2 EXISTING CONDITIONS AND ISSUES

2.1 Introduction

This section provides an overview of the existing Airport facilities as shown on **Exhibit 2.2-1** as well as other key attributes and policies that will be considered in the development of the 2040 ABIA Master Plan. The specific topics discussed in this section include:

- Airfield and Airspace Facilities
- Meteorological Conditions
- Passenger Terminal Buildings
- Landside and Access Roads
- Airport and Airline Support Facilities
- General Aviation/FBO/Military/TxDOT Facilities
- Air Cargo Facilities
- Site Utilities
- Stormwater
- Environmental Overview
- Sustainability Programs and Policies

Also included in this section is a description of the current issues associated with each of the topics listed above. These issues were collected through extensive stakeholder interviews.

2.2 Airfield and Airspace Facilities

ABIA currently has two parallel runways oriented in a north-south direction with a 6,700-foot separation between them. The western runway system (Runway 17R-35L; and its associated Taxiways C, G, S, T, V, and W; the Maintenance Apron; and portions of the Cargo Apron) was originally constructed as part of Bergstrom Air Force Base (BAFB) in 1957. The eastern runway system (Runway 17L-35R and its associated taxiways A, B, E, F, G, H, J, K, L, M and N) was originally constructed from 1995-1997 when the airfield was converted from Bergstrom Air Force Base to the Austin-Bergstrom International Airport. **Table 2.2-1** summarizes the runway construction date information and the existing ABIA layout is shown on Exhibit 2.2-1.

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Exhibit 2.2-1: ABIA Overall Airport Layout Plan

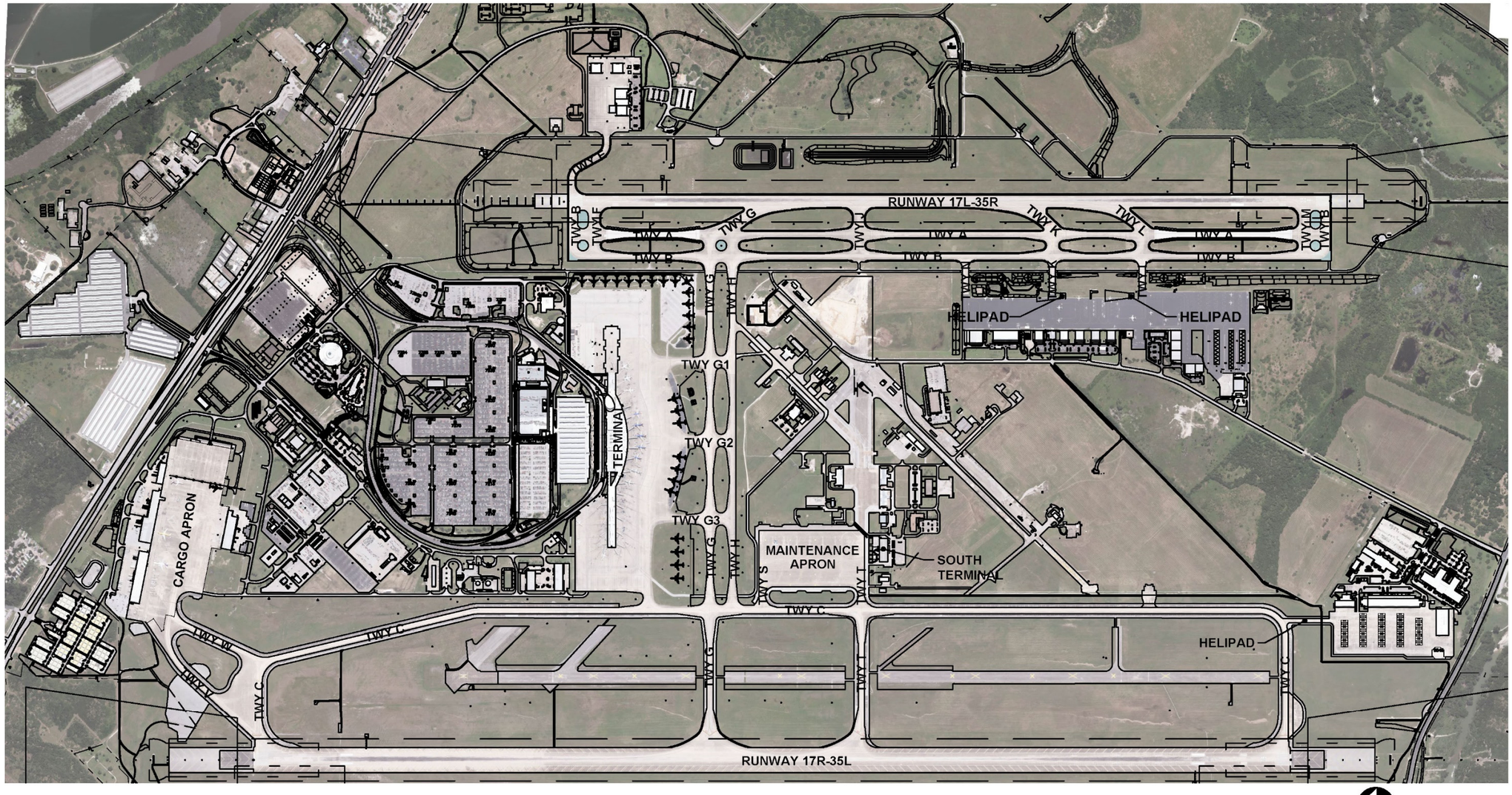

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Table 2.2-1: Runway Construction Dates

RUNWAY	ORIGINALLY CONSTRUCTED	ASSOCIATED TAXIWAYS
17R-35L (west)	as part of BAFB in 1957	C, G, S, T, V, W Maintenance Apron portions of the Cargo Apron
17L-35R (east)	with conversion from the BAFB to ABIA in 1995-1997	A, B, E, F, G, H, J, K, L, M, N

Source: ABIA Planning and Engineering Department

2.2.1 Airfield Facilities

2.2.1.1 Runways

Both parallel runways at ABIA are designated as Airport Design Group V and Aircraft Approach Category D. Runway 17R-35L is approximately 12,250 feet in length with 150-foot-wide concrete pavement and 75-foot-wide concrete shoulders, providing a total pavement width of 300 feet. Runway 17L-35R is approximately 9,000 feet in length with 150-foot-wide concrete pavement, and 12.5-foot-wide asphalt shoulders, providing a total pavement width of 175 feet. Federal Aviation Administration (FAA) standards allow dual simultaneous precision instrument approaches without the use of Precision Radar Monitor equipment to parallel runways separated by 4,300 feet or more. The two runway centerlines at ABIA are separated by 6,700 feet, which allows simultaneous operations to occur on each runway, providing two arrival and departure streams of traffic during poor weather conditions. The established airport elevation, which is defined as the highest point along any of the airport's runways, is 541.6 feet above Mean Sea Level (MSL) and is located on Runway 17R-35L. Approach visibility and other components of each runway end are listed in **Table 2.2-2**.

2.2.1.2 Runway Lighting

The west runway 17R-35L is equipped at the north end (17R) with Medium Intensity Approach Lighting System, precision approach path indicators (PAPI), and Runway Visual Approach (RVR). The south end (35L) of the west runway is equipped with Medium Intensity Approach Lighting System with runway alignment indicator lights (currently out of service), precision approach path indicators, and Runway Visual Approach.

The east runway 17L-35R is equipped at the north end (17L) with High Intensity Approach Lighting System Category II configuration with sequenced flashers, precision approach path indicators, Runway Visual Approach, and Touchdown Zone Lighting (TDZ). The south end (35R) of the east runway is equipped with Medium Intensity Approach Lighting System with runway alignment indicator lights, precision approach path indicators, Runway Visual Approach, and Touchdown Zone Lighting. This allows the runway to remain operational in lower visibility conditions.

Both runways are marked with standard precision point, touchdown zone, and edge markings. A summary of the existing runway components and data is shown in Table 2.2-2.

Table 2.2-2: Existing Runway Data

CATEGORY		RUNWAY			
		17L	35R	17R	35L
Aircraft Design Group (ADG)		V	V	V	V
Length		9,000’	9,000’	12,250’	12,250’
Width (not including shoulders)		150’	150’	150’	150’
Surface Composition		PCC	PCC	PCC	PCC
PCC Grooving		Yes	Yes	Yes	Yes
Effective Gradient		0.20%	0.20%	0.44%	0.44%
Approach Category		P1	P1	P1	P1
Approach Visibility		600’	1,800’	4,000’	2,400’
Approach Ceiling		0’	200’	200’	200’
Departure Minimum		Standard	Standard	Standard with min. climb of 240 ft. per NM to 2600	Standard with min. climb of 240 ft. per NM to 2600
Runway Marking		Precision CAT IIIb	Precision CAT I	Precision CAT I	Precision CAT I
Runway Lighting		TDZ, HIRL, RCLS	TDZ, HIRL, RCLS	HIRL	HIRL
Weight Bearing Capacity	Single Wheel Landing Gears	75,000 lbs.	75,000 lbs.	75,000 lbs.	75,000 lbs.
	Dual Wheel Landing Gears	210,000 lbs.	210,000 lbs.	210,000 lbs.	210,000 lbs.
	Dual Tandem Landing Gears	618,000 lbs.	618,000 lbs.	618,000 lbs.	618,000 lbs.
Visual Aids		ALSF-2, PAPI, RVR, TDZ	MALSR, PAPI, RVR, TDZ	MALS, PAPI, RVR	MALSR, PAPI, RVR
Runway End Elevation, [MSL]		491.7	473.7	541.6	487.6
Takeoff Runway Available		9,000’	9,000’	12,250’	12,250’
Takeoff Distance Available		9,000’	9,000’	12,250’	12,250’
Accelerate Stop Distance Available		9,000’	9,000’	12,250’	12,250’
Landing Distance Available		9,000’	9,000’	12,250’	12,250’

Notes: Portland Cement Concrete (PCC), Precision Instrument Approach Category 1 (P1), High Intensity Runway Lighting (HIRL), Runway Centerline Lighting System (RCLS), High Intensity Approach Lighting System Category II Configuration with Sequenced Flashers (ALSF-2), Precision Approach Path Indicator (PAPI), Runway Visual Range (RVR), Medium Intensity Approach Lighting System (MALS), Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights (MALSR)
Source: ABIA Airport Layout Plan.

2.2.1.3 Taxiways

The existing taxiway system at ABIA is comprised of high-speed runway exits and parallel and connecting taxiways that allow the circulation of aircraft while on the ground between the terminal ramps, maintenance ramps, cargo area, and runways. All taxiways are constructed with Portland Cement Concrete (PCC) surfaces and either PCC or asphalt shoulders. All taxiways can accommodate a single wheel load of 75,000 pounds. The existing taxiways are equipped with a High Intensity Taxiway Lighting (HITL) system, and Taxiways B, F, G, H, K, L, and M are equipped with centerline lights. The recently completed extensions of Taxiway A are equipped with empty light cans and conduit for future centerline lights.

The west runway 17R-35L has four exit taxiways. Taxiway G provides a 30-degree acute angle exit for aircraft traveling from both directions, while Taxiway T provides 30-degree acute angle exit for aircraft traveling from north to south. These are not considered as typical high-speed exits; however, aircraft can exit the runway at a slightly higher speed than a typical 90-degree exit. Taxiway C provides access at the north and south ends of the runway and serves as a parallel taxiway for the full length of the runway with a centerline separation from Runway 17R-35L of 1,788 ft.

The east runway 17L-35R has eight exit taxiways. Taxiways K and L provide 30-degree acute angle exits for aircraft traveling from north to south. Taxiway G provides a 30-degree acute angle exit for aircraft traveling south to north. These are not typical high-speed exits; however, aircraft can exit the runway at a slightly higher speed than on a typical 90-degree exit. Taxiway J provides a standard 90-degree exit near the midpoint of the runway. The 30-degree acute angle exit taxiways are 150 feet wide at the runway, while all other taxiways are 75 feet wide. The runway has dual entrance and exit taxiways at each end, with Taxiway B providing access at the north and south ends of the runway and continuing as a parallel taxiway for the full length of the runway. Taxiway F is parallel to Taxiway B at the north end of the runway, and Taxiway M is parallel to Taxiway B at the south end of the runway and provide a second entrance/exit point to the runway ends. Taxiways F and M provide a second departure point for aircraft departures. Taxiway A serves as a second parallel taxiway for the full length of the runway. Taxiway A centerline is 400 feet offset from the Runway 17L-35R centerline and 267 feet offset from the Taxiway B centerline.

2.2.1.3.1 Taxiway Design Groups

In 2012, the FAA Advisory Circular 150/5300-13, *Airport Design*, was updated to include Taxiway Design Groups (TDG) to supplement the ADG criteria when designing taxiways. In 2015, construction was completed on portions of Taxiway A, extending the parallel taxiway for the entire length of Runway 17L-35R. These sections of Taxiway A were designed to accommodate the B747-400 aircraft, which resulted in a TDG-6. Due to the TDG-6 classification, the north and south ends of Taxiway A were constructed with 35-foot wide shoulders, while all other taxiways on the airfield were constructed before 2012 with 12.5-foot wide shoulders. Although the taxiway design criteria used was for TDG-6, the existing horizontal spacing of parallel Taxiways A and B, and Runway 17L-35R restrict the size of aircraft that can be used on each segment of the airfield at once. This is discussed later in the chapter under Current Airfield Issues.

2.2.1.4 Helipads

ABIA operates three existing helipads. Two helipads are located adjacent to the General Aviation Apron, between Taxiway L and Taxiway K. These helipads have 60-foot by 60-foot concrete surfaces and are generally used by the Austin Police Department and the Texas State Police. The third helipad is located on the taxiway connecting Taxiway C to the Army Aviation Support Facility. This helipad has 50-foot by 50-foot concrete surface and is restricted to military use only.

2.2.1.5 Pavement Management Plan Summary

Currently ABIA is in the process of finalizing an overall Pavement Management Plan (PMP) for its airfield and landside pavements. The purpose of the PMP is to assist ABIA in determining locations and priorities for future pavement maintenance and reconstruction project needs throughout the airport. A Pavement Condition Index (PCI) has been established as part of the PMP for the majority of airfield and landside pavements. A resulting technical Pavement Classification Number (PCN) for the airfield pavements has been established based on the current and forecasted aircraft fleet mix at ABIA.[1] With the PCI and PCN data, a comprehensive PMP is being established that identifies and prioritizes future maintenance, rehabilitation and/or reconstruction projects for the airside and landside pavements. At this point in time, the PCI values have been established for each branch of airfield pavement, and pavement branches have been categorized into a maintenance category based on the PCI condition according to the PCI rating scale shown in **Table 2.2-3**.

Table 2.2-3: PCI Rating Scale

PCI RATING	RANGE	DEFINITION	MAINTENANCE CLASSIFICATION
Good	100-85	Pavement has minor or no distresses and requires only routine maintenance.	Preventative Maintenance
Satisfactory	84-70	Pavement has scattered low-severity distresses that need only routine maintenance.	
Fair	69-55	Pavement has a combination of generally low- and medium-severity distresses. Maintenance & rehabilitation needs are routine to major in the near future.	Rehabilitation
Poor	54-40	Pavement has low-, medium-, and high-severity distresses that probably cause some operational problems.	
Very Poor	39-25	Pavement has predominantly medium- and high-severity distresses that cause operational restrictions.	Reconstruction
Serious	24-10	Pavement has mainly high-severity distresses that cause operation restrictions. Immediate repairs are needed.	
Failed	9-0	Pavement has deteriorated to the point that safe operations are no longer possible. Complete reconstruction is required.	

Source: From the Pavement Management Plan (DRAFT) PCI Chapter, March 24, 2017. Prepared for ABIA by RS&H.

[1] Fleet mix data for the PMP report was derived from the ABIA monthly noise reports for the year 2015, with an assumed growth factor of 2.8%. Pavement Management Plan (DRAFT) PCI Chapter, March 24, 2017, prepared for ABIA by RS&H.

2.2.1.5.1 Airfield Pavement Condition

ABIA airfield PCI inspections took place between the fall of 2016 and the spring of 2017. During that time, approximately 99% of the existing airfield pavement area was inspected to determine the current airfield PCI values. The sections of the airfield not covered in the inspections were obstructed due to terminal expansion construction activities and a portion of the Cargo Ramp being repurposed as overflow long-term vehicle parking. The resulting existing condition PCI values are shown in **Table 2.2-4**.

Table 2.2-4: 2017 ABIA Airfield PCI Results

AIRFIELD BRANCH ID	BRANCH WEIGHTED PCI VALUES	PCI CONDITION CATEGORY	MAINTENANCE CATEGORY	PAVEMENT SECTION
Runway 17L-35R	70	Satisfactory	Preventative	16” PCC / 6” CTB / 6” DBC / 6” LTS
Runway 17R-35L	76	Satisfactory	Preventative	19”-23” PCC / 6”-7.5” FBC
Taxiway A	81	Satisfactory	Preventative	16” PCC / 6”-8” CTB / 6” LTS
Taxiway B	77	Satisfactory	Preventative	16” PCC / 6” CTB / 6” LTS
Taxiway C	53	Fair	Rehabilitation	23” PCC / 7.5” FBC
Taxiway E	83	Satisfactory	Preventative	16” PCC / 6” CTB / 6” SBC / 6” LTS
Taxiway F	70	Satisfactory	Preventative	16” PCC / 6” CTB / 6” SBC / 6” LTS
Taxiway G (East)	70	Satisfactory	Preventative	16” PCC / 6” CTB / 6” SBC / 6” LTS
Taxiway G (Midfield)	73	Satisfactory	Preventative	16” PCC / 6” CTB / 6” SBC / 6” LTS
Taxiway G (West)	69	Fair	Rehabilitation	17”-18” PCC / 6” CTB / 6” DBC / 6” LTS
Taxiway G1	87	Good	Preventative	16” PCC / 6” CTB / 6” SBC / 6” LTS
Taxiway G2	81	Satisfactory	Preventative	16” PCC / 6” CTB / 6” SBC / 6” LTS
Taxiway G3	81	Satisfactory	Preventative	16” PCC / 6” CTB / 6” SBC / 6” LTS
Taxiway H	74	Satisfactory	Preventative	16” PCC / 6” CTB / 6” SBC / 6” LTS
Taxiway J	75	Satisfactory	Preventative	16” PCC / 6” CTB / 6” SBC / 6” LTS
Taxiway K	74	Satisfactory	Preventative	16” PCC / 6” CTB / 6” SBC / 6” LTS
Taxiway L	74	Satisfactory	Preventative	16” PCC / 6” CTB / 6” SBC / 6” LTS
Taxiway M	79	Satisfactory	Preventative	16” PCC / 6” CTB / 6” SBC / 6” LTS
Taxiway N	75	Satisfactory	Preventative	15.5” PCC / 6” CTB / 6” SBC / 6” LTS
Taxiway S	59	Fair	Rehabilitation	23” PCC / 7.5” Filter Base Course
Taxiway T	63	Fair	Rehabilitation	23” PCC / 6” Filter Base Course

AIRFIELD BRANCH ID	BRANCH WEIGHTED PCI VALUES	PCI CONDITION CATEGORY	MAINTENANCE CATEGORY	PAVEMENT SECTION
Taxiway V	61	Fair	Rehabilitation	21" PCC / 6" Base
Taxiway W	70	Satisfactory	Preventative	21" PCC / 6" Base
Cargo Apron	76	Satisfactory	Preventative	Varies
General Aviation Apron	77	Satisfactory	Preventative	4" AC / Base Varies
Maintenance Apron	69	Fair	Rehabilitation	19"-23" PCC / 6" Base
Terminal Apron	82	Satisfactory	Preventative	15.5"-16" PCC / 6" CTB / 6" SBC / 6" LTS
TxDOT Apron	76	Satisfactory	Preventative	Varies
Warmup Pad	77	Satisfactory	Preventative	21" PCC / 6" Base

Notes: Definition of abbreviated terms: Portland Cement Concrete (PCC), Cement Treated Base (CTB), Dense Base Course (DBC), Flexible Base Course (FBC), Subbase Course (SBC), Lime Treated Subgrade (LTS)
Source: From the Pavement Management Plan (DRAFT) PCI Chapter, March 24, 2017. Prepared for ABIA by RS&H.

