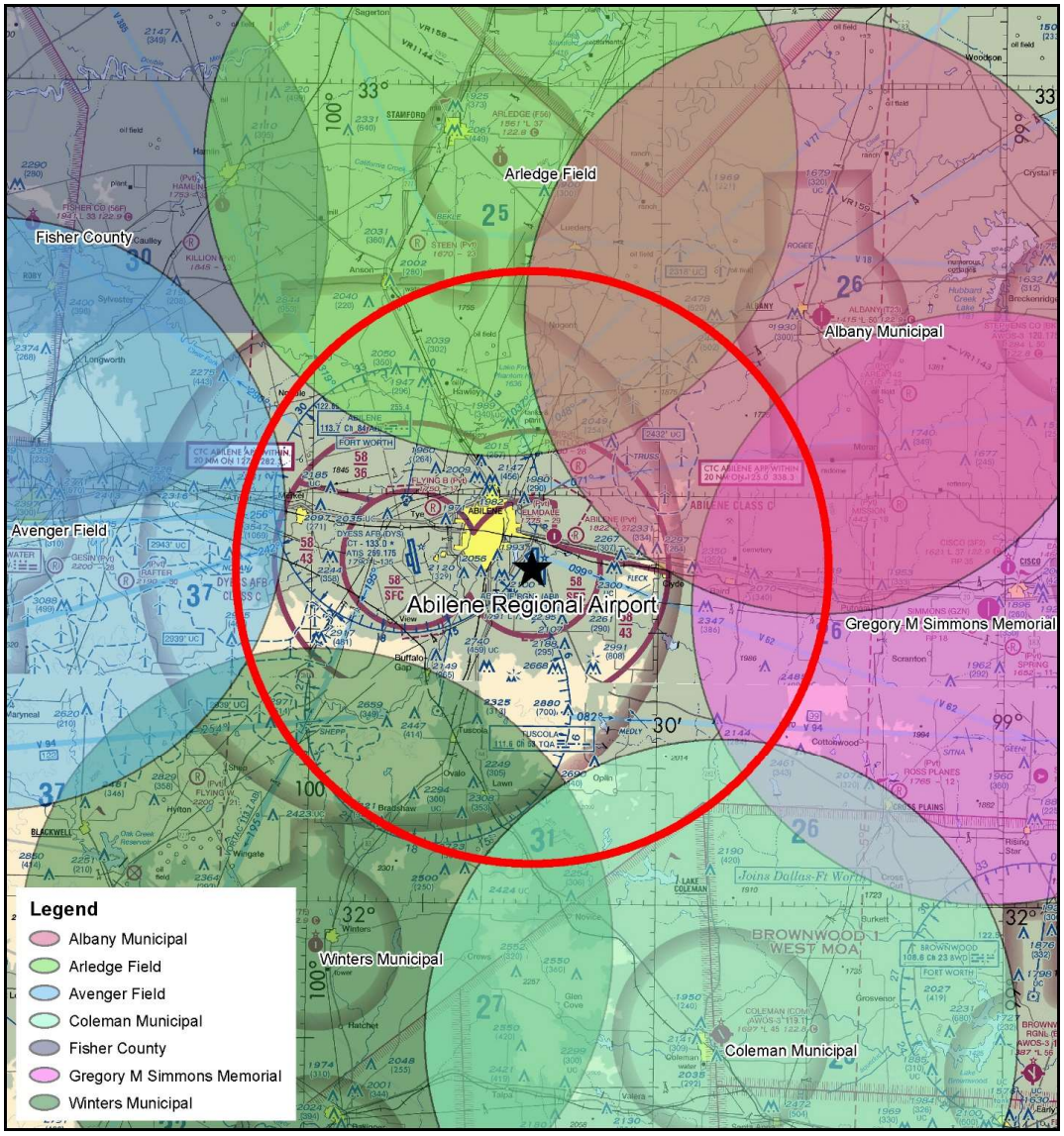
For the purposes of this Airport Master Plan, two different areas will be defined and studied for ABI:

- General Aviation Service Area
- Commercial Passenger Catchment Area

General Aviation Service Area

The NPIAS defines the GA Service Area as the area encompassed by a 25-minute drive time from a given airport. In rural, less densely populated areas, this methodology is a sufficient to define a given airport's GA service area. **Figure 2-54** depicts the various airports in the region along with their specified GA service area. ABI is located in the center of the graphic. However, in areas where multiple airports are located in close proximity to each other, an analysis of the competing airports in the region and their facilities/services is required to develop a Composite Service Area for the airport. Surrounding airports have varying degrees of influence on the composite service area based on the competing services they offer (e.g., available hangar rentals, flight training, charters, fuel, maintenance, courtesy car, security, etc., facilities and equipment, navigational aids, and accessibility), their relative distance to population centers, ease of accessibility, and proximity to ABI.

Figure 2-54
NPIAS Service Area



Source: Garver, 2017

Table 2-14 lists the primary airports competing for GA traffic with ABI and the service characteristics of each airport. **Figure 2-55** shows the Composite Service Area for ABI based on the competing airports in the region.

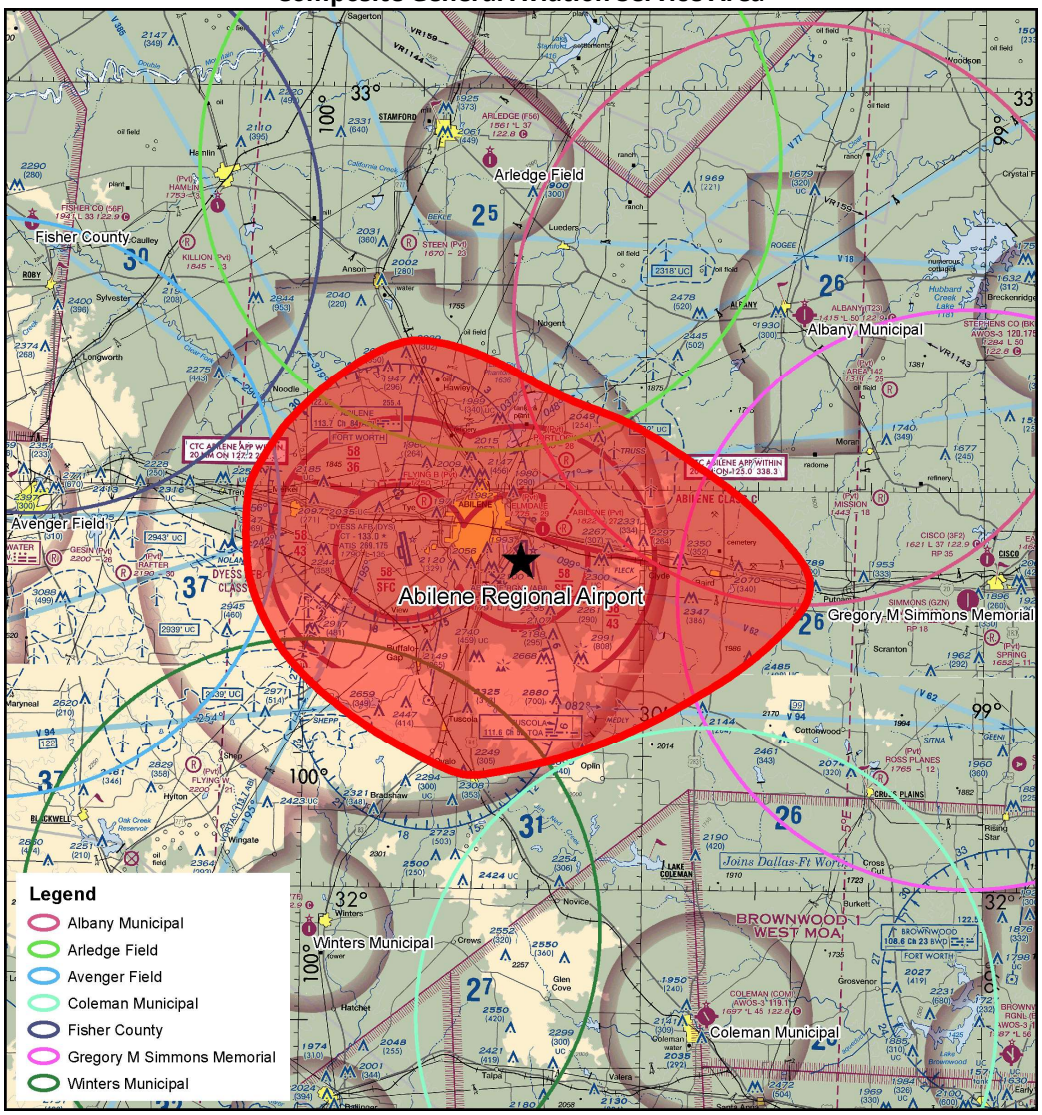
Table 2-14
Area General Aviation Airports

Airport Name Airport Sponsor Distance From ABI	Airport Role: NPIAS/ TASP	Runway Characteristics	Aircraft/ Operations	Airport Services	Repairs: Airframe/ Power Plant
Abilene Regional **CITY OF ABILENE** **N/A**	S/CMS	17R-35L 7203' x 150' (P) 17L-35R 7198' x 150' (P) 4-22 3679' x 100' (P)	117 aircraft 54,390 ops	Fuel/Hangars/ Tie Downs	Major/Major
Albany Municipal **CITY OF ALBANY** **34 miles North East**	UN/CS	17-35 5,000' x 75' (P)	7 aircraft 2,800 ops	Fuel /Tie Downs	None/None
Arledge Field Airport **CITY OF STAMFORD** **35 Miles North**	LB/CS	17-35 3,707' x 60' (P) 26-Aug 2,211' x 50' (T) 13-31 1,702' x 50' (T)	16 aircraft 4,370 ops	Hangars/Tie Downs	Major/Major
Avenger Field **CITY OF SWEETWATER** **46 Miles West**	LB/BC	17-35 5840' x 100' (P) 22-Apr 5658' x 75' (P)	12 aircraft 9,860 ops	Fuel/Hangars/Tie Downs	Major/Major
Coleman Municipal **CITY OF COLEMAN** **42 miles southeast**	LB/CS	15-33 4,506' x 75' (P)	22 aircraft 7,665 ops	Fuel/Hangar/Tie Downs	Major/Major
Fisher County Airport **FISHER COUNTY** **50 miles northwest**	UN/BS	16/34 3,300' x 60' (P) 7-25 2,800' x 50' (P)	6 aircraft 2,400 ops	Tie Downs	None/None
Gregory M. Simmons Memorial **ROBERT EARLY, CFO** **34 MILES EAST**	UN/BS	18-36 6,536' x 100' (P)	6 aircraft, 500 ops	Fuel/Hangars/Tie Downs	Minor/Minor
Winters Municipal **CITY OF WINTERS** **37 Miles Southwest**	UN/BS	17-35 3,204' x 50' (P)	8 aircraft, 3,172 ops	Hangars/ Tie Downs	None/None