With widely varying ages of the pavements across the airfield, resulting PCI condition categories range from fair to good, with the majority of the pavement area in the satisfactory and good categories. The overall PCI value for all airfield pavements is 74, classifying the overall airfield as satisfactory. Seventy-three percent of the airfield pavement fell within the preventative maintenance category; with 8% (1,543,480 square feet (sq.ft.), rated good and 65% (13,435,027 sq.ft.) rated satisfactory. Twenty-seven percent of the airfield pavement fell within the rehabilitation category, with 24% (4,975,354 sq.ft.) rated fair and three percent (629,141 sq.ft.) rated as poor. No portions of the airfield pavement received failing, serious, or very poor ratings; therefore, no portions of the airfield pavement need immediate reconstruction based on the PCI results. Portions of the Taxiway C pavement associated with the West Runway System provide the lowest PCI values and would be the current highest priority for pavement rehabilitation on the airfield.

ABIA has planned several airside improvement projects that are budgeted within their 5-year Capital Improvement Program (CIP). The airfield pavement projects listed in the current 5-year CIP are shown in **Table 2.2-5**.

Table 2.2-5: Planned ABIA Airfield Pavement Capital Improvement Projects

FISCAL YEAR	CAPITAL IMPROVEMENT PROJECT	TOTAL BUDGET
FY2018	Airside Improvements FY2018	$3,500,000
	Midfield Access Road (East Service Road to Maintenance Ramp)	$600,000
FY2019	East Taxiway System Shoulder Modifications – Design	$5,000,000
FY2020	East Taxiway System Shoulder Modifications – Construction	$10,000,000
	Airfield Improvements FY2020	$6,000,000

Note: Fiscal Year = FY
Source: ABIA Fiscal Year 2017 CIP 5-year Plan, Revised Feb. 26, 2016.

2.2.1.6 Airfield Compliance and Constraints

Airfields should be designed in accordance with the current FAA guidelines and requirements at the time of construction. These guidelines help to determine the airport's critical aircraft(s), runway, and taxiway design standards, and assist with identifying any airfield constraints that require modification. The following sections present the existing airfield constraints at ABIA based on FAA Advisory Circular's 150/5300-13A Change 1, *Airport Design*.

2.2.1.7 Modification of Standards

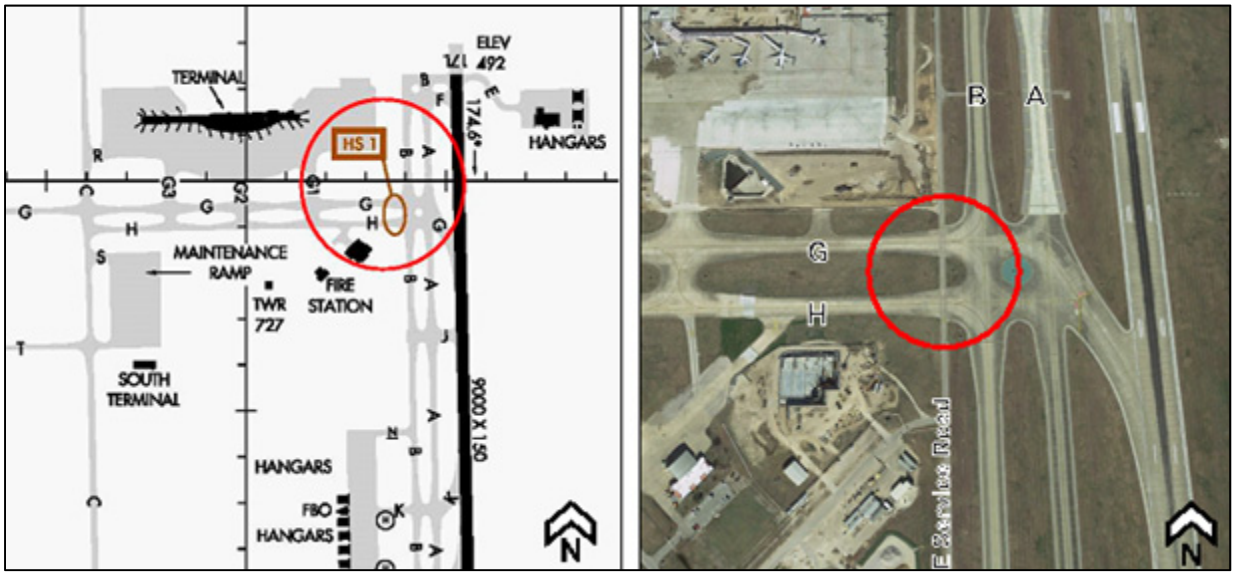
As a condition of receiving federal grants for airport improvements, airports must comply with design standards adopted by the FAA. These standards are necessary for the safety, efficiency, and economy of the national airport system and its users. However, when local conditions do not allow an airport to meet standards, the FAA provides a process for airport sponsors to apply for a Modification of Standards (MOS) for airport design standards in order to maintain an adequate level of safety. A MOS enhances or maintains airfield capacity and efficiency by assuring that aircraft can safely operate when current standards are not met. At the time of this Master Plan Study, no recorded MOS for ABIA have been submitted to the FAA.

2.2.1.8 Hot Spots

The FAA defines a "hot spot" as a location on an airport movement area where collisions or runway incursions have occurred or are likely to occur. Air Traffic Control (ATC), pilots, and vehicle drivers must be alert when operating in these areas. The FAA ATC identified one location on the ABIA airfield that is considered a hot spot. The hot spot location is shown in **Exhibit 2.2-2** and is labeled HS-1. HS-1 consists of the East Service Road, running north to south that intersects Taxiways G and H just west of parallel Taxiway B.

Hot Spot-1 is a problem area where ground vehicles cannot stop between Taxiways G and H when crossing them. This area will be reviewed and evaluated for potential solutions during the airfield alternatives process.

Exhibit 2.2-2: ABIA Hot Spot



Source: FAA Terminal Procedures and Airport Diagrams, Effective June 22 through July 19, 2017. https://www.faa.gov/air_traffic/flight_info/aeronav/digital_products/dtpp/search/results/?cycle=1707&ident=aus

2.2.1.9 Current Airfield Issues

Taxiway A centerline separation from Runway 17L-35R is 400 feet, which only meets current ADG-III planning standards for Runway Safety Area Clearance (Runway 17L-35R cannot be used if an ADG-IV or larger aircraft is on Taxiway A). For future planning purposes, the critical aircraft at ABIA is the Boeing 787, which is in the ADG-V category. This will require a minimum runway to taxiway centerline separation of 500 feet. Currently Taxiway A is limited to ADG-IV aircraft due to the 400-foot separation from Runway 17L-35R. This also results in a limitation of ADG-IV aircraft on Runway 17L-35 when Taxiway A is being used for taxiing purposes by ADG-IV aircraft. This design limitation will be considered when determining the future airfield requirements to meet the future critical aircraft design standards.

As a reliever airport, ABIA will occasionally receive ADG VI aircraft as diversions from other surrounding airports, mainly Dallas Fort Worth Airport (DFW) and George Bush Intercontinental / Houston Airport (IAH). Runway 17L-35R is capable of handling these aircraft due to the existing overall concrete pavement width of 300 feet (runway striped as 150 feet wide, with 75-foot shoulders). However, several of the existing Taxiway C fillets are not sufficient to accommodate aircraft greater than ADG V' and would require reconstruction in order to avoid the need for ADG-VI aircraft to back-taxi on the runway. This design limitation will be considered when determining the future airfield requirements to meet the future critical aircraft design standards.

2.2.2 Airspace Facilities

2.2.2.1 Airspace and Air Traffic Control

The airspace surrounding ABIA is designated as Class C airspace, generally defined as that airspace from the surface to 4,000 feet above the airport elevation (charted in MSL) surrounding those airports that have an operational control tower, which are serviced by a radar approach control and which have a certain number of instrument flight rules (IFR) operations or passenger enplanements. Although the configuration of each Class C airspace area is individually tailored, the airspace usually consists of a five-nautical mile (NM) radius-core surface area that extends from the surface up to 4,000 feet above the airport elevation and a 10-NM radius-shelf area that extends no lower than 1,200 feet up to 4,000 feet above the airport elevation.[2] This section further describes the airspace configuration surrounding the airport, as well as airspace facilities that are offered at ABIA.

2.2.2.2 Airport Airspace Configuration

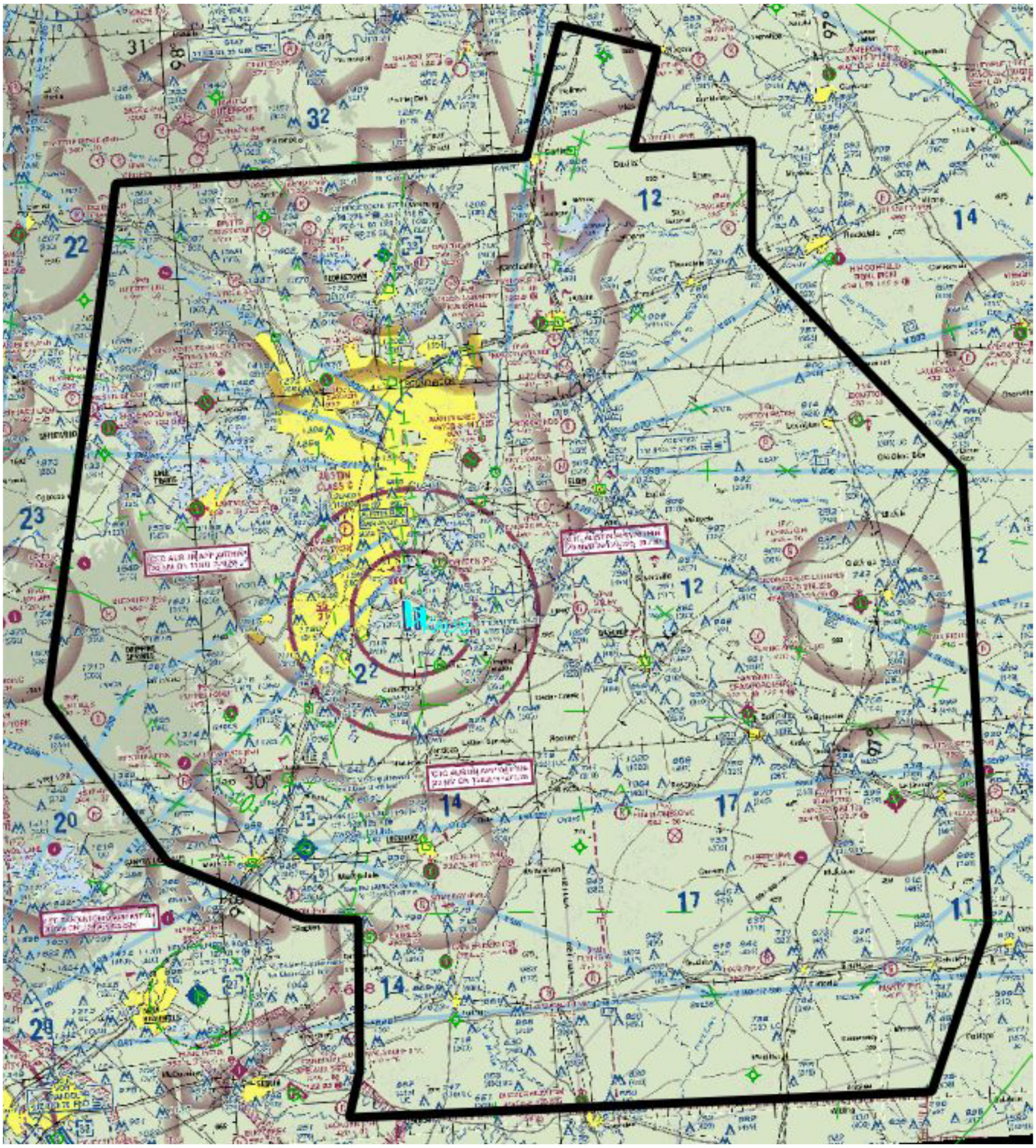
The airspace configuration surrounding ABIA is made up of Terminal Radar Approach Control Facility (TRACON) managed airspace, which assists aircraft with approach and departure control services within a designated area of airspace. Many low-altitude airways traverse the area and serve aircraft flying below 18,000 feet MSL. This area is depicted in **Exhibit 2.2-3**.

2.2.2.3 Airport Airspace Facilities

ABIA has a combined Airport Traffic Control Tower (ATCT) and Terminal Radar Approach Control Facility. The ATCT is a terminal facility that uses air/ground communications, visual signaling, and other devices to provide ATC services to aircraft operating in the local vicinity of an airport or on the movement area. ATCT authorizes aircraft to land or takeoff at the airport, controlled by the tower, or to transit the Class C airspace area regardless of flight plan or weather conditions (instrument flight rules or visual flight rules). The TRACON facility works an area of airspace with a 50+-mile radius and up to an altitude of 17,000 feet. Aircraft within this area are provided vectors to airports, around terrain and weather, as well as separation from other aircraft. Controllers in TRACONs determine the arrival sequence for the control tower's designated airspace. Enroute air traffic controllers work in facilities called centers. These centers control IFR aircraft from the time they depart from an airport or terminal area's airspace to the time they arrive at another airport or terminal area's airspace as shown in **Exhibit 2.2-4**. The Air Route Traffic Control Centers (ARTCC) facility serving ABIA aircraft enroute to or from the Airport is located in Houston.

[2] FAA Aeronautical Information Manual, October 12, 2017.

Exhibit 2.2-3: ABIA Airspace Configuration Area



Source: Austin-Bergstrom International Airport Air Traffic Control, 2017.

Exhibit 2.2-4: ATC Diagram

Source: Landrum & Brown analysis, 2017.

2.2.2.4 Airport Navigational Aids

Various airport navigational aids (NAVAIDS) currently in use at ABIA TRACON assist pilots with visual and electronic guidance to and from the airport.

2.2.2.4.1 Airport Surveillance Radar

An Airport Surveillance Radar (ASR) is the short-range radar used primarily for identifying and separating traffic surrounding airports. ABIA has an ASR-9 model that is located east of the central portion of Runway 17L-35R, which is labeled as Building 3005. ASR-9 is used by air traffic controllers to sequence, separate, and provide navigational guidance to aircraft in the terminal area environment within approximately 60 nautical miles of the airport.

2.2.2.4.2 Instrument Landing System

An Instrument Landing System (ILS) is a guidance system that provides both vertical and horizontal information to align an aircraft with the centerline of a runway. ABIA has three Category I (CAT I) ILS systems and one CAT II/IIIB ILS system.

Runway Ends 17R, 35L, and 35R are equipped with CAT I ILS approaches. CAT I ILS systems provide approaches to a decision height down to 200 feet and Runway Visual Range down to 1,800 feet. Runway End 17L is equipped with a CAT IIIB approach that permits landings with horizontal visibility as low as 600-feet and 0-feet decision height (no ceiling limitation) but requires special aircrew and aircraft certification for use. The ILS equipment and approach minimums for each runway are listed in **Table 2.2-6**.

The ILS consists of various components including a localizer transmitter, which provides pilots with electronic horizontal guidance, and a glide slope transmitter, which provides pilots with electronic vertical guidance to the runway. Runway visual range equipment is located at each runway end to support the ILS systems for each runway end.

Table 2.2-6: AUS ILS Approach Minimums

RUNWAY	TYPES OF APPROACH	CEILING [FT.]	VISIBILITY [FT.]
17L	ILS CAT IIIB	0	600
35R	ILS CAT I	200	1800
17R	ILS CAT I	200	2600
35L	ILS CAT I	200	2400

Note: The type of approach column indicates the best minimums achievable on landings on that runway end using designated equipment for that type of approach.
Source: FAA Terminal Procedure Approach Plates, Effective July 20, 2017 thru August 16, 2017.

2.2.2.4.3 Remote Transmitter/Receivers

ABIA has three remote transmitter/receivers (RTR) on the airfield, all located close to a runway end. RTR's are located northwest of the Runway 17R end, southwest of the Runway 35L end, and northeast of the Runway 17L end.

2.2.2.4.4 Distance Measuring Equipment

Distance Measuring Equipment (DME) is used to measure the slant range distance, in nautical miles, of an aircraft from the DME navigational aid. The DME operates in the UHF spectrum of frequencies on a line-of-sight principle. ABIA is equipped with DME antennae on all four runway ends that are associated with the ILS system.

2.2.2.4.5 Very High Frequency Omnidirectional Range Tactical Air Navigation

The CENTEX (CWK) Very High Frequency Omnidirectional Range Tactical Air Navigation (VORTAC) is located 13.2 nautical miles northeast of ABIA. The coordinates of the VORTAC are N30° 22.71' and W97° 31.79'. It is categorized as a high-altitude service volume and is usable for a distance of 40 nautical miles between altitudes of 1,000 to 14,500 feet MSL and a distance of 130 nautical miles at altitudes between 14,500 feet and 45,000 feet MSL. Along with other VOR facilities in the national airspace system, the CENTEX VORTAC provides enroute navigational guidance to pilots.