Symbols: TSAP- Texas Airport System Plan: State role; BS- Basic Service; CS- Commercial Service; BC- Buisness/ Cooperate; RL- Reliever; CMS- Commercial Service; NPIAS Classification: CS – Commercial Service; NR - National/Regional; LB – Local/Basic Airport; L – Large Hub; M – Medium Hub; S – Small Hub; UN- Unclassified; N – Nonhub; (P) – Paved runway surface; (T) – Turf or gravel runway surface (í) – Control tower; NPI – Non-precision instrument approach; PI – Precision instrument approach, Instrument Landing System (ILS)

Source: FAA Form 5010 Report, Airport Master Records, January 2017; National Plan of Integrated Airport Systems

Figure 2-55
Composite General Aviation Service Area



Source: Garver, 2017

While there are a number of airports within 50 miles of ABI, all of these airports are much smaller than ABI, have fewer based aircraft, shorter runways, instrument approaches with higher minima, and are not as closely located to the City of Abilene which is the only major population center in the immediate area. Consequently, the only aircraft that ABI is probably losing from its NPIAS service area to these other competing airports are the smaller aircraft single-engine piston aircraft and ultra-light aircraft. A search of the FAA aircraft registry database shows that approximately 54% of the aircraft registered in Taylor, Jones, Shackleford, and Callahan Counties are based at ABI.

Commercial Passenger Catchment Area

A commercial airport's catchment area can be defined as the geographic region from which it commonly pulls enplaning passengers. The size of an airport's commercial passenger catchment area will vary depending on numerous factors. However, it is primarily defined by the proximity of other airports providing similar services. Currently, ABI has airline service from Abilene to DFW International Airport which then allows passengers to connect to the rest of the world. No other regularly scheduled non-stop airline service exists from ABI at this time but ABI is actively pursuing additional destinations and airlines.

To define ABI's catchment area, an examination of other commercial service airports in the area is required. For commercial airline passengers, the most important criteria when selecting an airport to fly to or from are the proximity (distance/convenience) and airfare. Travelers will be influenced by these factors in different ways. For the business traveler who prefers expedient travel over costs, higher airfares may be more acceptable. For the leisure traveler, cost may take on a higher priority with a willingness to bypass a closer airport in favor of lower airfare. Level of service or flight frequency, number of airlines, aircraft types, and non-stop destinations will play a factor for both the business and leisure traveler.

Currently, there are seven commercial service airports around ABI that a potential passenger could utilize to fly in/out of rather than using ABI. **Table 2-15** presents a summary of the commercial service airports that ABI competes with.

Table 2-15
Area Commercial Service Airports

Airport Name	Hub	CY 16 Enplanements	% of Statewide Enplanements	CY 15 Enplanements	% of State
Abilene Regional Airport	N	84,073	0.11%	86,000	0.11%
Dallas-Fort Worth International	L	31,274,875	39.16%	31,589,839	39.65%
Lubbock Preston Smith International	S	447,945	0.56%	443,239	0.56%
Midland International	S	471,311	0.59%	518,509	0.65%
San Angelo Regional/Mathis Field	N	60,277	0.08%	63,842	0.08%

Source: Federal Aviation Administration; Hub: (L) Large; (M) Medium; (S) Small; (N) Non-hub primary (EAS) Essential Air Service

As presented, in 2016 ABI was the 5th largest airport in the region in enplanements and ABI's enplanements were slightly down from its 2015 number of 86,000. However, many airports in Texas experienced a decrease in total enplanements from 2015 to 2016 including DFW, Midland, and San Angelo.

Table 2-16 describes each airport and their competing services. Each of these competing commercial service airports are less than four hours away from Abilene.

Table 2-16
Area Airport – Passenger Attributes

Airport	CY 16 Enplanements	Airlines Serving	Daily Departures	Non-Stop Destinations	Drive Time From ABI (Approx. hrs)
Dallas-Fort Work International	31,589,839	27	1853	221	2.5
Lubbock Preston Smith International	443,239	3	18	7	2.5
Midland International	518,509	3	24	7	2.5
San Angelo Regional/Mathis Field	63,842	1	3	1	1.8
Abilene Regional Airport	84,073	1	6	1	N/A

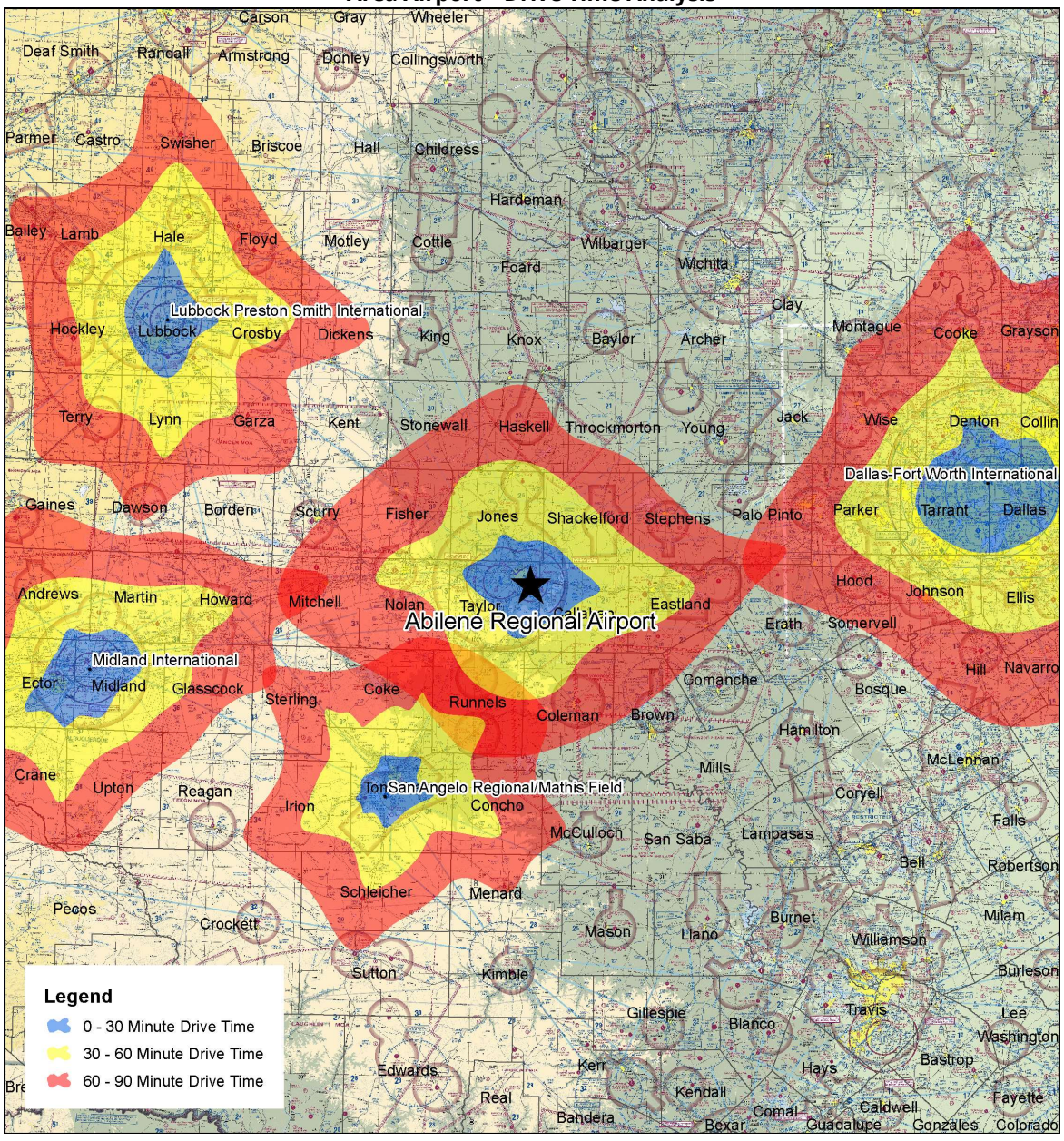
Source: Federal Aviation Administration; Airport Webpages; Airline webpages

Figure 2-56 shows the area within a 90-minute drive of each airport. The dark red area identifies areas where the drive time for both ABI and competing airports overlap. ABI has the most overlap with San Angelo Regional airport and a small amount of overlap with DFW and Midland International Airport. Due to San Angelo's small size and the fact that it only has non-stop service on American Airlines to DFW it is improbable that many business passengers within the ABI 60 minute drive zone shown on the map are driving to San Angelo to fly. However, if flights to a particular destination are cheaper out of San Angelo as compared to ABI, leisure passengers in the overlapping drive areas may choose San Angelo.

Midland International Airport has the potential to draw passengers out of ABI's 90-minute drive zone because they have three airlines and 24 daily departures to 7 non-stop destinations.

However, the primary competition for ABI regarding commercial passenger service is DFW because it is only 2.5 hours away and offers 221 non-stop destinations which passengers generally prefer. Studies have frequently shown that passengers are willing to drive extra distances for non-stop flights and lower airfares depending on circumstances their particular circumstances. Consequently, it is very likely that potential passengers on the far eastern end of ABI's 90- and 60-minute drive zone may choose to drive to DFW to fly rather than drive a relatively similar amount of time to ABI.