A VORTAC unit is comprised of a Very High Frequency Omnidirectional Range (VOR) unit navigational aid providing VOR azimuth, a Tactical Air Navigation (TACAN) azimuth and a TACAN DME unit co-located within the same facility. This is an ultra-high frequency electronic rho-theta air navigational aid which provides suitably equipped aircraft a continuous indication of bearing and distance to the TACAN station.

2.3 Meteorological Conditions

Meteorological conditions at an airport are an integral part of the airfield operational strategy. Wind and weather can sometimes dictate the operating configuration of the airfield as well as the amount of traffic that can be safely and efficiently handled. The direction and velocity of prevailing winds can influence the orientation of runways that accommodate aircraft activity as well as airfield operational performance. Cloud ceiling height and horizontal visibility determine the type of flight rules that are used, and precipitation can increase runway occupancy times, all of which affect runway capacity.

A wind-and-weather analysis was conducted to identify the meteorological conditions and to determine how often wind and weather conditions favor the use of each of the runway directions at ABIA. The analysis was conducted using the Landrum & Brown (L&B) WIND36 wind analysis computer program and the application of 17 consecutive years of weather data obtained from the National Climatic Data Center (NCDC) for the period of January 1, 2000 to December 31, 2016.

2.3.1 Meteorological Conditions Categories

Weather conditions such as low cloud ceiling and poor visibility can impact the capacity of an airport by closing the airport for operations or by increasing the aircraft separation requirement, thus reducing the number of operations that can occur in a given time period. Weather conditions are typically divided into three categories: all weather, Visual Meteorological Conditions (VMC), and Instrument Meteorological Conditions (IMC). All weather refers to any and all-weather conditions regardless of cloud ceiling height or surface horizontal visibility. By definition, all weather has a 100 percent occurrence and includes both VMC and IMC. Visual Flight Rules (VFR) apply when VMC exists, and similarly, IFR applies when IMC exists. The distinction between IFR and VFR is important because the separation distance required between aircraft arriving and departing during IMC conditions is greater than that required during VMC conditions. Consequently, given the same runway configuration, fewer aircraft operations can typically be accommodated during IMC conditions than during VMC conditions.

Both VMC and IMC have subsets that can be divided further. The meteorological conditions were calculated for several weather categories described in **Table 2.3-1**.

Table 2.3-1: Definitions of Meteorological Conditions

WEATHER CATEGORY	CLOUD CEILING BASE [FEET AGL]				SURFACE HORIZONTAL VISIBILITY		
All Weather	No Restrictions				No Restrictions		
VMC	≥1,000			and	≥3 miles		
IMC	≥0	and	<1,000	or	≥0 miles	and	<3 miles
CAT I	≥200	and	<1,000	or	1/2 to <3 miles (at least 2,400 feet RVR or 1,800 feet RVR with touchdown zone and centerline lighting)		
CAT II	≥100	and	<200	or	At least 1,200 feet RVR but no more than 2,400 feet RVR		
CAT III	≥0	and	<100	or	Less than 1,200 feet RVR		
CAT IIIA	≥50	and	<100	or	At least 700 feet RVR but no more than 1,200 feet RVR		
CAT IIIB	≥0	and	<50	or	At least 150 feet RVR but no more than 700 feet RVR		
CAT IIIC	0			or	Less than 150 feet RVR		

Notes: AGL is above ground level. IMC is instrument meteorological conditions. CAT I, CAT II, and CAT III represent divisions of IMC. CAT IIIA, CAT IIIB, and CAT IIIC represent divisions of IMC CAT III.
Source: FAA, Instrument Procedures Handbook (FAA-H-8261-1A), 2007. Landrum & Brown analysis.

2.3.2 Historical Occurrence of Meteorological Conditions

A summary of the historical occurrence for each meteorological condition is given in **Table 2.3-2**.

Table 2.3-2: Percent Occurrence of Meteorological Conditions

CONDITIONS	PERCENT OCCURRENCE
VMC	92.25%
IMC	7.75%
IMC CAT I	6.97%
IMC CAT II	0.50%
IMC CAT III	0.27%
IMC CAT IIIA	0.02%
IMC CAT IIIB	0.13%
IMC CAT IIIC	0.12%

Notes: Percentage occurrence total does not add up to 100% due to rounding
Weather described as VMC might also require ILS or other instrument approaches.
Source: National Climatic Data Center, station WBAN 13904, data recorded at Austin-Bergstrom International Airport (ABIA) for the period 01/01/2000-12/31/2016 and Landrum & Brown analysis

2.3.3 Wind Coverage by Runway End

Wind coverage refers to the percent of time crosswind and tailwind components are below an acceptable velocity. In accordance with FAA Advisory Circular (AC) 150/5300-13A, *Airport Design*, the crosswind should not exceed the velocities for the specific Runway Design Code (RDC) shown in **Table 2.3-3**.

Table 2.3-3: Allowable Crosswind Component per Runway Design Code

RDC	ALLOWABLE CROSSWIND COMPONENTS
A-I and B-I	10.5 knots
A-II and B-II	13.0 knots
A-III and B-III C-I through D-III D-I through D-III	16.0 knots
A-IV and B-IV C-IV through C-VI D-IV through D-VI	20.0 knots
E-I through E-VI	20.0 knots

Note: RDC is Runway Design Code
Source: FAA Advisory Circular 150/5300-13A, *Airport Design*, Table 3-1.

Therefore, the analysis allowed for maximum crosswind components of 10.5 knots, 13.0 knots, 16.0 knots, and 20.0 knots on each runway end. Additionally, the analysis allowed for a maximum tailwind component of five knots on each runway end. The results of the analysis showed the percent of time wind conditions would be favorable for arrival and departure operations in each runway direction, given the established crosswind and tailwind restrictions.

To determine the percent wind coverage for individual runway headings and all runways combined at ABIA, each crosswind limit component (10.5, 13, 16, and 20 knots) was used for each runway direction for a total of four scenarios.

Table 2.3-4 shows the percentage of time each individual runway direction provides wind coverage for each crosswind limit component for all weather conditions, based on the analysis. In addition, the column labeled "Total Runway Coverage" shows the total percent coverage provided by the two runway directions at ABIA. Total runway coverage is defined as when at least one runway direction (but not necessarily both) is available. Both runway directions combined provide a higher percent coverage than each runway individually.

Table 2.3-4: Percent Wind Coverage by Runway

CROSSWIND LIMIT	RUNWAY 17	RUNWAY 35	TOTAL RUNWAY COVERAGE
10.5 knots	80.78%	65.42%	98.92%
13 knots	81.31%	65.93%	99.71%
16 knots	81.43%	66.10%	99.93%
20 knots	81.46%	66.15%	99.99%

Source: National Climatic Data Center, station WBAN 13904, data recorded at Austin-Bergstrom International Airport (ABIA) for the period 01/01/2000-12/31/2016, and Landrum & Brown analysis

Further analysis indicated the percent of time wind conditions would be favorable for arrival and departure operations for each runway direction and for each weather category, given the established crosswind and tailwind restrictions. The results of this analysis are summarized in **Table 2.3-5**. The wind and weather analysis results did not take into consideration the actual capability of each runway end to accommodate aircraft operations during these specific conditions. Actual runway end usage is dependent on the runway instrumentation, aircraft fleet mix, flight destination, and in some cases, the use of surrounding airspace.

Table 2.3-5: Percent Wind Coverage by Runway End

WEATHER CATEGORIES	RUNWAY 17 [%]				RUNWAY 35 [%]				TOTAL COMBINED [%]			
	10.5 KNOTS	13 KNOTS	16 KNOTS	20 KNOTS	10.5 KNOTS	13 KNOTS	16 KNOTS	20 KNOTS	10.5 KNOTS	13 KNOTS	16 KNOTS	20 KNOTS
All Weather	80.78	81.31	81.43	81.46	65.42	65.93	66.10	66.15	98.92	99.71	99.93	99.99
VMC	81.22	81.77	81.89	81.92	64.18	64.71	64.88	64.93	98.89	99.71	99.94	99.99
IMC	75.60	75.86	75.95	75.98	80.14	80.44	80.58	80.67	99.30	99.70	99.87	99.97
CAT I	73.53	73.80	73.89	73.92	79.23	79.55	79.71	79.78	99.27	99.69	99.87	99.96
CAT II	93.22	93.35	93.48	93.48	87.10	87.10	87.10	87.23	99.60	99.73	99.87	100.00
CAT III	96.25	96.50	96.50	96.50	90.75	91.00	91.00	91.25	99.50	99.75	99.75	100.00
CAT IIIA	97.14	97.14	97.14	97.14	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
CAT IIIB	97.87	97.87	97.87	97.87	92.02	92.02	92.02	92.02	100.00	100.00	100.00	100.00
CAT IIIC	94.35	94.92	94.92	94.92	87.57	88.14	88.14	88.70	98.87	99.44	99.44	100.00

Notes: Total Combined column has at least one runway available
Source: National Climatic Data Center, station WBAN 13904, data recorded at Austin-Bergstrom International Airport (ABIA) for the period 01/01/2000-12/31/2016 and Landrum & Brown analysis.

2.3.4 Windrose

A windrose provides a graphical presentation of the average wind direction and velocity observed at an airport over a period of time and is used to calculate runway coverage. Three windrose diagrams were created for ABIA per FAA AC 150/5300-13A, *Airport Design*, Appendix 1, Wind Analysis: 1) reflecting VMC conditions, 2) reflecting IMC conditions, and 3) reflecting all weather conditions. Hourly weather data required to create the windroses was obtained from the NCDC for the period January 1, 2000 through December 31, 2016, and included wind direction, wind speed, cloud ceiling base height, and horizontal visibility.

The windrose diagrams showing all weather conditions, VMC, and IMC are depicted in **Exhibit 2.3-1, Exhibit 2.3-2** and **Exhibit 2.3-3**. The wind direction, which is measured at ten-degree intervals between 0 and 360 degrees, is displayed by radial lines with the directions labeled along the outer ring. The wind velocity is shown within the concentric circles at:

- zero to 10 knots
- 11 to 16 knots
- 17 to 21 knots
- 22 to 27 knots
- 28 knots or greater

Each segment of the windrose represents the percent occurrence of wind observations at the given direction and velocity range. Note that the center circle of the windrose displays the percent occurrence of wind observations at zero to 10 knots regardless of wind direction. Percentages were calculated and rounded to the nearest one-tenth of one percent and entered in the appropriate segment of the windrose. Plus (+) symbols are used to indicate direction and velocity combinations which occur less than one-tenth of one percent of the time but greater than zero percent of the time.

A crosswind template is overlaid on each windrose as parallel lines that show the existing runway end directions and crosswind limits, which for this analysis are 10.5, 13.0, 16.0, and 20.0 knots. This crosswind template is used to calculate the percent coverage offered by the runway orientation at each crosswind limit. By adding together the sum of the percentages that fall within each crosswind limit for all runways, the percent coverage can be calculated. The desirable wind coverage for an airport is 95%. This 95% considers various factors that influence operations and the economics of providing the coverage. Based on the weather observations presented in the windroses for all weather, VMC, and IMC conditions; the existing runway configuration at ABIA provides at least 95% coverage.

Exhibit 2.3-1: All-Weather Windrose

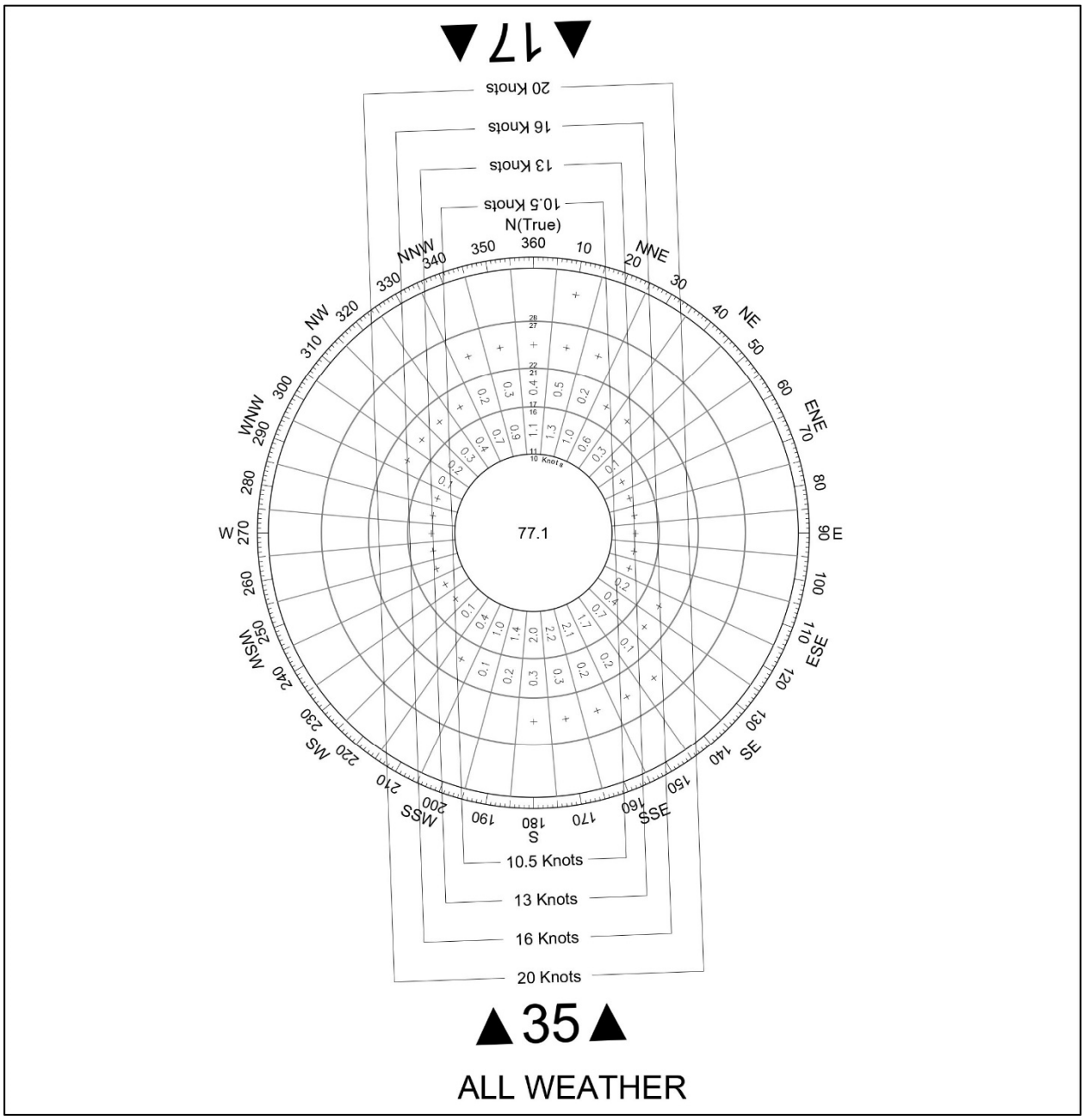


Exhibit 2.3-2: VMC Windrose

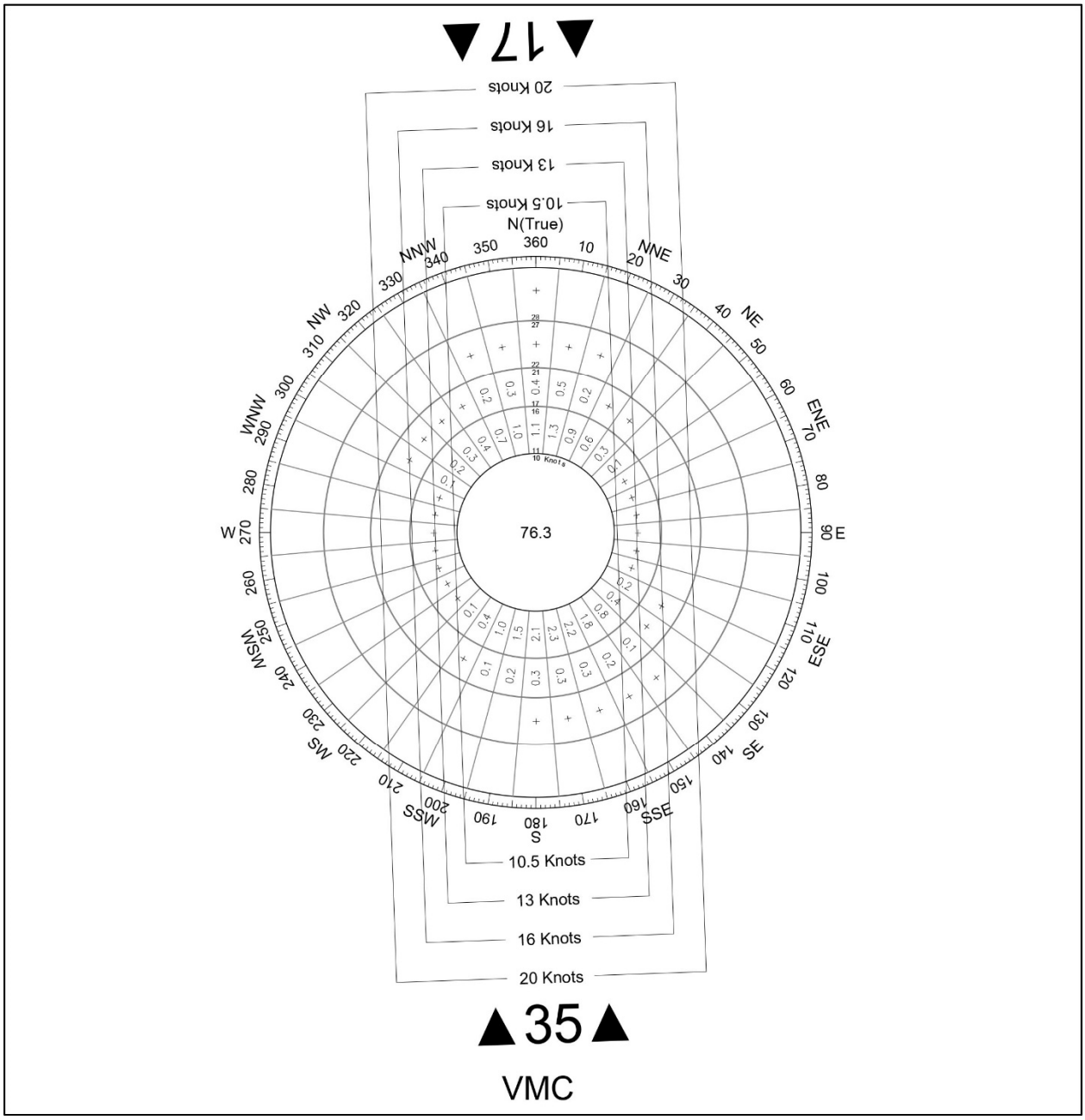
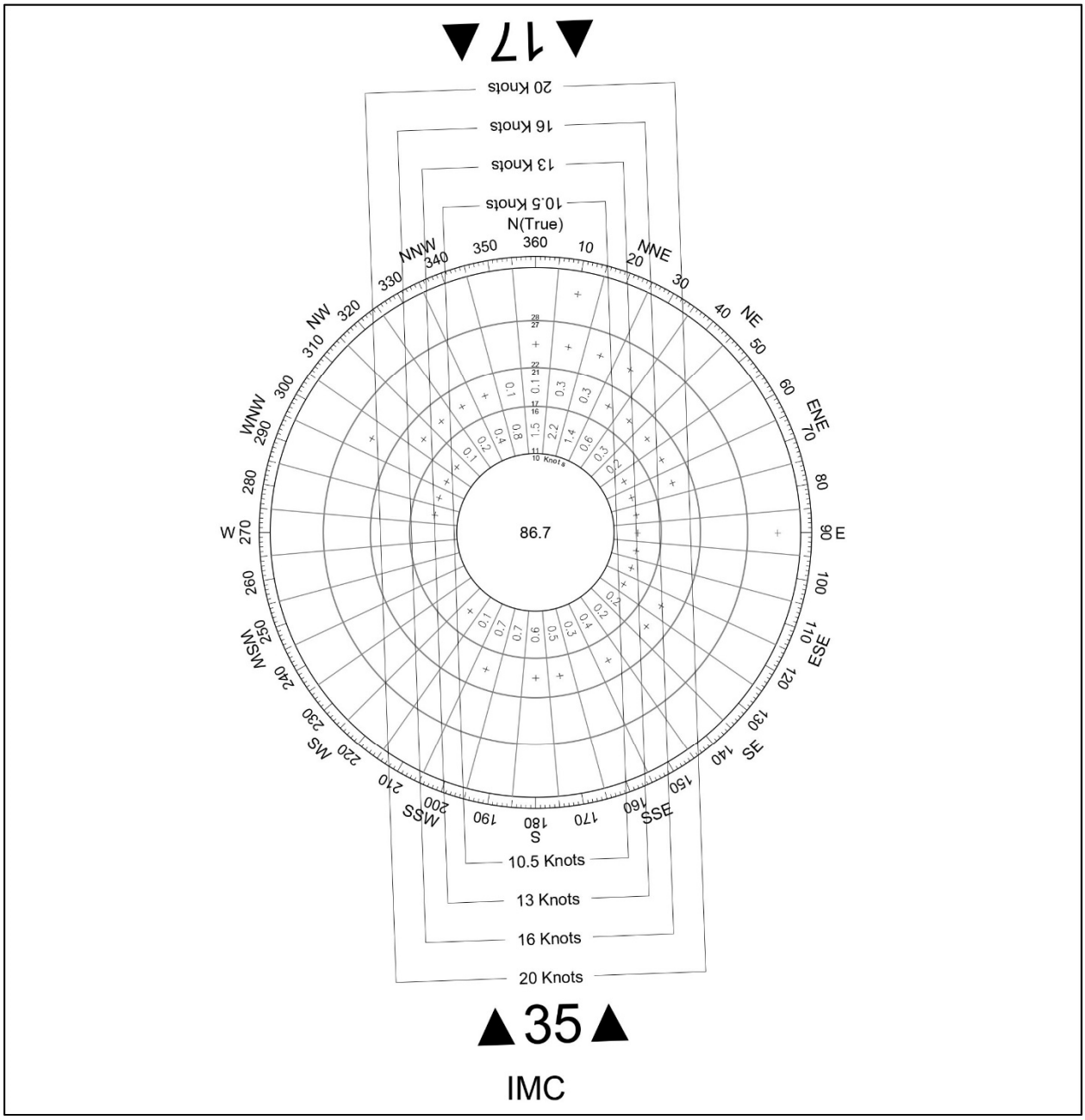


Exhibit 2.3-3: IMC Windrose

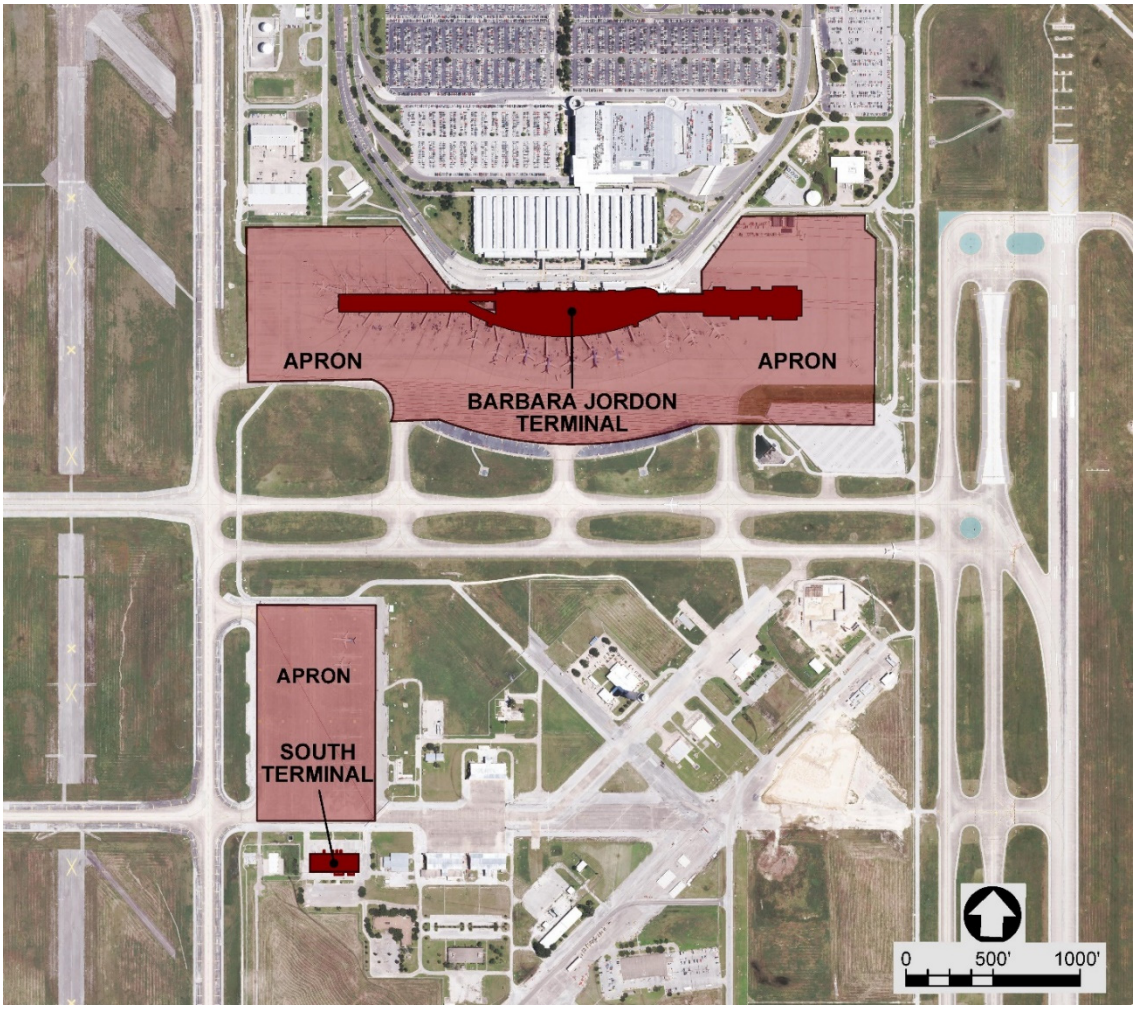


2.4 Passenger Terminal Buildings

ABIA opened in 1999 with a single passenger terminal building that served all airlines. Today the airport consists of two passenger terminal buildings that serve a combined total of more than 13 million (FY2017) annual passengers carried by 17 airlines. As shown on **Exhibit 2.4-1**, the Barbara Jordan Terminal is located on the north side of ABIA property and is accessed from State Highway 71 via Presidential Boulevard. The Barbara Jordan Terminal is the primary passenger terminal.

The South Terminal is located south of the cross-field taxiways and is accessed from U.S. Highway 183 via Burleson Road and Emma Browning Avenue. The South Terminal is a public-private developed project between the City of Austin Department of Aviation and LoneStar Airport Holdings, LLC, which commenced operation in April 2017. It currently serves low-cost carriers and select charter flights.

Exhibit 2.4-1: ABIA Overall Airport Layout Plan



2.4.1 Barbara Jordan Terminal

The Barbara Jordan Terminal has undergone several expansions since its opening in 1999 and is currently being expanded to the east. At completion of the East Expansion project in 2019, the terminal will consist of 34 contact gates and approximately 1,055,000 square feet of total terminal area. This will bring the capacity of the terminal to approximately 15 million passengers per year.

Table 2.4-1 identifies the key operational functions that are located on each level of the Barbara Jordan Terminal. The layout of the Barbara Jordan Terminal is shown in **Exhibit 2.4-2** through **Exhibit 2.4-5**.

Table 2.4-1: Barbara Jordan Terminal Functional Locations

BAGGAGE LEVEL	APRON LEVEL	CONCOURSE LEVEL	MEZZANINE LEVEL
International & Domestic Baggage Claim	Airline Offices & Ramp Support	Airline Ticketing/Check-in Counters & Offices	Airline Clubs
Airline Baggage Service Offices	Outbound Baggage Make-up	Security Checkpoints	Department of Aviation Offices
Baggage Claim	Transportation Security Administration Baggage Screening (EDS/CBRA/CBIS)	Concessions	Concessions
U.S. Customs & Border Protection Facility	Department of Aviation Offices	Gate Holdrooms	Transportation Security Administration Offices
Ground Transportation & Hotel Information Counters	Remote Gate 1 Holdroom	Musical Stage/Venue	Tenant Offices
Department of Aviation Offices			
Concessions			
Concession Storage			
Loading Dock			
Information Desk			

Source: Landrum & Brown analysis of existing terminal plans and East Terminal Expansion project.

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Exhibit 2.4-2: Barbara Jordan Terminal Baggage Level

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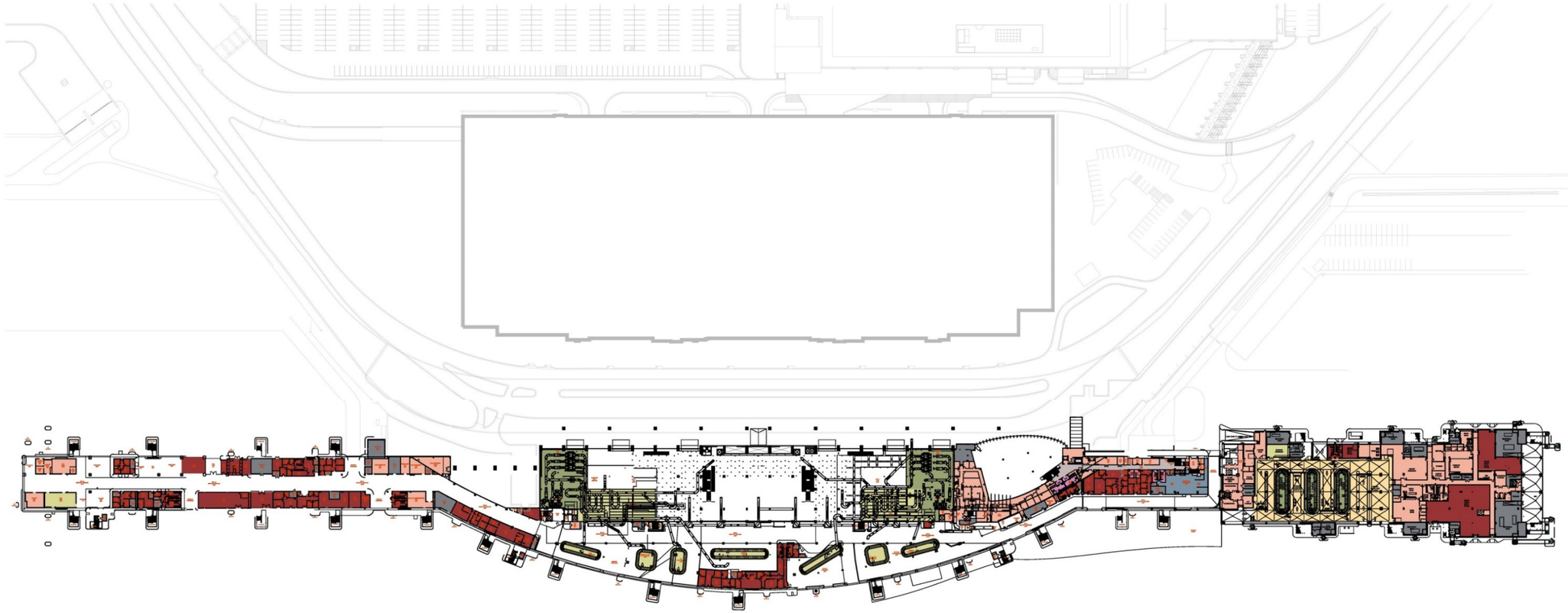
Exhibit 2.4-3: Barbara Jordan Terminal Apron Level



COLOR LEGEND

AIRPORT SUPPORT
AIRLINE SUPPORT
AIRSIDE CIRCULATION
RESTROOM PUBLIC
HOLDROOM
BHS
BAGGAGE SCREENING
BUILDING SUPPORT
STERILE CORRIDOR

200' 100' 0 200'

SCALE 1" = 200'

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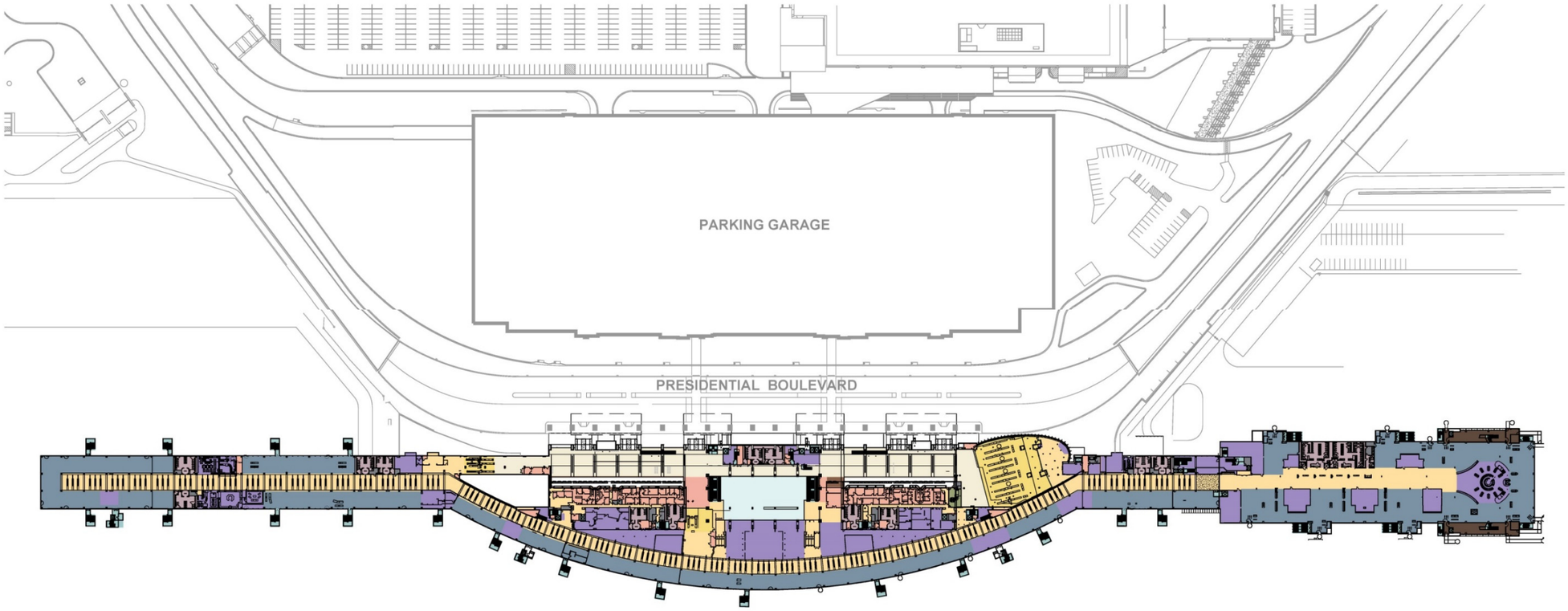
Exhibit 2.4-4: Barbara Jordan Terminal Concourse Level



COLOR LEGEND

- LANDSIDE CIRCULATION
- AIRLINE SUPPORT
- AIRPORT SUPPORT
- BAGGAGE CLAIM
- BHS
- OPEN TO BELOW
- CONCESSION MAIN
- HOLD ROOM
- VERTICAL CIRCULATION
- TSA SSCP QUEUE
- AIRSIDE CIRCULATION
- STERILE CORRIDOR
- SECONDARY SCREENING
- RESTROOMS
- BUILDING SUPPORT

200' 100' 0 200'

SCALE 1" = 200'

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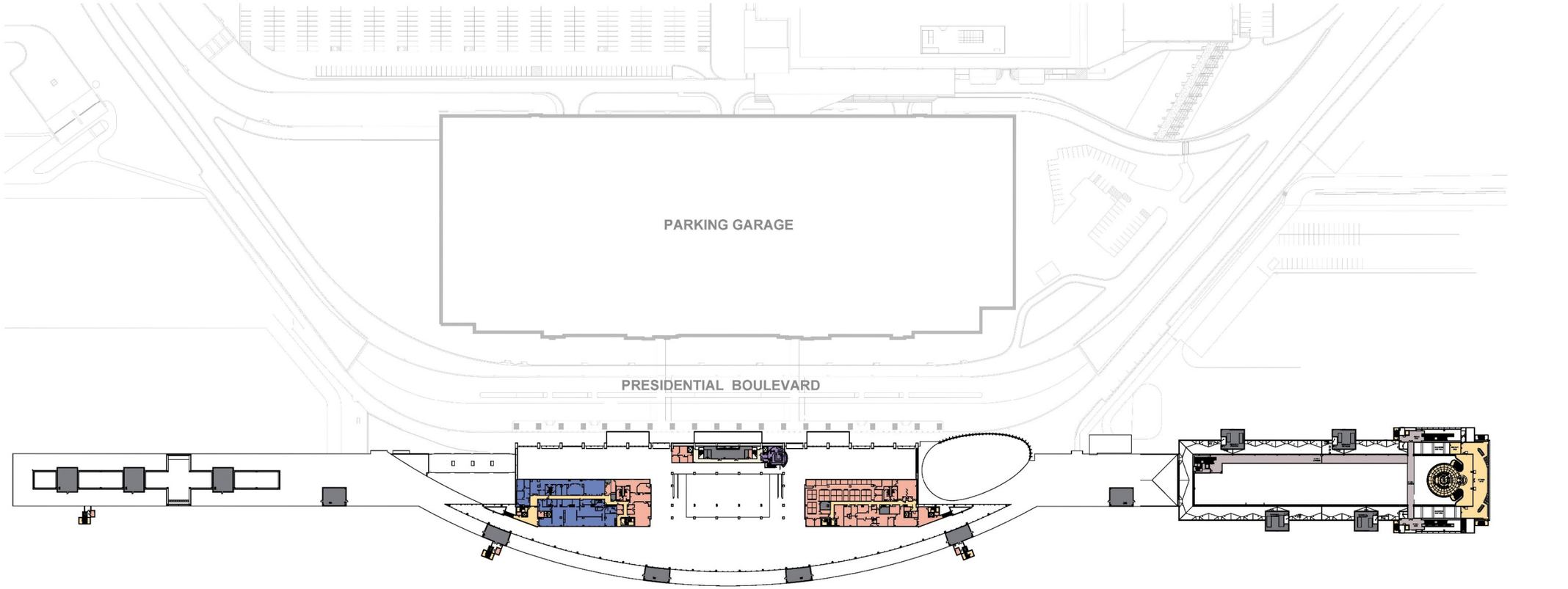
Exhibit 2.4-5: Barbara Jordan Terminal Mezzanine Level



COLOR LEGEND

STERILE CORRIDOR	CONCESSION MAIN	AIRPORT SUPPORT
AIRLINE CLUB	AIRSIDE CIRCULATION	BUILDING SUPPORT

200' 100' 0 200'

SCALE 1" = 200'

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2.4.1.1 Terminal Inventory

Table 2.4-2 provides a summary of the gross areas or quantities of the primary components of the Barbara Jordan Terminal. It includes the areas provided in the East Expansion as well as the planned concessions improvements.