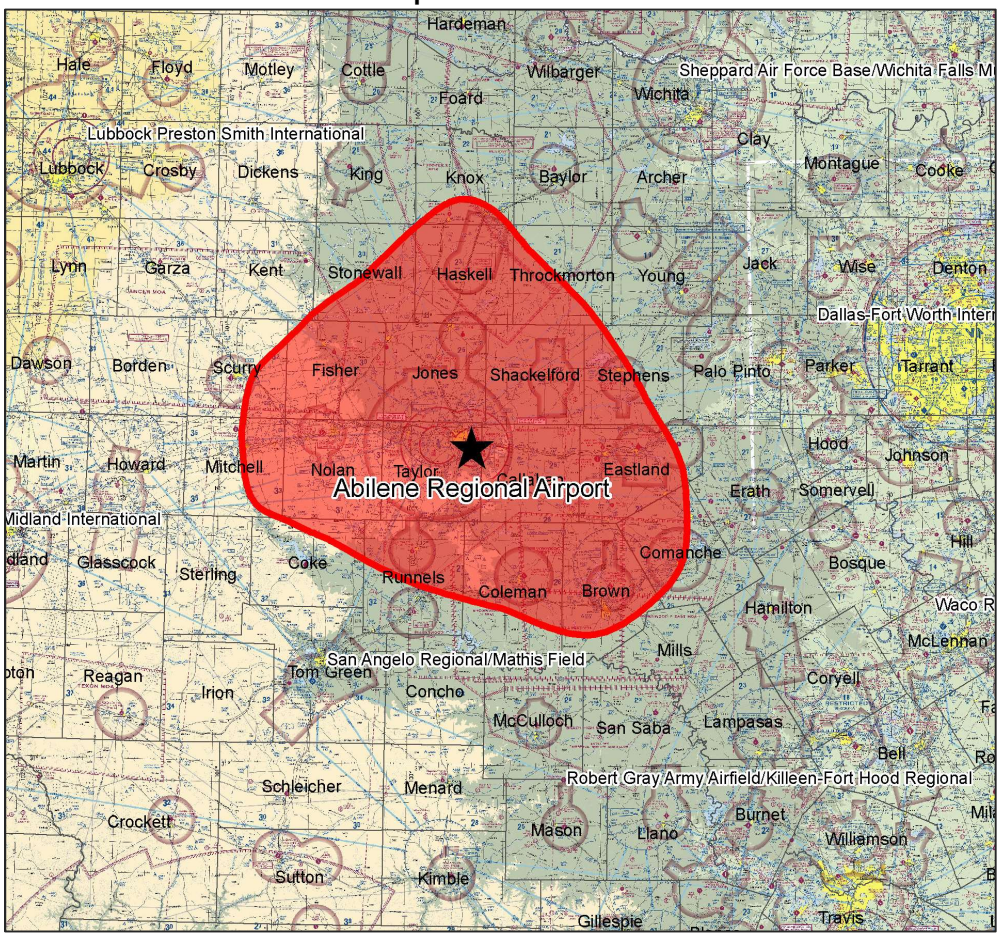
Figure 2-56
Area Airport – Drive Time Analysis



Source: Garver, 2017

Based on these factors, the ABI potential catchment area graphic shown as **Figure 2-57**, was developed. This catchment area is very similar to the catchment area that was defined in 2011 True Market Estimate study that also estimated the potential size of ABI's catchment area. Based on the potential catchment area and the 2016 population estimate data provided by the Texas Demographic Center (TDC) it is estimated the potential catchment area includes approximately 298,000 people. Approximately 137,438 of the total catchment area is estimated to live in Taylor County.

Figure 2-57
Area Airport – Catchment Area



Source: Garver, 2017

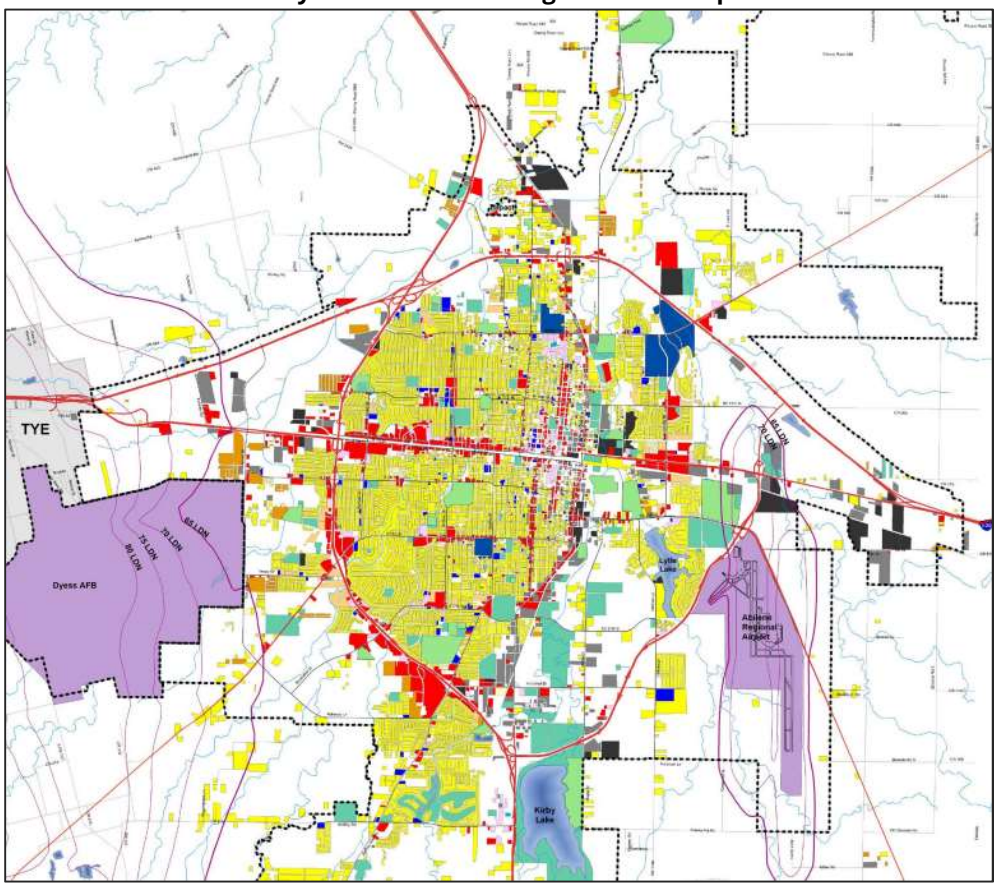
Land-Use and Controls

Land-use and controls in areas surrounding an airport are vital to protecting the continued safety and efficient use of an airport. The following section provides an overview of how property around the airport is currently utilized, zoning ordinances, and other land-use impacts. ABI is zoned as Planned Development according to the City of Abilene's Geographic Information System (GIS). All the land to the south, east, and west of the airport is zoned as Agricultural Open Space.

Existing Land-Use

In 2004, the City of Abilene completed a Comprehensive Plan for the growth of the City. As part of that study an existing land use map was developed that is shown below as **Figure 2-58.**

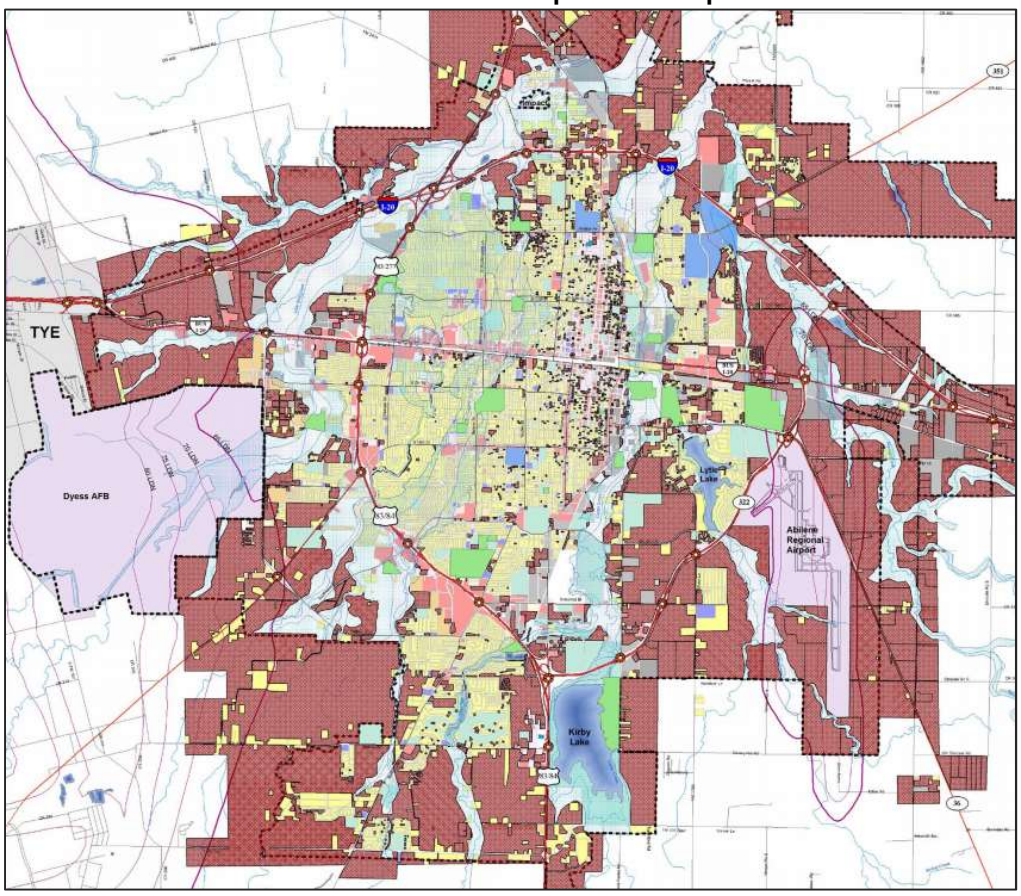
Figure 2-58
City of Abilene – Existing Land-Use Map



Source: City of Abilene Comprehensive Plan

As part of that same study the City of Abilene also developed a map showing potential areas for future growth and development. This map is depicted as **Figure 2-59.** The areas in reddish-brown are designated for vacant or undeveloped. As shown the vast majority of the property around ABI is vacant or undeveloped.

Figure 2-59
Vacant and Undeveloped Land Map



Source: City of Abilene Comprehensive Plan

In general, most of the land to the east and south of the airport is predominantly undeveloped with the exception of a few single-family residences. To the southwest of ABI, there is a golf course and some additional land that is undeveloped. The most developed area is west of the airport where there are subdivisions and the Taylor County Expo Center on the west side of Highway 322.

As areas around ABI are developed, the City of Abilene should ensure that the lands immediately surrounding the airport are protected from the development of facilities that could pose a hazard to the continued safe and efficient aeronautical use of the airport.