Table 2.4-2: Barbara Jordan Terminal Inventory

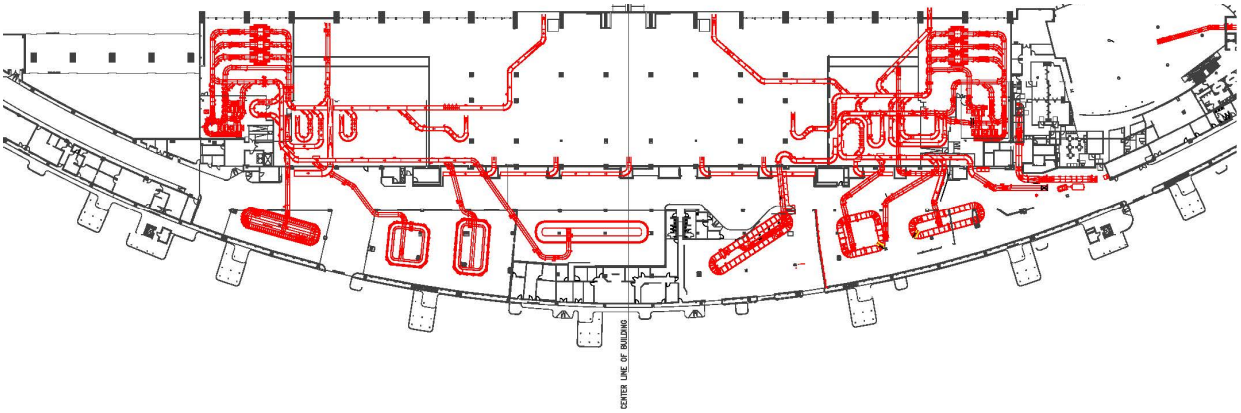
COMPONENT	UNIT	BAGGAGE LEVEL	APRON LEVEL	CONCOURSE LEVEL	MEZZANINE LEVEL
Ticketing/Check-in Counters	positions	X	X	83	X
Self-service Check-in	kiosks	-	-	64	-
Ticketing Hall	sq.ft.	X	X	29,301	X
Security Checkpoint	lanes			15	
Concessions	sq.ft.	X	X	44,866	1,295
Holdrooms	sq.ft.	X	X	109,725	X
Airline Clubs	sq.ft.	X	X	X	9,839
Outbound Baggage Make-up	devices	X	7 Carousels 1 Runout Pier	X	X
Outbound Baggage Make-up	ft.	X	1,032 MU + 33 Runout	X	X
Domestic Baggage Claim	devices	7	X	X	X
Domestic Baggage Claim	ft.	980	X	X	X
Domestic Baggage Claim Hall	sq.ft.	41,600	X	X	X
International Baggage Claim	devices	1	X	X	X
International Baggage Claim	sq.ft.	198	X	X	X
International Baggage Claim and USCBP Primary Hall	sq.ft.	6,500	X	X	X
U.S. CBP Primary	positions	10	X	X	X
Global Entry Kiosks	devices	8	X	X	X
Automated Passport Control Kiosks	devices	17	X	X	X
International Meeter/Greeter Area	sq.ft.	14,634	X	X	X

Source: Landrum & Brown analysis of existing terminal plans and East Terminal Expansion project.

2.4.1.2 Baggage Handling System

The Baggage Handling System (BHS) at the Barbara Jordan Terminal was initially designed to serve airlines on the east or west side of the terminal with no crossover function between the two sides of the BHS. Both sides of the BHS are configured in a similar manner as illustrated in **Exhibit 2.4-6**.

Exhibit 2.4-6: Barbara Jordan Terminal Outbound BHS Overview



Subsequent to the original installations, major renovation projects have been completed within the outbound BHS, including the integration of a new Checked Baggage Inspection System (CBIS) and later upgrades to the Explosion Detection System (EDS) units and Checked Baggage Reconciliation Area (CBRA). These changes have led to a more efficient baggage screening function within the airport but no material improvements to overall capacity. The inbound baggage handling and U.S. Customs and Border Protection (USCBP), former Federal Inspection Services) was significantly changed as part of the East Infill Project to improve baggage delivery times and reduce the distances tugs had to drive to unload bags from international flights. Further description of the BHS sub-systems is described in the following sections.

A summary of the existing Barbara Jordan Terminal BHS, inclusive of the integrated CBIS at ABIA, is provided in the following subsections. The BHS was inspected as a “system of systems” whereby the consultant looked at the state of the following sub-systems.

2.4.1.2.1 Outbound Baggage Handling System

As mentioned above, the Outbound Baggage Handling System (OBHS) at the Barbara Jordan Terminal was initially designed to serve airlines on the east or west side of the terminal with no crossover function between the two sides of the airport.

Subsequently, with the advent of 100% Checked Baggage Screening laws resulting from the 9/11 attack, ABIA worked with Transportation Security Administration (TSA) to build and integrate the baggage screening function into the BHS. In order to create an integrated CBIS, additional terminal space was created in an interstitial level, and the existing outbound BHS was demolished and reconstructed around the matrix in a less than optimal manner. This resulted in a shoe-horned new sub-system, thus making the existing OBHS overall challenging to operate efficiently, to access for maintenance, and to optimize processing capacity with the new automated and manual functions embedded within the BHS. This change introduced the requirement to sort the bags once screened to the assigned makeup carousels by reading the bag tag barcode, which identified the airline and flight for each bag.

In 2016, a CBIS renovation was completed with updated screening machines, reconfigured checked baggage resolution areas, and modified controls software targeted at improving reliability of the screening function. The system capacity remained relatively the same. Other modifications intended to improve the reliability of the system have been made but are not material to the system's configuration or processing capacity.

The OBHS as it is currently configured has materially reached capacity and could eventually become the limiting factor in supporting airline service growth in the Barbara Jordan Terminal. Based on recent analysis, approximately 90% of the existing capacity on the west side and 85% on the east side is used during peak hours, assuming airlines and TSA staffing and supporting equipment is fully available. These volumes of bags push TSAs "N+1" standard for EDS machine redundancy and could negatively impact baggage-handling performance should one or more EDS units fail during peak periods. Any significant growth on either side of the Barbara Jordan Terminal will challenge the OBHS and would need careful consideration as to how best to support the additional baggage handling demand.

Given the significance of the current BHS to ABIA's ability to expand future service, ABIA has decided to fund the redesign and replacement of the Barbara Jordan Terminal BHS. This program will substantially increase the capacity and improve the operational efficiency of the BHS function. It will be aligned with other capacity-expansion investments that are anticipated for the Barbara Jordan Terminal.

2.4.1.2.2 Outbound Bag Transport Conveyor Issues

The Barbara Jordan Terminal OBHS performs largely to the capacity required for the originally anticipated terminal traffic volumes. Since that time, the Austin market has grown significantly and is projected to surpass the capacity of the BHS with very limited ability to expand baggage-handling capacity in the Barbara Jordan Terminal. Facility constraints remain the largest limiting

factor to capacity expansion initiatives by ABIA. Given these constraints, there exists a general lack of flexibility to optimize the configuration and/or addition of equipment that could provide the additional outbound and inbound baggage processing, as well as TSA screening capacity needed to support expected growth at this time. The current BHS configuration remains less than optimal and lacks flexibility to expand the current capacity due to the following characteristics:

- Placement and size of conveyors do not allow for efficient transfer of the bags throughout the system and frequently result in jams in the system and misaligned bags on the belts. Currently, additional staff have been added to manually adjust bags and clear jams as needed to keep the system moving, at an additional cost to the airlines.
- Handling and screening of oversized checked items that do fit standard-size conveyor belts must be manually delivered to and moved from the checked baggage reconciliation area to the makeup areas, requiring additional airline resource time and extending the delivery time of those items to the baggage makeup areas. Future systems would accommodate approximately 98-99% of all bags checked, excluding only over-sized cumbersome items, such as bicycles or surfboards, without issue to the OBHS.
- The current OBHS serves airlines on the east or west side of the terminal with no crossover function between the two sides of the baggage handling system. Redundancy and overflow capacity are isolated between the separate sides of the OBHS, which limits ABIA's ability to react to surges in traffic or system outages on either side.

2.4.1.2.3 Checked Baggage Inspection System Issues

The CBIS function is inherently complex due the interdependencies between the airlines, TSA, and the various service providers required to support this function. Based on interviews with ABIA support staff and a review of the CBIS configuration, it was estimated that the CBIS supports approximately 950-1,000 bags per hour (BPH) for each of the east and west CBIS, which serves as the primary limitation for further capacity enhancements within the existing OBHS. Bound by the constraints of the surrounding OBHS and terminal facility, the following characteristics describe the current issues within the CBIS:

- The lack of queue belts before and after the EDS units limit the processing capacity of the EDS units to approximately 300-325 bags per hour, even though higher capacity units were installed with approximately twice the capacity during the TSA Recapitalization Project. Future negotiations with TSA about additional screening capacity could be impacted by the OBHS limitations within ABIA's control.
- CBRA capacity includes the number of manual screening stations, human factors accommodations, and delivery and takeaway functions, and needs to be expandable to increase TSA secondary screening when needed to support peak periods of activity.
- TSA's Planning Guidelines and Design Standards (PGDS) define TSA's needs within this sub-system and will continue to challenge the available space and flexibility needed for this function.
- Future ability to achieve the PGDS compliance and flexibility to respond to TSA changes requires the ability to add and reconfigure EDS units and to expand the CBRA capacity, which is not possible in the current space available.

With significant reconfiguration of the BHS, the capacity of the TSA EDS units, which are L-3 6700 series, and CBRA could be significantly increased, improving overall outbound baggage handling OBHS performance and the ability to support the anticipated growth at ABIA.

2.4.1.2.4 Baggage Makeup Carousels

As was common practice at that time of original install, baggage makeup carousels were installed across the apron area of the terminal and were tied directly via conveyors to corresponding ticketing positions within the lobby and curb. Passengers' checked baggage was accepted at the airlines' ticketing positions and delivered to the assigned makeup units with no screening involved. Once these outbound bags were delivered to makeup units, airline staff removed those bags and placed them into carts for delivery to the aircrafts or temporary storage until needed. Oversized items, such as bicycles, that were checked by passengers were manually delivered by airline staff to the makeup areas for further handling.

All checked baggage for departing flights are now screened then sorted according to airline to designated baggage makeup destinations – inclusive of seven carousels and one runout pier – for all flight activity within the Barbara Jordan Terminal. As originally envisioned, airlines continue to load, and transport checked baggage planeside via tugs and carts using these makeup units as an intermediate step in sorting and staging delivery of carts to the plane in an efficient manner according to flight departure time. This manually intensive function requires a large number of carts for temporary storage in addition to planeside delivery. ABIA is responsible for delivering baggage to these makeup units.

Once the bags are delivered to the makeup units, baggage makeup becomes the responsibility of the airlines. As such, each airline has similar but varying practices and resources to support this function at their own expense. This sub-system works largely as originally designed with adaptation for transfer baggage processing between arriving and departing flights. Various airlines are considering new layouts for the baggage makeup space, which will be explored in the master planning effort. Capacity varies according to each airline's cart-loading times and practices.

2.4.1.2.5 Baggage Makeup Issues

With the earlier arrival of passengers, airline staff who work with the baggage makeup functions must accommodate those early-checked bags by temporarily storing them in designated carts until they are needed. This is a labor- and space-intensive practice common to all airline operations. Carousels and surrounding areas commonly become congested with these early checked bags, which can also lead to operational and safety challenges. The significance of this issue becomes more apparent during peak operations and when flight departure times and locations change.

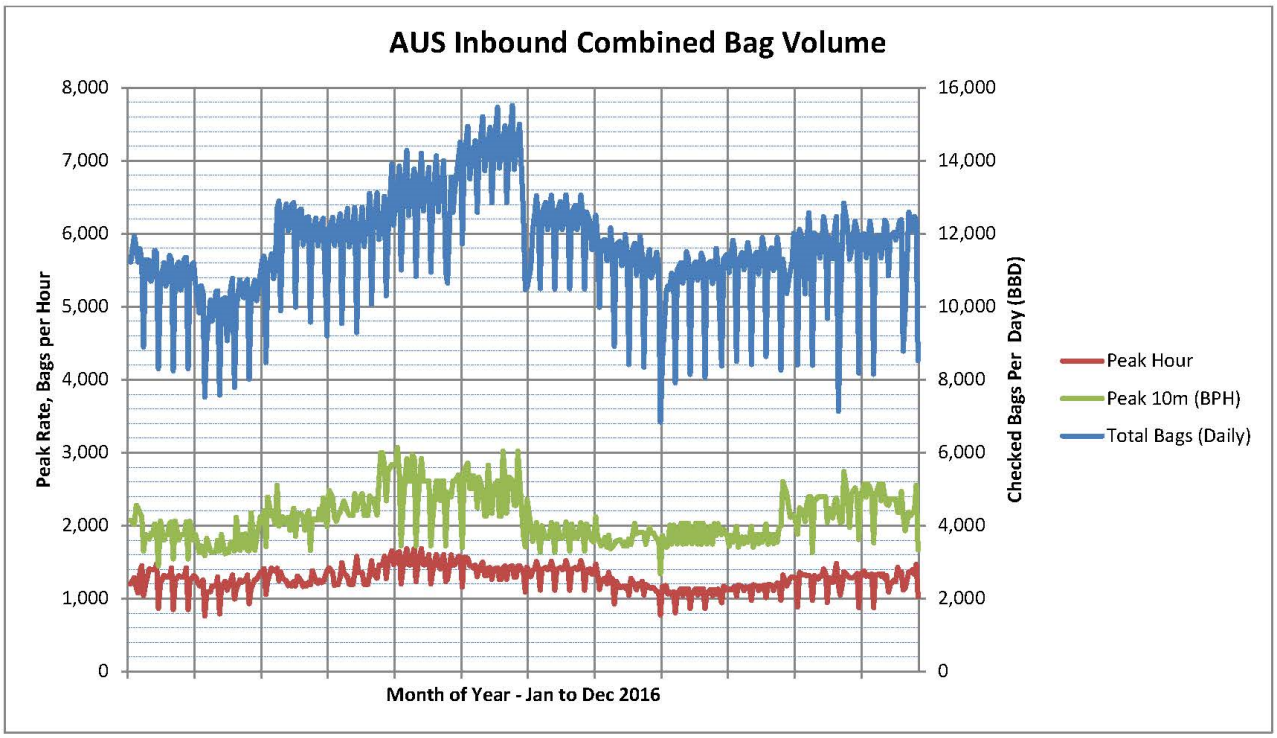
Growth projections, airline performance metrics, and airline baggage handling operations models are used to determine the size requirements for future expansion of this sub-system.

2.4.1.3 Inbound Baggage Handling System

The Inbound Baggage Handling System (IBHS) at the Barbara Jordan Terminal was developed in a similar fashion to the OBHS, with mirrored image designs for the east and west sides of the terminal. Largely a manual process, the airlines' staff unload baggage from the airplanes and transport them via tug and cart to the claim area of the terminal. From the secured side of the claim area, checked bags for arriving flights are delivered by each airline to one of seven claim units within the baggage claim area. Bags are placed onto conveyor belts tied directly to baggage claim carousels assigned to each flight. No automated sortation was used in the original system design. The IBHS function has not changed materially since the original system design.

Checked bags delivered for passenger claim peaked at 1,685 BPH in 2016 with an estimated ten-minute surge of bags within that hour of 2,917 BPH equivalent as illustrated in **Exhibit 2.4-7**. International arrival bags processed through the Federal Inspection Services (FIS) do not affect these peak numbers as those flights do not currently share the same peak arrival times with the domestic flights and do not use the domestic claims carousels.

Exhibit 2.4-7: ABIA Inbound Domestic Baggage Volumes (East and West Combined)



Notes: Data presented for all airlines using the Barbara Jordan Terminal. Allegiant and Via Airlines service are excluded from these numbers as they use the South Terminal for baggage-handling service.