Zoning Ordinance

The City of Abilene has established a comprehensive zoning ordinance that includes the airport. The airport zoning ordinance is partly based on 14 Code of Federal Regulations (CFR) Part 77 – *Safe, Efficient Use, and Preservation of the Navigable Airspace* (FAR Part 77). The ordinance requires a permit to be filed with the City of Abilene's Planning and Development Services

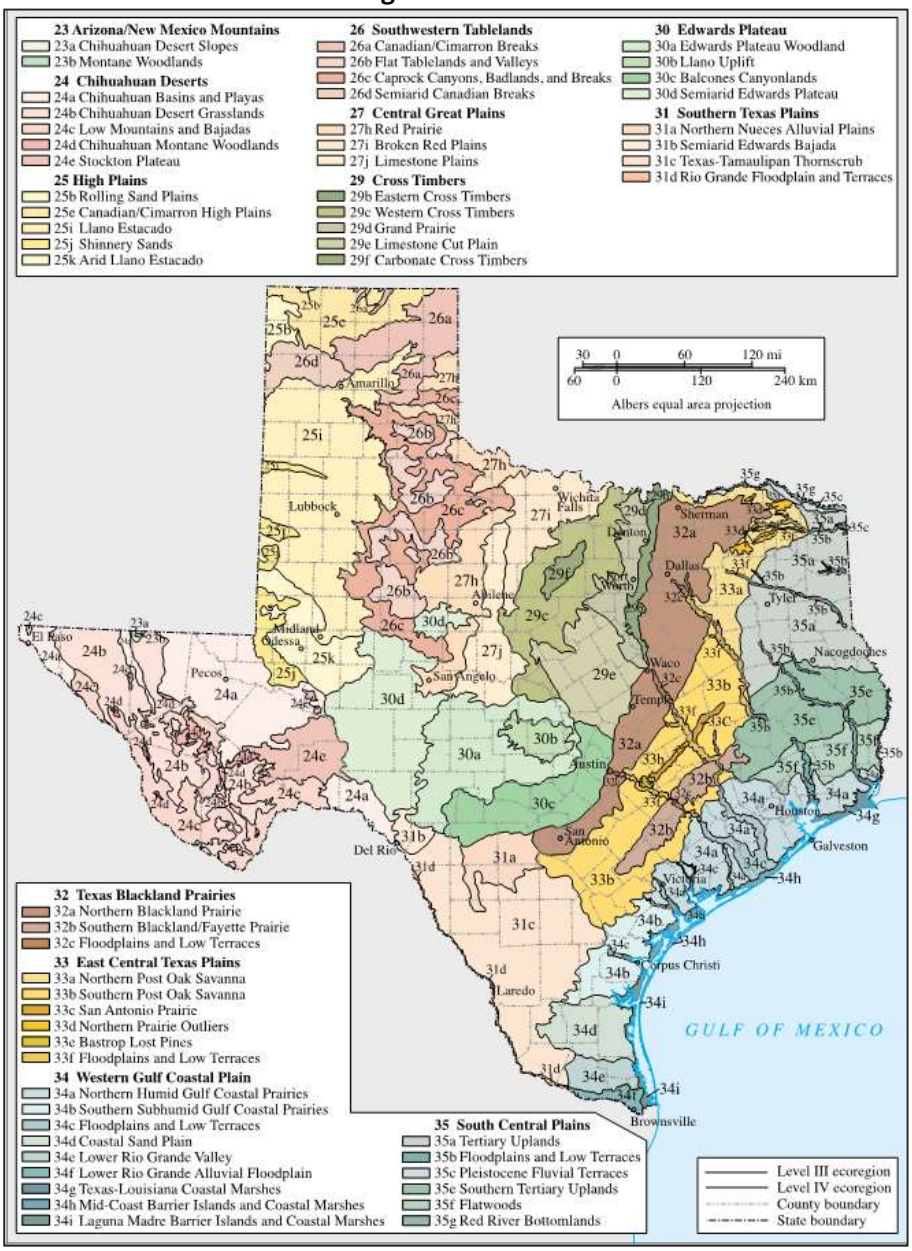
Department to evaluate the impacts of the proposed structure before any action can take place. It should be noted that the ordinance specifically mentions that the permit must be filed regardless of whether the development is inside the city limits or if the development is located within the footprint of any of ABI's FAR Part 77 imaginary surfaces If it is determined that the proposed construction or object won't negatively impact aircraft operations, an Airport Zone Development Permit will be used. Additionally, the ordinance also specifies "noise zones" based on the ABI's current noise contour map. This portion of the ordinance is meant to protect against the establishment of developments inside ABI's noise contours that could be adversely impacted by aircraft noise.

Existing Environmental Conditions

Taylor County and the City of Abilene fall within the Central Great Plains eco-region of Texas and, specifically, in the Red Prairie sub-region. According to a report entitled *Ecoregions of Texas* prepared by the US Department of Agriculture, the Red Prairie sub-region generally consists of level to gently rolling plains with intermittent streams. The vegetation consists of short and mid-grass prairie with a variety of other grasses and shrubbery. The ecoregions of Texas are depicted in **Figure 2-60**.

The topography in the area surrounding the airport has relatively minor elevation changes. In the central and western portions of Taylor County the topography changes and some hills are present in the area surrounding Buffalo Gap, the Callahan Divide, and Buzzard Mountain. The highest point is Taylor County is in the western portion of the county and is approximately 2,495 ft. above sea level.

Figure 2-60
Ecoregions of Texas



Source: US Department of Agriculture, Natural Resources Conversation Service.

Climate Overview

The climate of Taylor County is classified as a "hot-dry" climate as defined by the US Department of Energy. A "hot-dry" climate is defined as a region that receives less than 20 inches of annual precipitation and where the monthly average outdoor temperature remains above 45 degrees throughout the year. Cooler temperatures prevail from November through February with January typically being the coldest month. Warmer summer temperatures prevail

for about 8 months every year with July typically being the hottest month. Precipitation is heaviest in late May and early June. The total annual precipitation averages 24.82 inches. Taylor County has an average of 3 tornadoes annually however most of them are small. The average seasonal snowfall is 5 inches.

Taylor County has an average of 244 days of sunshine per year. The prevailing wind is from the south from late February to late November and from the north and west for the remainder of the year. Taylor County experiences mild seasonal variations in wind speed throughout the year. Late March and early April tend to be the windiest period of the year. Instrument Meteorological Conditions (IMC) are more common at ABI in the winter and early spring.

Soil Overview

Soils composition is important for airports to consider as it can affect the means and methods utilized for construction on the airport. The soils characterizing the area surrounding ABI are mainly in the Mollisols soil order according the USDA Web Soil Survey System. Mollisols are soft soils that are common in grassland ecosystems like those found in Taylor County. Mollisols soils are characterized by a thick, dark surface horizon.

Historic/Culture Resources

The National Historic Preservation Act of 1966 requires that an initial review be made to determine if any properties in or eligible for inclusion in the National Register of Historic Places are within the area of a proposed action's potential environmental impact. The Archaeological and Historic Preservation Act of 1974 provides for the survey, recovery, and preservation of significant scientific, pre-historic, historical, archaeological, or paleontological data when such data may be destroyed or irreparably lost due to a federal, federally funded, or federally licensed project. An online query through the Texas Historic Commission (THC) website revealed that there aren't any historic site locations in the immediate airport vicinity. ABI does have a few historic markers on site, but they do not fall under the jurisdiction of the THC. Additionally, there are no known areas of archaeological sensitivity that the ABI staff is aware of at the airport. However, a more thorough investigation and coordination may need to be conducted through both the state and federal cultural resources offices prior to future airfield construction.

Fish, Wildlife, and Plant Overview

The Endangered Species Act requires each federal agency to ensure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of habitat of such species. As provided by the Texas Parks and Wildlife Department, several threatened or endangered species are listed for Taylor County. As defined by the U.S. Fish and

Wildlife Service (USFWS), an Endangered Species is any species of wildlife whose continued existence as a viable component of the state's wild fauna is determined to be in jeopardy, and a Threatened Species is any species of wildlife that appears likely, within the foreseeable future, to become an endangered species. **Table 2-17** lists the threatened and endangered species for Taylor County on both a federal and state status regardless of whether they occur at ABI. At this time ABI staff is not aware that airport property serves as a habitat for any endangered plant or animal species. Future coordination with USFWS and the Texas Parks and Wildlife Department may be necessary prior to commencing any major construction project at ABI to confirm that no hazard to an endangered or threatened species is being created.