Sources: *US Department of Transportation Air Carrier Statistics Database* (T-100); *Southwest Airlines Station Intelligence Report*, May 2017; TSA PGDS version 5.0

Calculation of exact capacity of the IBHS is difficult to quantify and is largely impacted by the volume of concurrent flights arriving, as well as the rate in which bags are manually transferred by staff and retrieved by passengers.

2.4.1.3.1 Inbound Transport and Baggage Claim Issues

During these peak times, the airport may experience a backlog of claim unit availability resulting in extended passenger wait times to claim their baggage. For planning purposes, the forecasted flight schedule and historical service performance will serve as the basis for estimating additional capacity needs.

2.4.1.3.2 International Arrivals Baggage Claim Unit

Checked baggage arriving at the airport from international destinations is routed to the U.S. Customs and Border Protection area for passenger claim and possible inspection by USCBP officers. Supporting this function is a single inbound claim unit placed in the path of the international arriving-passenger flow. This function works as required by USCBP processing protocols. With peak international flight arrivals consisting of only two flights at once, the single claim unit appears to be sufficient to support the current flight schedule.

2.4.1.3.3 International Arrivals Baggage Claim Unit Issues

Two factors would dictate future needs for changes for this function: 1) an increase in the number of international flights arriving within the same general timeframe could result in the need for an additional claim unit, and 2) the location of the claim unit within the flow of the USCBP process could change based on the agreed upon inspection protocol and process flow.

2.4.1.4 Barbara Jordan Terminal – Current Issues

Through discussions with key terminal stakeholders, including airlines, TSA, and ABIA project managers, the following current issues have been identified to be addressed in the Master Plan:

- The baggage-handling system has a sub-optimal configuration due to the space available and is nearly at capacity. Full-time manual labor is required to clear jams and find bags that have been lost in the tracking system. Creating a consolidated CBIS is a priority.
- Seven tons of trash are generated daily at the terminal. Future terminal development must consider separation and removal of waste in large volumes. There is a growing requirement to separate recycling and composting of trash.
- Security Checkpoints 2 and 3 have lower performance than Checkpoint 1 due to space constraints. Queuing area for those checkpoints is minimal.
- Connecting baggage for international arriving flights is an issue because there is no baggage recheck area. Customers must recheck their baggage at the airline's ticket counters.
- Holdroom space is limited especially for the common-use gates used by the international carriers.

- The traditional check-in model/configuration is outdated, and the ticketing area does not facilitate implementation of more modern processes.
- There is no hydrant fueling system, which is preferred by most carriers.
- There is insufficient queuing space at the ticket counters to accommodate delayed flights, off-schedule operations, or heavy events such as South by Southwest (SXSW).
- The baggage makeup area lacks an overflow or default device.
- The Barbara Jordan Terminal is not well suited for international travelers. It would be good to have distinct facilities for international flights that provide a similar level of amenities as major gateway airports, including lounges, duty-free, and areas for passengers with reduced mobility.
- Vertical conveyance for wheelchairs and gate-check bags do not exist and should be considered.
- Double passenger loading bridges for wide-body aircraft would be beneficial.
- Back office and storage space are minimal throughout the terminal.
- Pet Relief areas are needed on the airside.
- Sufficient space needs to be reserved for future security checkpoint configurations.

2.4.2 South Terminal

The South Terminal is a 28,580-sq.ft. single-level building with three walkout gates. It is owned and operated by LoneStar Airport Holdings, LLC under a long-term lease with the City of Austin. It currently serves low-cost carriers and charter companies that are interested in using this type of facility. The terminal building consists of eight check-in counters, a security checkpoint, check-baggage screening, a holdroom, and a baggage-claim area. Additional seating is provided in an outdoor patio area located beyond the security checkpoint. **Exhibit 2.4-8** illustrates the configuration of the terminal building.

Exhibit 2.4-8: South Terminal Layout Plan

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2.4.2.1 Baggage-Handling Systems

The South Terminal baggage handling is a separate and largely manual process conducted independently of the Barbara Jordan Terminal baggage handling functions. A summary of the outbound and inbound baggage-handling systems at the South Terminal are provided below. No international flight activity or FIS function exists at this terminal at this time.

2.4.2.1.1 Outbound Baggage-Handling System

Checked baggage accepted at the ticket counters is processed, screened, and delivered from the ticket counters to the cart makeup pier on a single conveyor line, which includes 160 linear feet (lf) of transport conveyor with an integrated EDS screening machine. Approximate capacity of the OBHS is 180-200 BPH based on the throughput of the L-3 eXaminer 3DX 6000 series explosive detection system unit. The baggage screening sub-system is installed in a hybrid configuration requiring a TSA officer to press a button to have the queue conveyor manually feed the EDS entry tunnel. Once cleared, bags are placed back on the conveyor and moved to the makeup area. Oversized checked baggage is manually screened and transported directly to the baggage makeup area. Therefore, with a peak hour of less than 150 checked bags, the existing system when fully staffed by TSA can adequately support the current volume of checked baggage. Should additional flights be added onto the existing peak-hour flight bank, ABIA might need to look at alternatives for increasing capacity for baggage screening, which primarily dictates the processing capacity of the overall OBHS.

After arriving at the makeup pier, bags are manually pulled from the line and placed onto carts, which are designed for each departing flight. Airline processes and processing efficiency significantly affect the capacity of the cart makeup capacity.

South Terminal growth projections, airline performance metrics, and airline baggage-handling operations and screening models will be the determining factor in size requirements for future expansion of this sub-system.

2.4.2.1.2 Inbound Baggage Handling System

Checked baggage arriving at the South Terminal is delivered to the Bag Claim belt by the airline via cart. Each bag is manually placed on the secure side of the belt and transported inside onto a 130-lf baggage-claim unit for passengers to retrieve.

As with the Barbara Jordan Terminal IBHS, processing capacity is largely impacted by the volume of concurrent flights arriving, as well as by the rate at which bags are manually transferred by staff and retrieved by passengers.

2.5 Landside and Access Roads

2.5.1 Auto Parking

Short-term parking is available at ABIA through a combination of on-site surface lots and parking garages. Employee parking is provided in on-site surface lots. Long-term parking is available at ABIA through a combination of on-site surface lots and off-site privately-owned facilities.

2.5.1.1 On-Site Public Parking

ABIA currently provides approximately 13,072 total public parking spaces. This includes 3,374 spaces located in a three-story short-term Parking Garage #1, 751 spaces in the Consolidated Rental Car Facility Garage (CONRAC), and 8,147 spaces across several long-term surface parking lots. Long-term parking lots are Lots B, C, D, E, F and G. There are approximately 800 spaces at the South Terminal parking area. For this Master Plan, the South Terminal spaces are counted as long-term spaces.

The area previously designated as the Cell Phone Waiting Lot has been converted to a public-private-partnership retail center with 116 planned-waiting lot spaces. A new parking garage is currently under construction and will provide 5,800 additional spaces. Once this project is complete, the total available public parking will be 9,925 short-term spaces, and 8,947 long-term spaces, see **Table 2.5-1** and **Exhibit 2.5-1**.

In 2013, PGAL developed a report titled “ABIA 25 Year Parking Plan” for the City of Austin.[3] This report identified future parking facilities including a new surface lot on ABIA property located north of SH 71 with 1,200 spaces planned for 2018, and an additional surface lot on ABIA property located north of SH 71 with 2,000 spaces planned for 2027. To date, none of these parking facilities have been developed and are not considered as existing capacity.

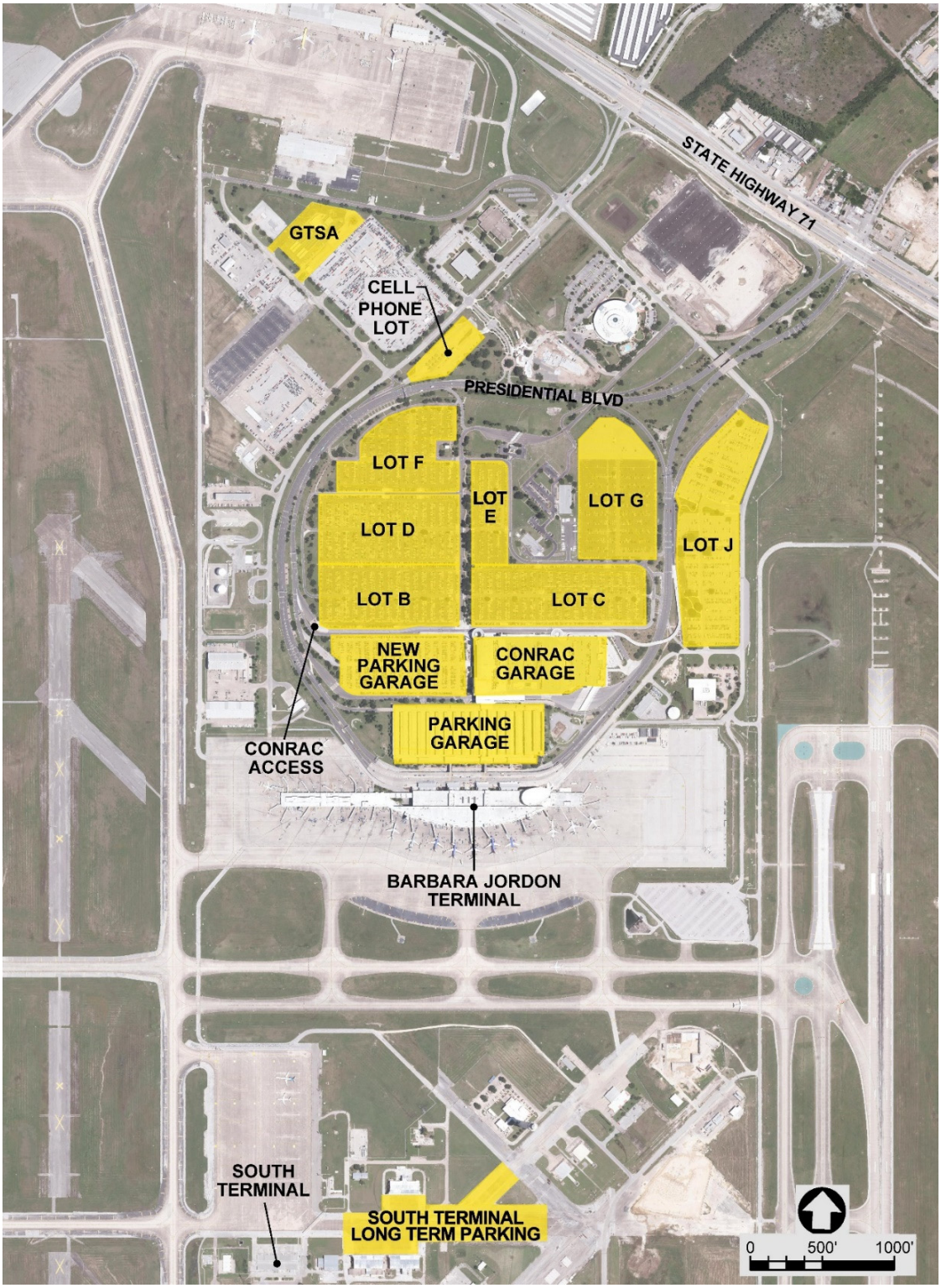
[3] PGAL, 2003, ABIA 25 years parking plan, prepared for City of Austin.

Table 2.5-1: On-Site Parking

FACILITY	EXISTING PUBLIC LONG-TERM PARKING SPACES	EXISTING PUBLIC SHORT-TERM PARKING SPACES	EXISTING VALET PARKING SPACES	EXISTING EMPLOYEE PARKING SPACES	PUBLIC PARKING SPACES UNDER CONSTRUCTION
Parking Garage 1 (G1)	0	2,927	447	165	0
CONRAC Garage (G2)	0	595	156	146	0
New Parking Garage (G3)	0	0	0	0	5,800
Lot B	1,244	0	0	0	0
Lot C	1,532	0	0	0	0
Lot D	1,421	0	0	0	0
Lot E	533	0	0	0	0
Lot F	1,116	0	0	0	0
Lot G	1,422	0	0	0	0
Lot J	0	0	0	1,474	0
Cargo (Overflow Lot)	879	0	0	0	0
South Terminal	800	NA	NA	NA	NA
Totals	**8,947**	**3,522**	**603**	**1,785**	**5,800**

Source: Parking space counts based on City of Austin Site Plans and data provided by ABIA staff.

Exhibit 2.5-1: On-Site Parking



Source: Aerial imagery provided by the 2015 Texas Orthoimagery Program, Texas Natural Resources Information System (TNRIS), https://tnris.org.

2.5.1.2 On-Site Employee Parking

ABIA provides approximately 1,785 total employee parking spaces. Lot J in the long-term parking area contains 1,474 employee parking spaces. In addition, there are approximately 20 reserved spaces for DOA employees, 109 reserved spaces for CONRAC employees, and 17 reserved spaces for vendor parking located on the ground floor of the CONRAC Garage for a total of 146 employee spaces. Employee parking spaces are also provided in various airport ancillary areas including Air Cargo, inflight catering, ARFF, FBO flight services, etc. (see Table 2.5-1).

The total number of all on-site parking spaces including long-term and short-term public, employee, and spaces in the garage currently under construction is 20,657 spaces.

2.5.1.3 Off-Site Parking

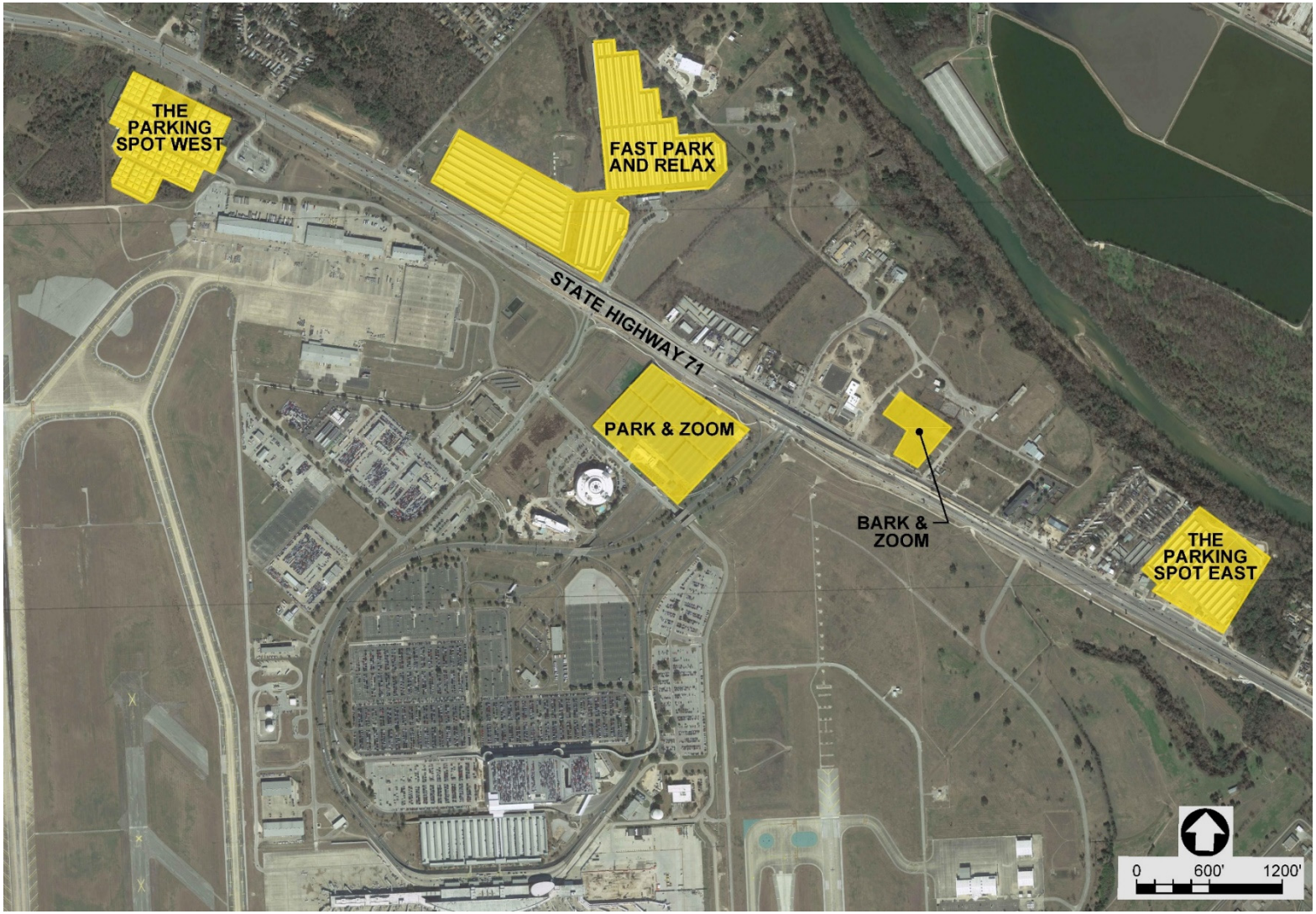
Multiple, privately owned, off-site parking facilities along SH 71 near ABIA include Park & Zoom with 1,931 spaces located on ABIA property, Bark & Zoom with 153 spaces, The Parking Spot West with 1,438 spaces, The Parking Spot East with 1,563 spaces, and FastPark & Relax with 6,823 spaces. The Bark & Zoom facility offers pet boarding and some off-site parking at a location across SH 71, and provides shuttle services and additional parking at Park & Zoom. In addition to the existing spaces, FastPark & Relax has indicated that it has the capacity to construct an additional 2,000 parking spaces in the next 10 years; see **Table 2.5-2** and **Exhibit 2.5-2**.

Table 2.5-2: Off-Site Parking

FACILITY	EXISTING PARKING SPACES
The Parking Spot – West	1,438
The Parking Spot – East	1,563
FastPark & Relax	6,823
Park & Zoom	1,931
Bark & Zoom	153
Total	**11,908**

Source: Parking space counts based on City of Austin Site Plans.