Table 2-17
Taylor County – Threatened and Endangered Species

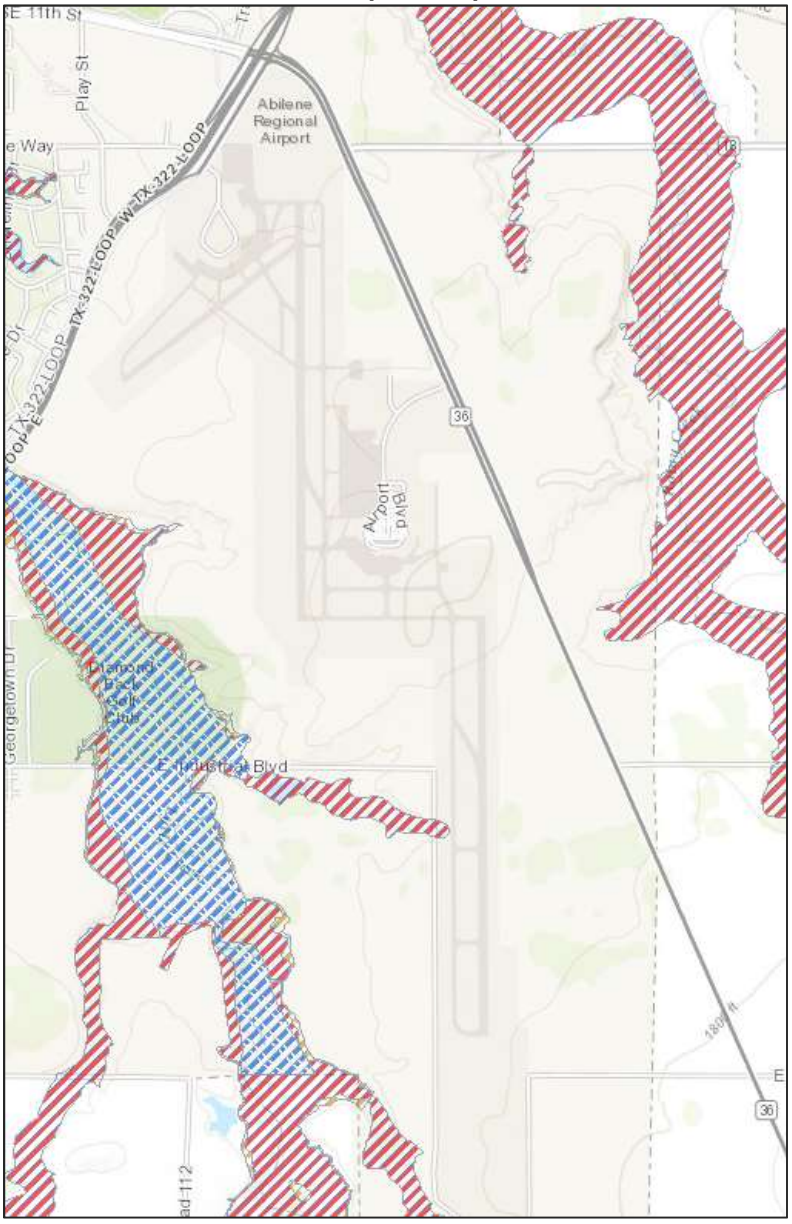
Common Name	Genus/Species	Federal Status	State Status
	BIRDS		
American Peregrine Falcon	*Falco peregrinus anatum*	DL	T
Arctic Peregrine Falcon	*Falco peregrinus tundrius*	DL	N/A
Baird's Sparrow	*Ammodramus bairdii*	N/A	N/A
Bald Eagle	*Haliaeetus leucocephalus*	DL	T
Black-capped Vireo	*Vireo atricapilla*	LE	E
Ferruginous Hawk	*Buteo regalis*	N/A	N/A
Mountain Plover	*Charadrius montanus*	N/A	N/A
Peregrine Falcon	*Falco peregrinus*	DL	T
Snowy Plover	*Charadrius alexandrinus*	N/A	N/A
Sprague's Pipit	*Anthus spragueii*	N/A	N/A
Western Burrowing Owl	*Athene cunicularia hypugaea*	N/A	N/A
Western Snowy Plover	*Charadrius alexandrinus nivosus*	N/A	N/A
Whooping Crane	*Grus americana*	LE	E
	MAMMALS		
Black-tailed prairie dog	*Cynomys ludovicianus*	N/A	N/A
Cave myotis bat	*Myotis velifer*	N/A	N/A
Gray wolf	*Canis lupus*	LE	E
Plains spotted skunk	*Spilogale putorius interrupta*	N/A	N/A
Red wolf	*Canis rufus*	LE	E
	MOLLUSKS		
Texas fatmucket	*Lampsilis bracteata*	C	T
	REPTILES		
Spot-tailed earless lizard	*Holbrookia lacerata*	N/A	N/A
Texas horned lizard	*Phrynosoma cornutum*	N/A	T
	PLANTS		
Cory's evening-primrose	*Oenothera coryi*	N/A	N/A
Glass Mountains coral-root	*Hexalectris nitida*	N/A	N/A
Prairie butterfly-weed	*Gaura triangulata*	N/A	N/A
Rock grape	*Vitis rupestris*	N/A	N/A
Warnock's coral-root	*Hexalectris warnockii*	N/A	N/A

Source: Texas Department of Fish and Wildlife

FEMA Floodplain Overview

Flooding can hamper the safe operation of an airport and make it difficult to develop property on or around an airport. As part of this study, an online inquiry was completed through the City of Abilene GIS site and the Federal Emergency Management Administration (FEMA) 100-year Floodplain does encroach on ABI property immediately to the west of Taxiway Delta. **Figure 2-61** shows the location of the floodplains around ABI. The red hashed areas indicate the location of the 100-year floodplain. The blue hashed area denotes an established regulatory floodway.

Figure 2-61
Floodplain Map

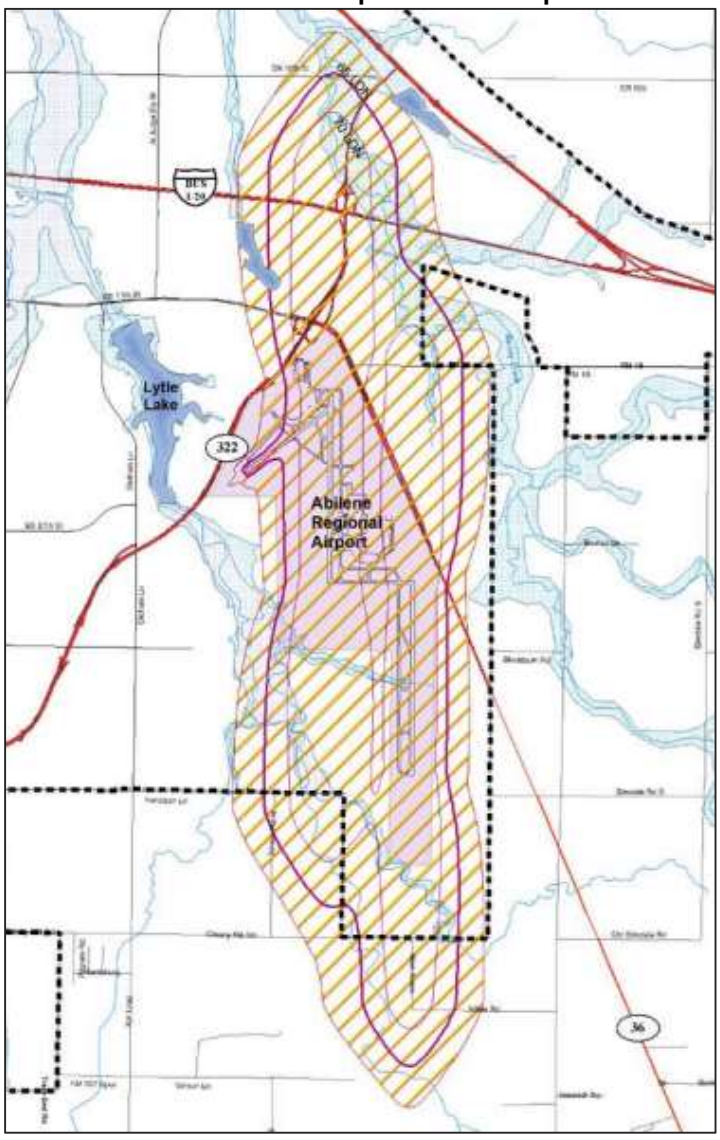


Source: City of Abilene – GIS System

Noise Exposure

Noise is an important environmental concern as it can affect the quality of life for the residences close to an airport. As part of the City of Abilene's 2004 Comprehensive Plan, "sensitive development areas" were established to help prevent developments that could negatively be impacted by aircraft noise from ABI. A copy of the Sensitive Development Area Map from the City of Abilene's Comprehensive Plan is shown as **Figure 2-62**. The orange hashed area denotes the sensitive development area. The purple line surrounding the airport identifies the currently established 65 DNL line. ABI staff reports that they receive very few noise complaints regarding their existing aircraft traffic.

Figure 2-62
Sensitive Development Area Map



Source: City of Abilene – Comprehensive Plan

Air and Water Quality

The impacts that an airport can have on local air and water quality should be a major consideration in the growth and development of an airport. There are no known issues at ABI related to water quality or air and water pollution at this time and the airport does have a current Stormwater Pollution Prevention Plan (SWPPP). ABI does have an EPA registered air quality monitoring and weather station located on airport property that is maintained by the National Weather Service (NWS).

Socioeconomics

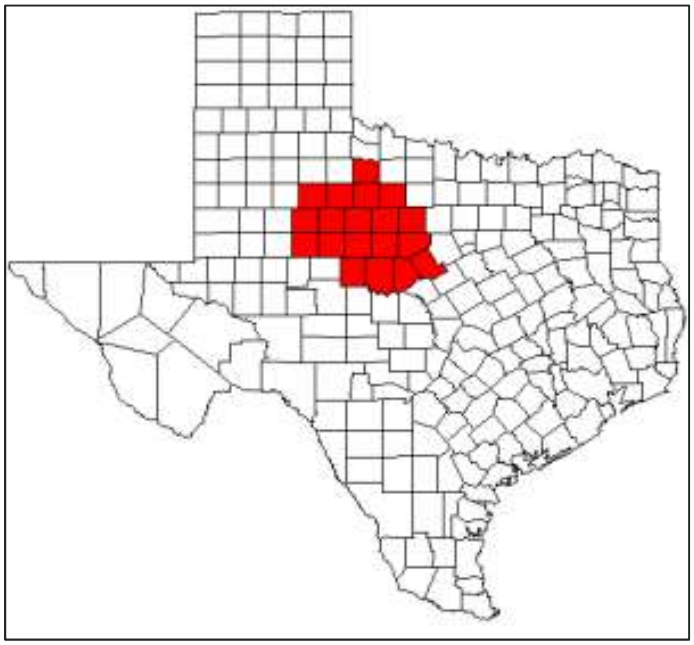
An assessment of regional economic conditions is conducted to gain a better understanding of the relationship between historic and future aviation activity levels within an airport's area of influence. This information is essential and directly influences a region's airport. Therefore, the following socio-economic information, population, median family income, and income distribution has been collected to understand current conditions and influence assumptions involved in the development of the aviation demand forecasts for ABI.

Regional Economy

Understanding the overall regional economy is important to understanding a community/region and potential changes/trends that could affect an airport in the future.

The economy in the region surrounding ABI is currently growing at a slow pace. The majority of the counties in ABI's commercial catchment area defined earlier in this chapter are part of the West Central Texas Council of Governments (WCTCOG). WCTCOG is composed of 19 counties, including Taylor County where ABI resides. The WCTCOG region is depicted below in **Figure 2-63**, *WCTCOG Counties*.

Figure 2-63
WCTCOG Counties



Source: Garver, 2017

WCTCOG oversees the West Central Texas Economic Development District (WCTEDD) which is focused on the economic development of the WCTCOG region. To ensure a focused and comprehensive approach to improving the economic climate in the region WCTEDD has established a Comprehensive Economic Development Strategy (CEDS). The CEDS was established in 2015.

The vision statement for the WCTEDD is:

> *The West Central Texas Economic Development District shall serve as a catalyst for economic expansion and prosperity while preserving the integrity and character of the Big Country region. Strategic development will occur through creation of sustainable wage jobs, establishment of innovative projects and businesses, strong alliances with local economic development efforts, provision of technical assistance, collection and interpretation of economic data, and vigorous evaluation and procurement of services and resources.*

According to the CEDS the total regional wages for the WCTCOG region totaled approximately $4.4 billion in 2015. The following industry clusters were the primary contributors:

1. Energy (Fossil and renewable) - $1,022,043,778
2. Biomedical/Biotechnical (Life Sciences) - $544,891,702
3. Business and Financial Services - $418,353,105
4. Defense Security - $371,075,366
5. Education and Knowledge Creation - $276,484,899

The predominant industry cluster in the region is energy as it accounts for almost 25% of the total wages for the region. This industry cluster includes both renewable energy (e.g. wind) and non-renewable energy (e.g. oil and gas) exploration, extraction, and production.

Another key aspect of a region's economy is understanding a region's Location Quotient (LQ). Location Quotient is a way of quantifying how concentrated a particular industry or occupation is in a given region compared to the nation as a whole. Unsurprisingly, the occupations with the highest LQs in the WCTCOG region are related to the energy industry. The top 5 are:

- Extraction Workers – Helpers – LQ 18.38
- Roustabouts, Oil and Gas – LQ 16.95
- Derrick Operators, Oil and Gas – LQ 15.00
- Service Unit Operators, Oil and Gas – LQ 12.63
- Wind Turbine Technicians – LQ 11.88

In addition to these energy industry centric occupations, the WCTCOG region also has high LQs in the following areas:

- Forestry Occupations – LQ 2.09
- Construction and Extraction Occupations – LQ 1.52
- Installation, Maintenance, and Repair Occupations – LQ 1.27
- Protective Service Occupations – LQ 1.26
- Healthcare Support Occupations – LQ 1.26
- Healthcare Practitioners and technical Occupations – LQ 1.08

These labor concentrations demonstrate the skills of the WCTCOG labor force and can be leveraged to market the region to new businesses or to encourage existing businesses to expand related to applicable industry clusters.

Additionally, according to the CEDS, in 2016 the total number of individuals employed in the labor force in the WCTCOG region was 141,494. The unemployment rate was 4.4%, which was slightly up from the 4.0% unemployment mark set in 2015.

One of the region's most significant challenges has been the development and education of the regional workforce. According to the CEDS, the WCTCOG region trails both the national and state averages in educational attainment.

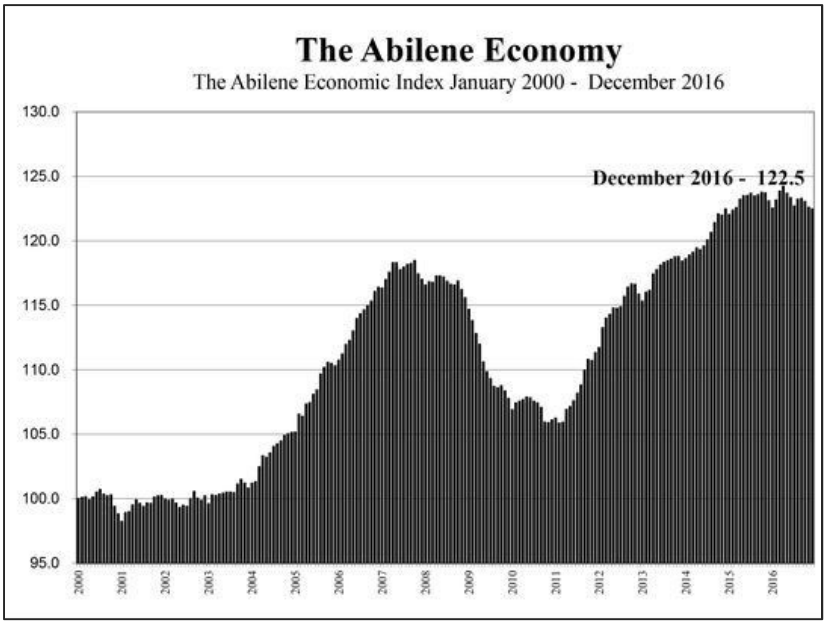
While recent economic indicators have not shown much growth, the WCTEDD and other local economic development partners have been working to improve the trend.

City of Abilene Economy

The City of Abilene is the largest municipality in the WCTCOG region and, consequently, plays a major role in the development and health of the regional economy. The City of Abilene works closely with a number of partner organizations including the Development Corporation of Abilene (DCOA), the Abilene Industrial Foundation (AIF), the Abilene Chamber of Commerce, and others to improve economic development in Abilene.

According to the Abilene Economic Index (AEI), a monthly economic indicator that is prepared by the DCOA and takes into account numerous economic elements, the Abilene economy has grown consistently since 2011 but began to soften in 2016. It is believed that this is primarily due to the low prices for crude oil and natural gas and the subsequent retraction in activity. **Figure 2-64**, *Abilene AEI*, shows the monthly AEI from January 2000 to December 2016.

Figure 2-64
Abilene AEI



Source: Abilene News Reporter

The Abilene Metropolitan Statistical Area (MSA) – comprised of Taylor, Jones, and Callahan County – saw consistent employment from 2000 to 2008 reaching a peak of 79,811 jobs in 2008. The economic recession in 2008, 2009, and 2010 resulted in some employment losses but employment numbers have been slowly increasing since 2010 and are now close to the 2008 peak. According to the DCOA, most of the recent job growth has been in the restaurants, bar, and hotel industry sector as well as the wholesale trade, and oil, gas, and mining industry sectors. The most substantial losses in recent years have been in the education and federal government (military) industry sectors.

It should also be noted that the composition of the local economy in the Abilene MSA differs from the regional economy in that it is more diverse and less dependent on the historically volatile oil and gas market. However, oil and gas remain a major component of the Abilene economy. According to the Economic Development Strategic Plan prepared by DCOA in March 2016 the largest industry sectors by employment in the Abilene MSA are:

- Healthcare and Social Assistance – 13.2% of the MSA
- Retail Trade – 10.8% of the MSA
- Local Government (Including public education and hospitals) – 9.9% of the MSA
- Lodging, Restaurants, & Bars – 9.1% of the MSA
- Construction – 6.5% of the MSA

The largest employers in the area are listed below:

- Dyess Air Force Base – 5,400 employees
- Hendrick Health System – 3,020 employees
- Abilene Independent School District – 2,450 employees
- Abilene State Supported Living Center – 1,240 employees
- City of Abilene – 1,200 employees

Additionally, the Location Quotients (LQs) for the Abilene MSA indicate that the following industries make up a larger share of the region's job base compared to national averages:

- Mining (including oil and gas) – LQ 4.80
- Federal Government (including military) – LQ 4.46
- Educational Services (Private) – LQ 1.79

These LQs are unsurprising because of the oil and gas exploration taking place in the region, the presence of Dyess Air Force Base, and the number of private higher education institutions (e.g. Abilene Christian University, Hardin-Simmons University, and McMurry University) within the MSA.

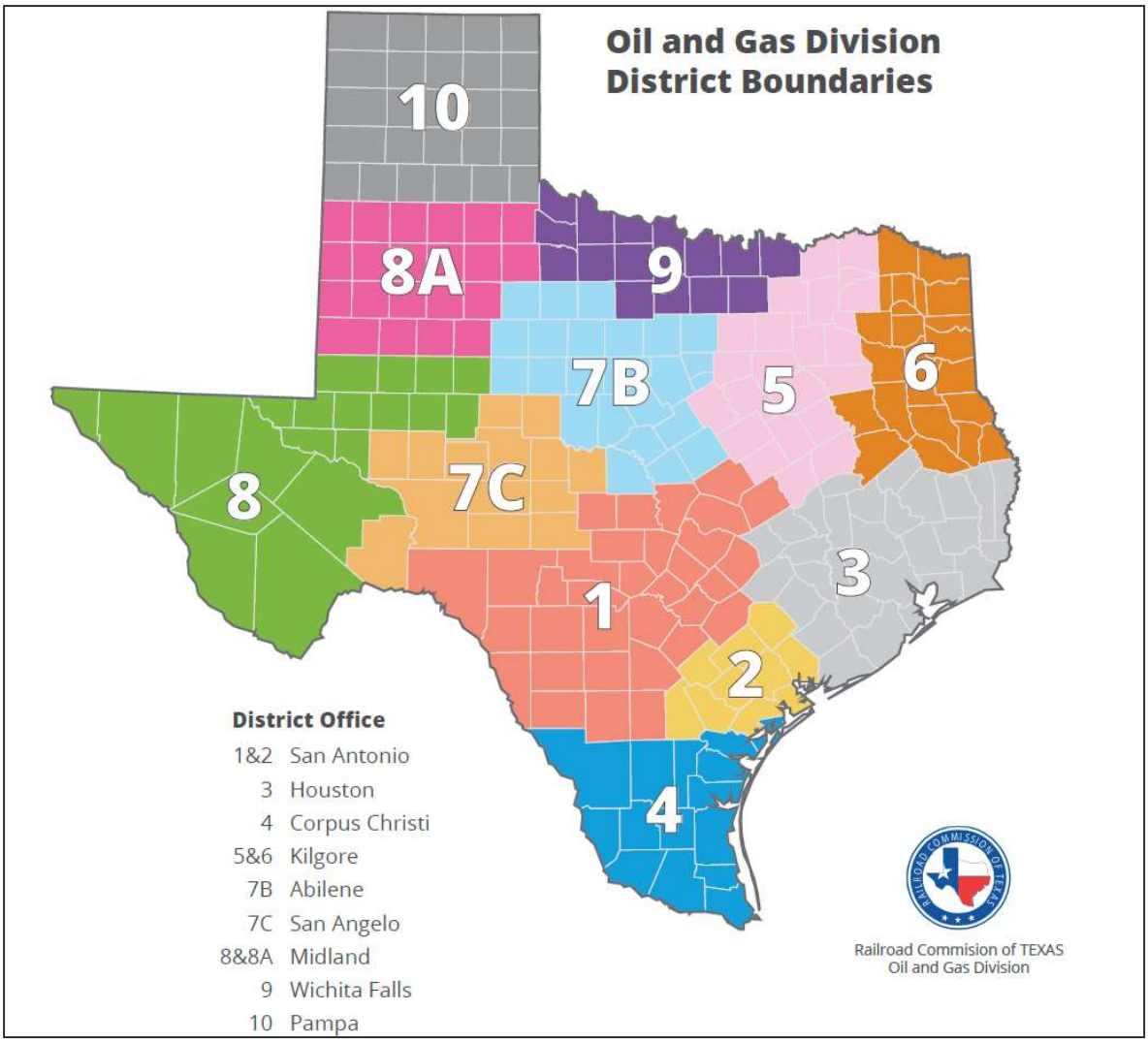
Abilene also ranks as one of the most affordable places to live in the US. Average home sale prices are 35% below the national average. Additionally, other items such as groceries, utilities, transportation, and health care are also below national averages.