Exhibit 2.5-2: Off-Site Parking



Source: Aerial imagery provided by the 2015 Texas Orthoimagery Program, *Texas Natural Resources Information System*, https://tnris.org Access and Terminal Area Roadways

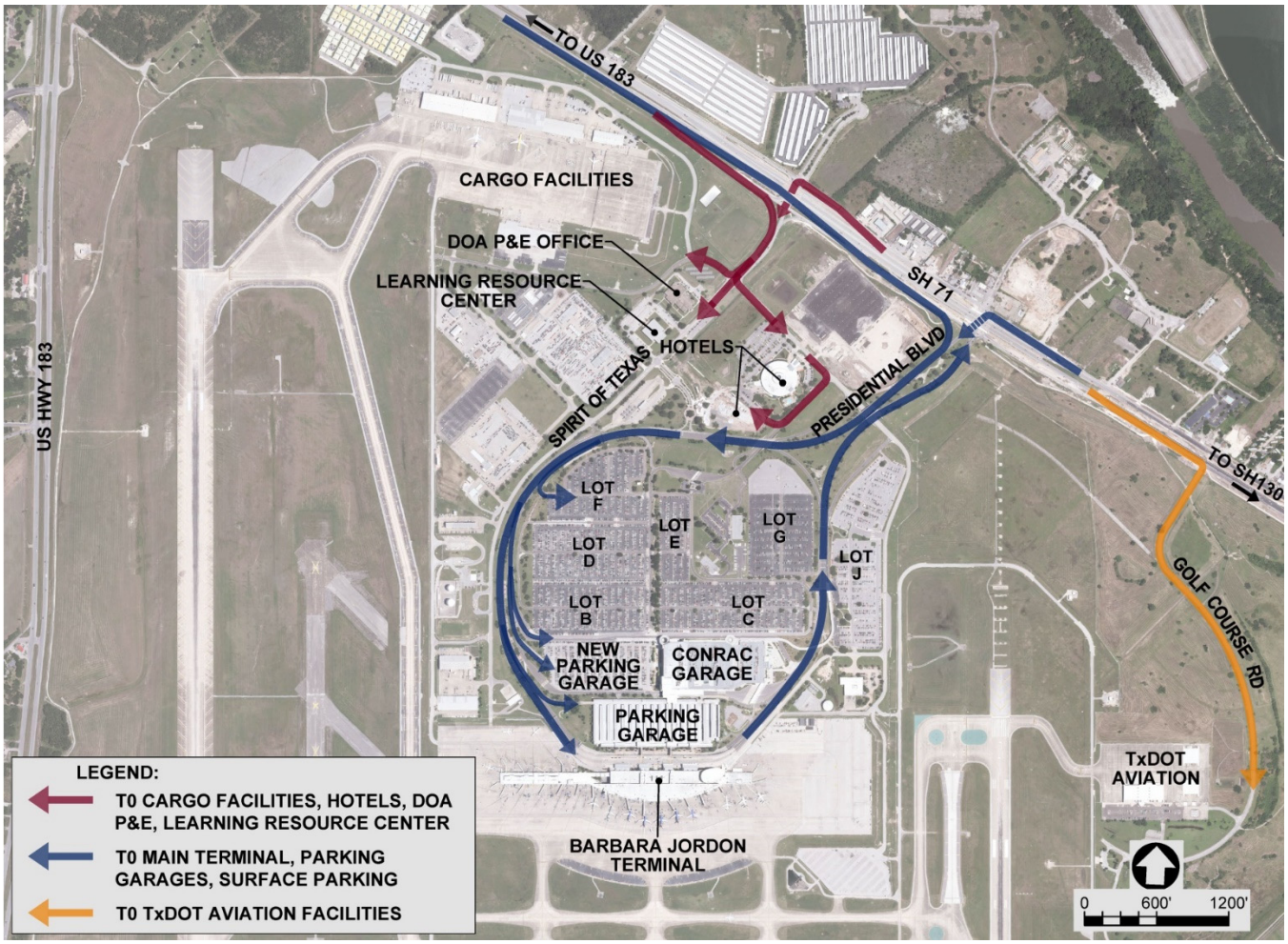
2.5.1.4 ABIA Barbara Jordan Terminal Roadway Access

Surface access to airport facilities is one of the key factors for operational success. The on-airport surface roadway system serves as the internal transportation network that allows passengers, airport staff, tenants, vendors, cargo carriers, and ground transportation providers to circulate freely and conduct their activities, similar to the blood vessels in the human body. If they are kept clear, then people and goods move quickly and efficiently through the system. If they are blocked or constricted, then the health of ABIA suffers. This inventory of the on-airport surface roadway system functions as a check-up of the current health and capacity of the roadways.

ABIA is accessed from two major regional roadways: State Highway (SH) 71 from the north and US 183 from the south.

SH 71 provides access points for Spirit of Texas Drive and Presidential Boulevard that serve the Barbara Jordan Terminal, administrative areas, parking, and cargo facilities, see **Exhibit 2.5-3**. SH 71 provides access from Austin to the west from US 183 and to the surrounding suburban communities from the east by SH 130 (a toll road).

Exhibit 2.5-3: Barbara Jordan Terminal Roadway Access Points



Source: Texas Statewide Planning Map, www.txdot.gov/apps/statewide_mapping/StatewidePlanningMap.html, Accessed on June 29, 2017.

The Barbara Jordan Terminal access point from SH 71 serves an interior airport roadway system that connects the Barbara Jordan Terminal, parking, rental car facility, airport hotels, airport administrative offices, cargo facility, and airport support facilities. This road network handles most of the surface traffic using ABIA. The arterial airport roadways that connect to SH 71 are Presidential Boulevard, the primary airport access point, and Spirit of Texas Drive. The posted speed limit on Presidential Boulevard is 45 mph for the majority of the roadway section and 30 mph near the entrance and exit from terminal curb. Presidential Boulevard is roughly divided into three roadway sections with different functions and characteristics.

Based on 2015 Texas Department of Transportation (TxDOT) saturation count data, Presidential Boulevard and Spirit of Texas Drive at SH 71 carried 13,662 and 8,879 vehicles per day (VPD) respectively. The first section is a six-lane two-way divided roadway stretching approximately 2,000 feet between SH 71 and Terminal Loop road. The second section forms a one-way loop that connects the first section to parking lots, terminal curb, and adjoining facilities such as the CONRAC and terminal garage areas. The third section is the two-level terminal roadway system below.

Spirit of Texas Drive is a north-south roadway of approximately 5,000 feet traversing from SH 71 to the air cargo area and has a posted speed limit of 30 mph. It is a four-lane undivided roadway from the SH 71 service road to the Department of Aviation Planning and Engineering building and two-lane undivided roadway for the remaining length. Spirit of Texas Drive provides access to the air cargo area via New Airport Drive and Cargo Avenue, the Ground Transportation Staging Area, the rental car service/storage areas via Rental Car Lane, airline freight, and other ancillary uses west of the terminal. It also serves as the main access point for airport employee parking, inflight catering, and other airport functional areas east of the terminal via New Airport Drive. Sprit of Texas intersects with Hotel Drive, Freight Lane, and Car Rental Lane at two stop-controlled intersections. Other major on-airport roadways at ABIA include Hotel Drive, Rental Car Lane, Freight Lane, and Cargo Avenue.

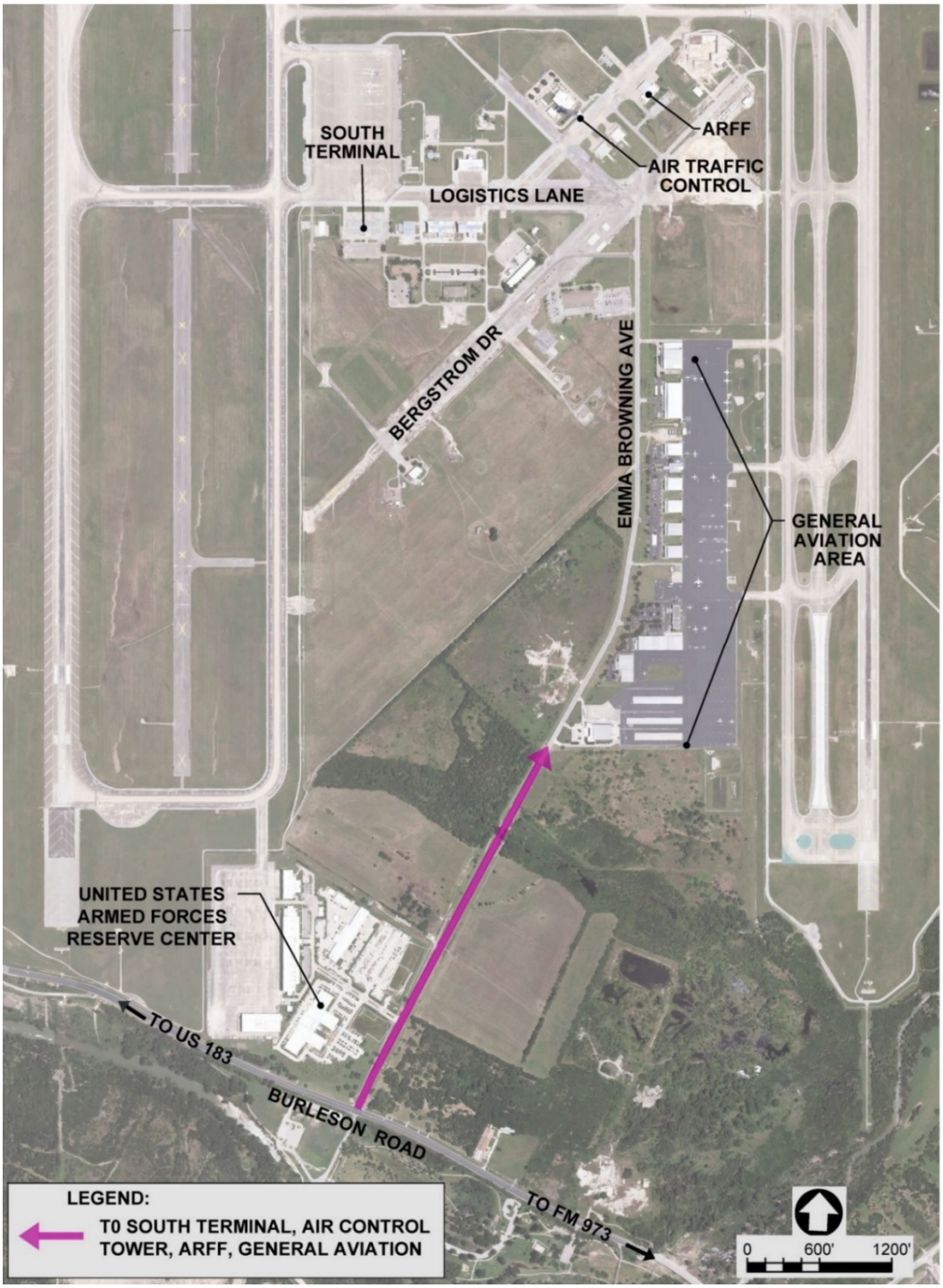
SH 71 is currently under construction to be expanded to include additional general-purpose lanes as well as express (toll) lanes. Airport access from SH 71 is grade separated at both Spirit of Texas Boulevard and Presidential Boulevard. Traffic along SH 71 is expected to increase due to rapid growth of communities east of Austin, along SH 130. The TxDOT aviation facility is accessed from SH 71 via a dedicated two-lane access road east of ABIA.

2.5.1.5 South Terminal Roadway Access

US 183 provides access for the South Terminal, general aviation area, airport support facilities, and the air traffic control tower via Burleson Road, see **Exhibit 2.5-4**. US 183 is four-lane divided highway that has a signalized intersection with Burleson Road.

The South Terminal, general aviation area, airport facilities, and air traffic control tower are all accessed via Burleson Road that connects to US 183 and a left turn onto General Aviation Avenue/Emma Browning Avenue.

Exhibit 2.5-4: South Terminal / Airfield Roadway Access

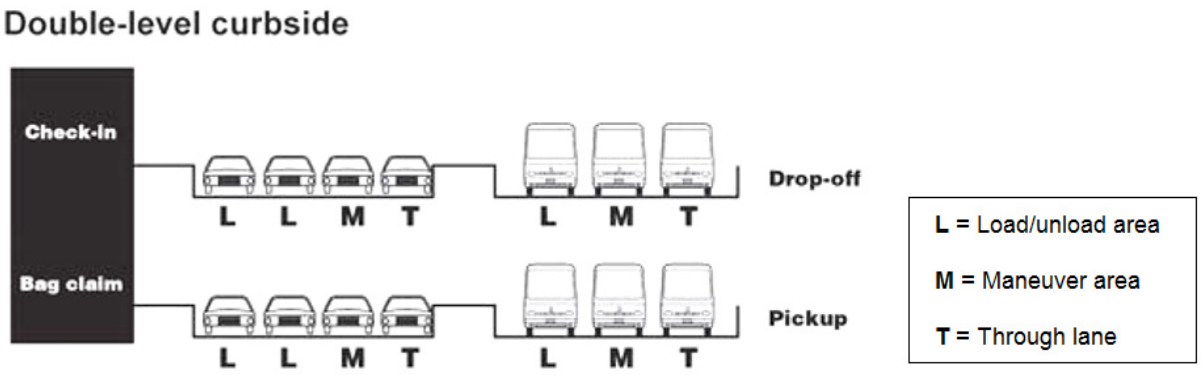


2.5.2 Terminal Curb

2.5.2.1 Terminal Curb Layout

Austin-Bergstrom International Airport has a two-level curbside as depicted **Exhibit 2.5-5**. The upper level curbside area is at the same level as airline passenger ticketing and check-in facilities inside the terminal and is intended for passenger drop-off. The lower level curbside area is designated for passenger pickup.

Exhibit 2.5-5: Terminal Curbside Configuration



Source: Airport Cooperative Research Program Report-40 – Airport Curbside and Terminal Area Roadway Operations - by the Transportation Research Board, sponsored by the Federal Aviation Administration, 2010.

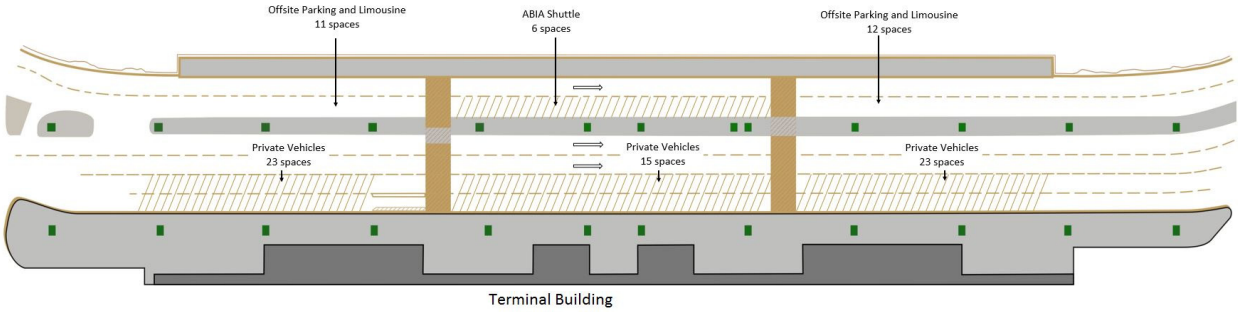
The upper or departures level, is comprised of an inner curbside and an outer curbside. Each curbside is crossed by two crosswalks used by passengers to travel between the terminal, outer curb, and terminal-parking garage as shown in **Exhibit 2.5-6**. Each curbside is effectively divided into three zones or regions: prior to Crosswalk 1, between Crosswalks 1 and 2, and after Crosswalk 2. The inner curbside is comprised of four lanes and is used by private and commercial vehicles to drop off passengers departing from ABIA. [4], [5] The two right lanes are used for passenger drop-off and the two left lanes are predominantly used for driving and access to / egress from the drop-off lanes. The numbers of stopping positions per curbside zone are as follows: 23 vehicles total prior to Crosswalk 1, 15 vehicles total between Crosswalks 1 and 2, and 23 vehicles total after Crosswalk 2. The outer curbside is comprised of two lanes and is used by commercial vehicles to pick up passengers arriving at ABIA and to drop off passengers departing from ABIA. The right lane is used for passenger drop-off / pick-up and the left lane is used for driving. The number of stopping positions per curbside zone are as follows: seven limo pick-up positions and four shuttle positions for pick-up/drop-off before Crosswalk 1, three shuttle positions

[4] TransSolutions, LLC, 2013, Final Curbside Operations Analysis Parking Operation Improvements, prepared for City of Austin, Department of Aviation.

[5] RW Armstrong & Associates, Inc., 2013, Engineering report for curbside improvements project, prepared for City of Austin, Aviation Department.

for pick-up / drop-off and three valet positions between Crosswalks 1 and 2, and three valet positions, two shuttle drop-off positions, and seven limo pick-up positions after Crosswalk 2.

Exhibit 2.5-6: Upper Level Curbside Layout



Source: Developed by Atkins, 2017.

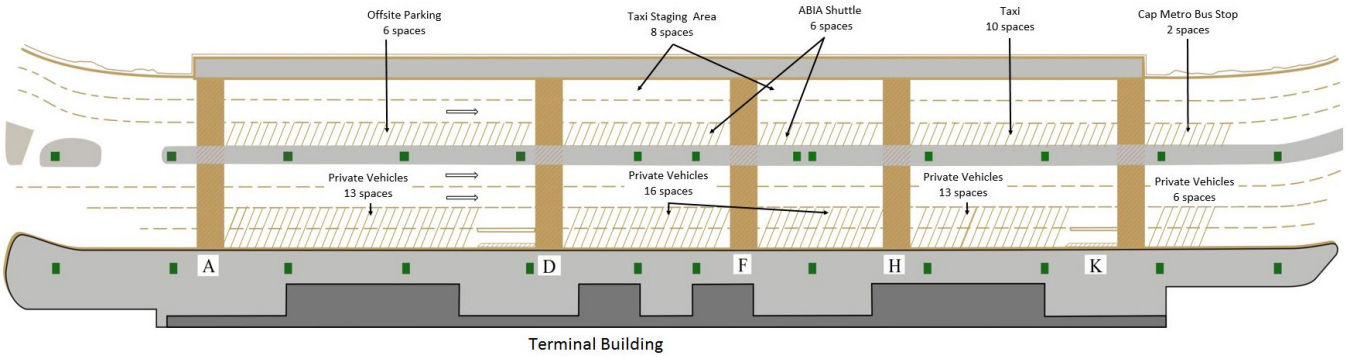
The lower, or arrivals, level is also comprised of an inner curbside and an outer curbside. Each curbside is crossed by five crosswalks used by passengers to travel between the terminal, outer curb, and terminal-parking garage as shown in **Exhibit 2.5-7**.[6,7] Each curbside is effectively divided into four zones or regions: between Crosswalks 1 and 2, between Crosswalks 2 and 4, between Crosswalks 4 and 5, and after Crosswalk 5. The inner curbside prior to Crosswalk 1 is usually occupied by official vehicles. The outer curbside is comprised of three lanes and is used by most commercial vehicles to pick up passengers arriving to ABIA. The right lane is used for passenger pick-up, the left lane is used for vehicle staging, and the center lane is used for driving. The number of stopping positions per curbside zone are as follows:

- Two off-site parking shuttles and four shared-ride vans in the right lane between Crosswalks 1 and 2.
- Six remote-parking shuttles in the right lane.
- 10 staging taxis in the left lane between Crosswalks 2 and 4, eight taxis each in the right and left lanes between Crosswalks 4 and 5.
- Two Metro buses in the right lane after Crosswalk 5.