Oil and Gas Production

The Texas Railroad Commission is the organization tasked with overseeing and monitoring the exploration and production of oil and natural gas in the State of Texas. The Texas Railroad Commission has segmented the counties in the State of Texas into various districts. Taylor County and the surrounding counties are part of District 7B, which has a total of 24 counties. A

map showing the various districts in Texas is shown in **Figure 2-65**, *Texas Oil and Gas Division District Boundaries*.

Figure 2-65
Texas Oil and Gas Division District Boundaries



Source: Railroad Commission of Texas

Since 2000, oil and gas production in District 7B has decreased. The largest declines have been in Casinghead Gas (gas produced along with crude oil of from oil wells) and Gas Wells. Oil production has also decreased but the declines are much smaller. **Table 2-18,** *Texas District* 7B *Oil and Gas Production*, displays the annual oil and gas production in District 7B since 2000.

Table 2-18
Texas District 7B Oil and Gas Production

Date	Oil (BBL)	Casinghead (MCF)	GW Gas (MCF)
2000	14,122,019	45,332,107	45,332,107
2001	13,066,915	46,762,531	46,762,531
2002	11,591,308	47,472,568	47,472,568
2003	10,836,610	43,547,887	43,547,887
2004	10,430,039	41,304,380	41,304,380
2005	9,745,582	41,096,140	41,096,140
2006	9,411,805	42,065,026	42,065,026
2007	9,025,461	40,595,600	40,595,600
2008	9,456,980	42,830,824	42,830,824
2009	8,985,966	39,344,840	39,344,840
2010	8,970,248	35,338,592	35,338,592
2011	9,577,422	33,319,622	33,319,622
2012	10,418,682	32,020,310	32,020,310
2013	11,066,655	30,690,788	30,690,788
2014	12,296,871	29,951,638	29,951,638
2015	11,807,894	27,610,918	27,610,918
2016	10,430,042	23,841,080	23,841,080

Source: Railroad Commission of Texas

The western edge of District 7B is located along the edge of the Permian Basin which is forecasted to seeing increasing oil production in the near future. In 2016, it is estimated that oil and gas companies paid over $28 billion for land acquisitions, which is over triple what was spent for land acquisitions in the area in 2015. Additionally, the U.S. Energy Information Administration estimates that oil production in the Permian Basin area will break previous production records in 2017 and again in 2018. However, the recent growth in the Permian Basin region does not seem to have impacted overall oil production numbers in Region 7B. The counties located in the western portion of Region 7B (Fisher, Nolan, Scurry, and Mitchell Counties) in the Permian Basin have seen little to no growth in the last 2 to 3 years.

Population

Population growth can be directly tied to the success and growth of an airport supporting a given population set. Additionally, population trends and expected rate of change provide insight into an area's economic potential.

ABI supports a much wider population base than that solely found within the City of Abilene or Taylor County. Consequently, for the purposes of this population analysis the primary counties comprising the ABI Catchment Area defined earlier in this chapter will be utilized to analyze

population trends related to ABI. The counties included in this analysis include: Taylor, Haskell, Fisher, Jones, Shackelford, Mitchell, Nolan, Callahan, Throckmorton, Eastland, Runnels, Coleman, Brown, Comanche, Stonewall, and Stephens. Small portions of the ABI Catchment Area protrude into Knox, Coke, and Scurry Counties. However, due to the small portion of each of these counties that are part of the catchment area they have been excluded from this analysis.

The ABI Catchment Area Counties annual population growth rate from 2000 to 2016 was 0.14% which is well below the growth rate for the State of Texas (1.85%) during the same period. During the forecast period (2017 -2037), the annual growth rate for the ABI Catchment Area Counties is expected to increase to 0.33% annually while the growth rate for the State of Texas is expected to slow to 1.06% annually. **Table 2-19**, *Catchment Area Population Data,* shows a breakdown of the historic and projected population figures for the area compared to Texas.

Table 2-19
Catchment Area Population Data

Historical Growth	Catchment Area Counties	Texas
2000	303,428	20,851,820
2010	305,942	25,145,561
2015	310,624	26,581,256
2016	310,516	27,947,116
Annual Growth Rate	0.14%	1.85%
Forecasted Growth		
2017	317,200	28,634,896
2022	324,564	29,576,078
2027	330,877	31,512,597
2032	335,661	33,456,996
2037	338,833	35,389,580
Forecast Annual Growth Rate	0.33%	1.06%

Source: Texas Demographic Center (TDC)

Note: Data for 2000 and 2010 are based on US Census Data as depicted on the TDC website. All other figures are based on population estimated provided by TDC and assume ½ the migration pattern seen between the 2000 and 2010 census. This model was used because the TDC recommends it as the best model for long-term forecasting.

Table 2-20, *County-Level Population Data*, shows the historic and projected population figures for each county in the ABI Catchment Area. From 2000-2016, Taylor County has been the primary driver in population growth within the region, with a total population growth of approximately 9,000 people and an annual growth rate of 0.52%. This trend is expected to continue during the forecast period as Taylor County is.

Table 2-20
County-Level Population Data

Counties	2000 Population Census	2010 Population Census	2015 Estimate	2016 Estimate	Annual Growth Rate (2000 - 2016)	2017 Estimate	2022 Estimate	2027 Estimate	2032 Estimate	2037 Estimate	Annual Growth Rate (2017 - 2037)
Brown	37,674	38,106	39,128	39,103	0.23%	39,410	40,252	40,814	41,133	41,189	0.22%
Callahan	12,905	13,544	14,154	14,167	0.58%	13,891	14,220	14,612	14,931	15,126	0.43%
Coleman	9,235	8,895	8,572	8,541	-0.49%	8,914	8,968	9,049	9,094	9,076	0.09%
Comanche	14,026	13,974	13,906	13,876	-0.07%	14,366	14,711	15,054	15,332	15,522	0.39%
Eastland	18,297	18,583	18,419	18,282	-0.01%	19,121	19,450	19,711	19,810	19,828	0.18%
Fisher	4,344	3,974	3,858	3,842	-0.76%	3,984	3,994	3,985	3,972	3,931	-0.07%
Haskel	6,093	5,899	5,716	5,678	-0.44%	5,866	5,887	5,938	5,972	5,963	0.08%
Jones	20,785	20,202	19,938	19,871	-0.28%	21,155	21,860	22,604	23,174	23,629	0.55%
Mitchell	9,698	9,403	8,980	9,013	-0.46%	9,670	9,863	10,047	10,160	10,268	0.30%
Nolan	15,802	15,216	14,756	14,673	-0.46%	15,786	16,224	16,637	16,977	17,158	0.42%
Runnels	11,495	10,501	10,439	10,447	-0.60%	10,678	10,888	11,042	11,152	11,152	0.22%
Shackelford	3,302	3,378	3,410	3,430	0.24%	3,506	3,592	3,667	3,718	3,707	0.28%
Stephens	9,674	9,630	9,340	9,199	-0.31%	9,888	10,110	10,323	10,487	10,558	0.33%
Stonewall	1,693	1,490	1,411	1,391	-1.22%	1,491	1,498	1,501	1,488	1,460	-0.10%
Taylor	126,555	131,506	137,000	137,438	0.52%	137,824	141,409	144,273	146,669	148,704	0.38%
Throckmorton	1,850	1,641	1,597	1,565	-1.04%	1650	1,638	1,620	1,592	1,562	-0.27%
Total	**303,428**	**305,942**	**310,624**	**310,516**	**0.14%**	**317,200**	**324,564**	**330,877**	**335,661**	**338,833**	**0.33%**

Source: Texas Demographic Center (TDC)

Note: Data for 2000 and 2010 are based on US Census Data as depicted on the TDC website. All other figures are based on population estimated provided by TDC and assume ½ the migration pattern seen between the 2000 and 2010 census. This model was used because the TDC recommends it as the best model for long-term forecasting.

forecasted to account for roughly 50% of the total population growth within the catchment area (approximately 11,000 of the total expected growth of 22,000).

Something that should be noted regarding the catchment area's population is that much of the growth since 2011 has come from retirees moving into the region. Abilene has been ranked #1 on Forbes' Best Places to Retire List in 2014, 2015, and 2016 primarily because of its nice weather, low crime, and economical cost of living. The population data shown in **Table 2-21**, *Population Data by Age*, depicts this trend.

Table 2-21
Population Data by Age

	Age Range 16-35		Age Range 36-55		Age Range 56-75		Age Range 76+	
County	**2011**	**2015**	**2011**	**2015**	**2011**	**2015**	**2011**	**2015**
Brown	9,264	9,324	9,687	9,254	8,704	9,737	2,677	2,814
Callahan	2,882	3,140	3,582	3,508	3,290	3,576	975	1,129
Coleman	1,660	1,764	2,299	1,985	2,404	2,385	810	848
Comanche	2,898	3,013	3,508	3,243	3,486	3,599	1,164	1,215
Eastland	4,471	4,458	4,446	3,997	4,446	4,774	1,557	1,588
Fisher	815	835	1,027	886	1,001	1,022	396	426
Haskell	1,320	1,252	1,513	1,391	1,407	1,485	614	567
Jones	5,916	5,890	6,166	5,746	3,828	4,067	1,120	1,147
Mitchell	3,221	3,061	2,419	2,178	1,674	1,709	537	557
Nolan	3,596	3,571	3,774	3,407	3,345	3,446	1,065	1,071
Runnels	2,221	2,389	2,640	2,334	2,469	2,613	913	902
Shackelford	705	737	938	818	778	901	266	277
Stephens	2,373	2,365	2,342	2,143	2,168	2,217	748	732
Stonewall	280	274	369	324	364	372	176	183
Taylor	41,883	43,442	31,162	29,633	22,370	25,093	7,818	8,194
Throckmorton	324	334	407	365	425	424	175	201
Total	**83,829**	**85,849**	**76,279**	**71,212**	**62,159**	**67,420**	**21,011**	**21,851**
Change (2011-2015)	**2,020**		**-5,067**		**5,261**		**840**	
Annual Growth Rate	**0.60%**		**-1.70%**		**2.05%**		**0.98%**	
State of Texas	7,421,092	7,943,975	6,929,843	7,160,528	4,078,083	4,790,634	1,052,433	1,147,862
Change (2011-2015)	**522,883**		**230,685**		**712,551**		**95,429**	
Annual Growth Rate	**1.72%**		**0.82%**		**4.11%**		**2.19%**	

Source: Texas Demographic Center (TDC)

Overall, the population of the ABI Catchment Area is expected to grow during the forecast period at a slow to moderate pace (0.33% annually). However, if the growth continues to come from the retiree population the economic impact to employment figures in the region may be not be substantial. This could also impact passenger utilization characteristics of ABI as the retiree population are typically leisure travels.

Employment

Table 2-22, *Total Employment-Catchment Area*, and **Table 2-23***, Unemployment Rate,* provide employment information for the catchment area region. Overall employment in the catchment area has slightly declined since 2012, lagging behind the State of Texas and the United States. However, unemployment rates have fallen in 13 of the 16 counties in the catchment area since 2012 and the 10 counties have lower unemployment rates that the State of Texas.

Table 2-22
Total Employment – Catchment Area

County	2012	2013	2014	2015	2016	Annual Growth Rate
Brown	14,981	14,928	15,008	15,159	15,377	0.65%
Callahan	5,572	5,587	5,564	5,469	5,463	-0.49%
Coleman	3,067	2,924	2,926	2,872	2,879	-1.57%
Comanche	5,421	5,331	5,262	5,115	5,097	-1.53%
Eastland	7,716	8,026	7,946	7,634	6,966	-2.52%
Fisher	1,805	1,786	1,777	1,726	1,675	-1.85%
Haskell	2,627	2,582	2,584	2,484	2,408	-2.15%
Jones	5,480	5,464	5,478	5,340	5,297	-0.85%
Mitchell	2,706	2,724	2,777	2,582	2,412	-2.83%
Nolan	6,672	6,581	6,736	6,612	6,514	-0.60%
Runnels	4,781	4,724	4,754	4,483	4,462	-1.71%
Shackelford	2,136	2,225	2,305	2,017	1,816	-3.98%
Stephens	4,124	3,996	4,098	3,923	3,770	-2.22%
Stonewall	715	675	669	631	597	-4.41%
Taylor	60,834	61,346	61,608	60,834	60,804	-0.01%
Throckmorton	786	757	799	753	736	-1.63%
County Totals	**129,423**	**129,656**	**130,291**	**127,634**	**126,273**	**-0.61%**
State of Texas	**11,818,675**	**12,070,808**	**12,340,567**	**12,463,031**	**12,671,801**	**1.76%**
United States	**142,469,000**	**143,929,000**	**146,305,000**	**148,834,000**	**151,436,000**	**1.54%**

Source: Texas Workforce Commission – TRACER System

Table 2-23
Unemployment Rate

County	2012	2013	2014	2015	2016
Brown	6.80%	6.40%	5.20%	4.30%	4.40%
Callahan	6.10%	5.70%	4.40%	4.30%	4.30%
Coleman	7.50%	7.50%	6.10%	5.60%	5.90%
Comanche	6.40%	5.80%	4.80%	4.20%	4.30%
Eastland	6.70%	6.00%	4.80%	4.70%	5.50%
Fisher	5.40%	5.40%	4.50%	3.80%	4.40%
Haskell	5.30%	4.90%	3.90%	3.50%	4.40%
Jones	7.20%	6.70%	5.50%	5.50%	5.90%
Mitchell	6.00%	5.50%	4.20%	5.60%	7.20%
Nolan	5.90%	5.70%	4.30%	4.00%	4.90%
Runnels	5.50%	5.20%	4.20%	3.70%	4.10%
Shackelford	3.50%	3.30%	2.70%	2.80%	3.90%
Stephens	5.90%	5.20%	4.40%	4.20%	5.30%
Stonewall	4.40%	4.70%	3.90%	4.40%	4.60%
Taylor	5.70%	5.20%	4.20%	3.70%	3.70%
Throckmorton	5.30%	5.00%	4.00%	3.20%	3.70%
State of Texas	**6.70%**	**6.20%**	**5.10%**	**4.50%**	**4.60%**
United States	**8.10%**	**7.40%**	**6.20%**	**5.30%**	**4.90%**

Source: Texas Workforce Commission – TRACER System

This paradoxical blend of an improving unemployment rate reduced overall employment, and growing population can be linked to the influx of retirees into the area and the declining population numbers of individuals in the 36-55 age range.

Additionally, many employable individuals within the area are traveling and working in locations outside of the catchment area. In DCOA's 2016 Strategic Plan, an analysis was conducted of the commuting patterns within the Abilene MSA. The study found that approximately 20,298 individuals that live within the Abilene MSA commute to jobs outside the MSA. While some of these individuals commute to other counties with the catchment area to work, many of them commute to Dallas, Ft. Worth, Austin, Midland, Lubbock and other areas to work.

Median Household Income

Table 2-24 provides the historic median household income for the region based on estimates from the US Census Bureau's American Community Survey (ACS). Median household income indicates the relative changes between income and population. As the productivity of business and industry increases, median household income also rises. Median household incomes have

increased consistently in Texas and the United States since 2010. Thirteen of the sixteen counties in ABI's catchment area have seen growth in median household income since 2010. Most of the counties have seen growth rates similar to those seen in Texas and the United States. However, the overall median income numbers for most counties are significantly lower than the median income averages in Texas and the United States. Taylor and Jones County (2 of the 3 counties in the Abilene MSA) have seen steady increases in median household income at rates higher than the state and national average. Callahan County, the other county in the Abilene MSA, has seen a slight decrease.

Table 2-24
Median Household Income

County	2010	2011	2012	2013	2014	2015	Annual Growth Rate
Brown	$38,832	$39,965	$40,821	$39,776	$40,982	$41,962	1.56%
Callahan	$44,596	$45,933	$46,812	$44,902	$42,102	$40,981	-1.68%
Coleman	$26,951	$27,910	$30,690	$31,373	$34,692	$35,156	5.46%
Comanche	$35,218	$36,326	$36,599	$36,020	$35,692	$37,470	1.25%
Eastland	$32,452	$34,531	$35,044	$34,914	$35,221	$34,888	1.46%
Fisher	$41,458	$43,724	$42,900	$42,125	$42,850	$41,406	-0.03%
Haskell	$35,295	$39,578	$40,247	$36,857	$42,645	$39,850	2.46%
Jones	$39,568	$37,872	$38,896	$41,297	$42,287	$43,897	2.10%
Mitchell	$37,260	$41,281	$41,082	$42,045	$45,769	$49,870	6.00%
Nolan	$37,102	$37,177	$37,671	$36,806	$37,342	$37,102	0.00%
Runnels	$37,823	$38,556	$39,115	$37,667	$38,684	$41,526	1.89%
Shackelford	$46,629	$44,647	$46,181	$47,277	$50,857	$48,750	0.89%
Stephens	$35,691	$37,400	$38,424	$41,728	$43,082	$43,951	4.25%
Stonewall	$52,222	$47,083	$52,917	$42,429	$42,321	$42,155	-4.19%
Taylor	$42,403	$43,065	$44,372	$44,891	$44,695	$45,396	1.37%
Throckmorton	$36,339	$40,380	$41,019	$39,286	$40,833	$41,042	2.46%
Texas	$49,646	$50,920	$51,563	$51,900	$52,576	$53,207	1.40%
United States	$51,914	$52,762	$53,046	$53,046	$53,482	$53,889	0.75%

Source: US Census Bureau American Community Survey 5-Year Estimates.

Income Distribution

Table 2-25 displays the distribution of household income for the counties in the ABI catchment area, the State of Texas, and the United States. Studies completed by the U.S. Department of Commerce have determined that the likelihood of taking a trip by air increases as household income increases. A parallel can be applied to GA market potential. The inclination to own and/or operate a general aviation aircraft or travel via commercial air carriers for business or pleasure is a direct function of income. The income distribution for the catchment area is slightly different from the United States and the State of Texas. There are fewer households in the higher income bracket in the catchment area compared to state and national averages.

Table 2-25
2015 Income Distribution

County	# of Households	Less Than $15,000	$15,000- $24,999	$25,000 - $34,999	$35,000 - $49,999	$50,000 - $74,999	$75,000 +
Brown	13,295	15.70%	13.40%	13.30%	16.40%	18.10%	23.10%
Callahan	5,273	10.40%	8.40%	11.70%	13.60%	21.60%	34.30%
Coleman	3,405	18.90%	18.40%	12.50%	18.10%	14.90%	17.20%
Comanche	5,119	18.40%	13.40%	14.20%	19.20%	16.00%	18.70%
Eastland	6,810	20.20%	18.60%	11.30%	17.50%	16.30%	16.10%
Fisher	1,667	15.20%	9.30%	15.60%	18.30%	19.50%	22.10%
Haskell	2,285	16.90%	17.30%	12.60%	11.80%	21.60%	20.00%
Jones	5,489	16.30%	13.90%	10.10%	16.60%	19.10%	24.10%
Mitchell	2,753	8.60%	13.40%	11.20%	17.10%	23.10%	26.70%
Nolan	5,599	17.50%	15.60%	14.20%	15.50%	15.70%	21.50%
Runnels	3,703	14.60%	16.30%	11.10%	16.70%	16.80%	24.40%
Shackelford	1,377	18.50%	10.00%	9.50%	13.10%	24.80%	24.10%
Stephens	3,447	16.80%	13.70%	11.90%	13.50%	16.90%	27.30%
Stonewall	580	23.00%	9.10%	7.60%	16.60%	15.30%	28.50%
Taylor	49,476	14.20%	11.90%	12.70%	15.00%	19.40%	26.80%
Throckmorton	701	14.50%	18.00%	10.60%	13.00%	16.40%	27.60%
Texas	9,149,196	12.30%	10.70%	10.30%	13.60%	17.80%	35.30%
United States	116,926,305	12.50%	10.60%	10.10%	13.40%	17.80%	35.60%

Source: U.S. Census Bureau, 2011-2015 American Community Survey.