6 TransSolutions, LLC, 2013, Final Curbside Operations Analysis Parking Operation Improvements, prepared for City of Austin, Department of Aviation.

7 RW Armstrong & Associates, Inc., 2013, Engineering report for curbside improvements project, prepared for City of Austin, Aviation Department.

Exhibit 2.5-7: Lower Level Curbside Layout



Source: Developed by Atkins, 2017.

2.5.3 Consolidated Rental Car Facility

ABIA opened the CONRAC Parking Garage in October 2015. This four-floor garage is located north of the Terminal, adjacent to the previously existing parking garage and new Parking Garage #3, see Exhibit 2.5-1. Access to CONRAC is available to vehicle traffic via the Pedestrian Blvd Loop road, and to pedestrians exiting the ABIA terminal via a pedestrian bridge. For the South Terminal, access to the CONRAC is provided by the shuttle to the Barbara Jordan Terminal.

Currently eleven rental car companies operate within the CONRAC at ABIA. Within the CONRAC, there are approximately 1,771 total ready/return (R/R) spaces, 282 total quick-turnaround (QTA) vehicle-stacking spaces, 1,341 total staging/storage vehicle spaces, 104 employee parking spaces and five ADA-accessible employee parking spaces. The QTA area includes 48 fueling stations and 12 car washes on site, see details on **Table 2.5-3**.

Table 2.5-3: CONRAC Rental Car Space Allocation

RENTAL CAR COMPANY	READY/ RETURN VEHICLE SPACES	QTA VEHICLE STACKING STALLS	STAGING/ STORAGE VEHICLE STALLS	EMPLOYEE PARKING STALLS	TOTAL VEHICLE STALLS
Advantage Rent A Car	68	12	0	2	82
Avis/Budget/Payless	535	84	215	29	863
Dollar/Thrifty	136	24	0	5	165
Enterprise/Alamo/ National	535	84	730	39	1,388
EZ Rent A Car	34	3	0	1	38
Fox Rent A Car	34	3	62	3	102
Hertz	429	72	334	25	860
CONRAC Total	**1,771**	**282**	**1,341**	**104**	**3,498**

Notes: These values are based on the current allocation of spaces for each Rental Car Company servicing the CONRAC facility as of November 2017. Staging/Storage and Employee Parking stalls will adjust annually based on market share of each Rental Car Company.

2.5.4 Ground Transportation Service Providers

ABIA is served by one public transit bus operator, Capital Metro Transit Authority, five taxicab operators, eight transportation networking companies, as well as various limousine, livery, shared-ride shuttles, and charter bus operators. Several complimentary shuttle services are provided by nearby hotels and long-term parking companies. ABIA offers a courtesy shuttle service between the terminal and all surface parking lots located on-site. The South Terminal has a drop-off area served by taxis and the transportation networking terminal as well as a regular shuttle to the Barbara Jordan Terminal.

The Ground Transportation Staging Area (GTSA), located on Rental Car Lane, provides a staging area for commercial vehicles prior to dispatching to the terminal passenger pick-up area. The GTSA includes a 3,480 square-foot climate-controlled waiting area with restrooms and vending facilities. There are spaces for 111 vehicles at the GTSA. Taxi, limo, and shuttle service providers must have GTSA access cards obtained through the DOA. **Table 2.5-4** lists the providers with additional details.

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Table 2.5-4: Ground Transportation Service Providers

TRANSPORTATION TYPE	SERVICE PROVIDER	ACCESS TO TERMINAL CURB AREAS [Y/N]	HOURS OF OPERATION	ON-CALL VS CONSTANT CIRCULATION
Public Transit – Bus				
	CapMetro Route 350 (Guitar Stop)	Y	Weekdays: 5:30 AM -10:30 PM Saturday: 6:45 AM -10:45 PM Sunday: 6:30 AM m-9:00 PM	Every 30 minutes
Taxi	Austin Cab Company	Y	24/7	Constant
	Lone Star Cab	Y	24/7	Constant
	Yellow Cab Austin	Y	24/7	Constant
	Austin Express Cab	Y	24/7	Constant
	SuperShuttle	Y	24/7	On call
Transportation Networking Companies	Ride Austin	Y	24/7	On call
	Uber	Y	24/7	On call
	Lyft	Y	24/7	On call
	Fasten	Y	24/7	On call
	GetMe	Y	24/7	On call
	Wingz	Y	24/7	On call
	zTrip's ExecuCar	Y	24/7	On call
	InstaRyde	Y	24/7	On call
Hotel Shuttles[8]	Hilton Austin Airport	Y	24/7	On call
	Hyatt Place Austin Airport	Y	24/7	On call
	Microtel by Wyndham Austin Airport	Y	24/7	On call
	Comfort Suites Austin Airport	Y	5:00 AM–11:00 PM	On call
	La Quinta Inn & Suites Austin Airport	Y	24/7	On call
	Holiday Inn Express Austin	Y	24/7	Constant
	Courtyard by Marriott	Y	4:00 AM–11:30 PM	On-Call
	Hampton Inn & Suites	Y	24/7	On call
	Super 8 Austin Airport South	Y	24/7	On call
	Residence Inn by Marriott Austin Airport	Y	24/7	On call
	Wyndham Garden Austin	Y	24/7	On call
	Casulo Hotel	Y	24/7	On call
Parking Shuttles	ABIA Long Term Parking Lots	Y	24/7	Constant
	FastPark & Relax	Y	24/7	Constant
	The Parking Spot	Y	24/7	Constant
	Park & Zoom	Y	24/7	Constant

[8] Hotels located within the area bounded by I-35, SH 130, Riverside Drive/Ben White, and Burleson Road.

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2.5.4.1 Review of Previous Studies

Several traffic studies have been conducted for roadways serving ABIA. A traffic study was conducted by ABIA Retail, LLC, to analyze the traffic impact of proposed ABIA retail development located at the east corner of Spirit of Texas Drive and Rental Car Lane.[9] The data was collected on December 10, 2014, between 7:00 AM–9:00 AM, the AM peak time, and between 4:00 PM–6:00 PM, the PM peak time. The development consists of adding a hotel, shopping center, high turnover restaurants fast food with drive-through, a coffee or donut shop with drive-though, and a gasoline/service station with a convenience market. Spirit of Texas Drive and Hotel Drive, Spirit of Texas Drive and Spirit of Austin Lane, and Spirit of Texas Drive and Rental Car Lane, the three intersections along Spirit of Texas Drive were reported to operate at or better than Level of Service (LOS) C in 2018 with built-retail establishments.

A study was conducted by Bury and Partners in 2011 to analyze the mobility of pedestrian and vehicles out of the CONRAC facility.[10] Manual-turning movement counts were collected in November 2010 between 7:00 AM–9:00 AM, the AM peak time, and between 4:00 PM–6:00 PM, the PM peak time. The study recommends moving the egress point of the CONRAC facility further downstream or relocating it to prevent merging and weaving conflicts with shuttle buses attempting to enter the Lot C entrance.

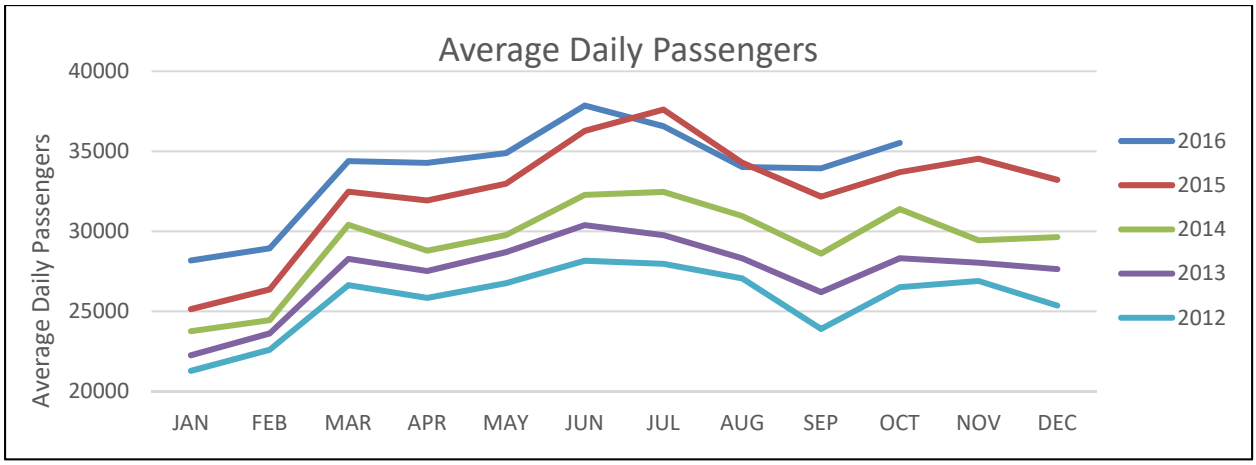
Alliance Transportation Group is currently studying the traffic impacts of a new parking garage and Administrative Building at ABIA.[11] The new parking garage is proposed to be located on the existing parking Lot A with a capacity of 6,000 parking spaces that can be used for a mixture of short-term and long-term parking. Existing Lot A currently accommodates 5,000 parking spaces. This traffic-impact study evaluates existing conditions as well as future 2019 built-out traffic conditions on all roadways adjacent to this site. As part of this study, 24-hour traffic counts and 15-hour turning movement counts were collected at various locations over a period of seven days in July of 2016. AM and PM peak period were reported to be 11:30 AM–12:30PM and 4:00 PM–6:00 PM, respectively. There have been several developments since July 2016, such as opening of the Park & Zoom, which is anticipated to have altered traffic volumes and patterns in the study area. A comprehensive traffic-data collection and/or studies have not been conducted for airport circulation and access roadways during the past five years.

9 HDR, Inc. 2015, ABIA retail traffic study, prepared for ABIA retail, LLC.
10 Saenz-bury engineering, LLC, Austin-Bergstrom International Airport parking garage and rental car facility.
11 Alliance Transportation Group, 2016, Traffic Engineering Study: Austin-Bergstrom International Airport –Parking Garage," prepared for City of Austin.

2.5.4.2 Data Collection Plan

To evaluate existing and future traffic operations within the airport terminal circulation area, the Airport Cooperative Research Project (ACRP) Report-40 recommends that the traffic counts and curbside surveys should be conducted during the peak hours on a typical busy day and ideally during a peak month.[12] Typically, the peak days occur in the months with the largest volumes of airline traffic. At many airports, the busiest days are Mondays and Fridays, but at some airports—especially those serving large volumes of nonbusiness passengers—the busiest days may be Sundays. The monthly number of passengers over the past five years was obtained from the ABIA Planning Division and are presented in **Exhibit 2.5-8**. Based on this data, average daily number of passenger's peak during June and July, and it was determined that July is the month with highest number of passengers.

Exhibit 2.5-8: Monthly Variation of Average Daily Passengers 2012–2016



Source: Austin-Bergstrom International Airport, Planning Division.

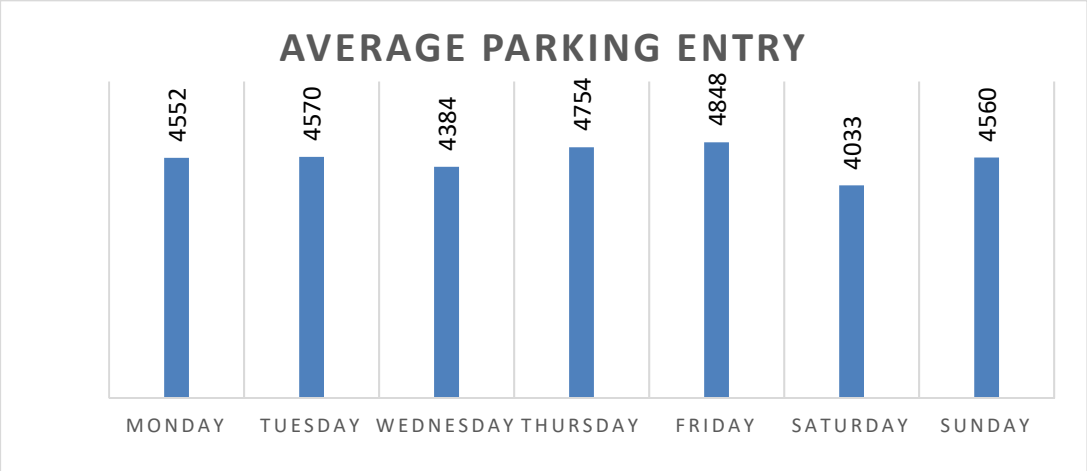
The parking data along with flight arrival and departure times during July of 2016 was analyzed in detail to determine the appropriate peak day and peak hours for traffic-data collection. Based on the parking data for July 2016 for garage, Valet Parking and Lot A, as shown in **Exhibit 2.5-9**, Friday is the peak weekday for both parking entry related to flight departure and parking exit related to flight arrival. This data includes parking in both Lot A and Valet Parking. The morning peak occurred between 4:45 AM and 5:45 AM and evening peak occurred between 4:30PM and 5:30 PM. Further analysis of plane arrival and departure times on Friday shows that during July 2016, the peak departure time was from 6:30AM–7:30 AM and peak arrival time was from 3:30 PM–4:30 PM. ACRP Report-40[13] suggests that surveys of the departures passenger drop-off area roadways should be conducted during the three hours prior to and including the 60-minute period with the most departing flights. Surveys of the arrivals passenger pickup area roadways should

[12] ACRP, 2010. The Airport Cooperative Research Project Airport Curbside and Terminal Area Roadway Operations, 2010.

[13] Airport Cooperative Research Program Report – 40, Airport Curbside and Terminal Area Roadway Operations - by the Transportation Research Board, sponsored by the Federal Aviation Administration, 2010.

be conducted during the three hours including and after the 60-minute period with the most flights arriving.

Exhibit 2.5-9: Average Garage Parking Entry - Parking Lot A / Valet Parking



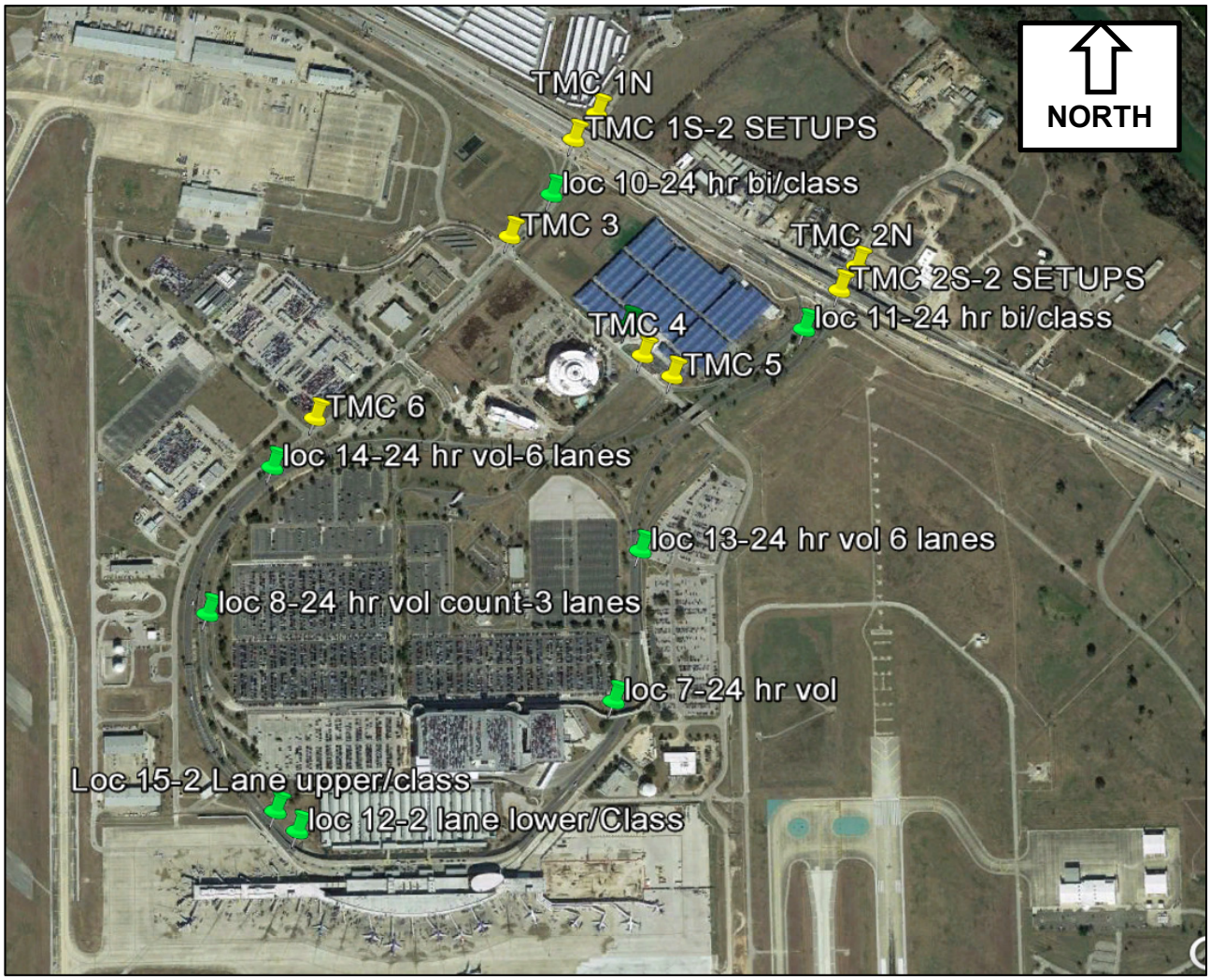
Source: ABIA 2017parking lot transaction records.

A detailed data-collection plan was prepared to support the traffic study to evaluate existing and future traffic conditions on airport access roads and traffic circulation at ABIA. The traffic counts consisted of 24-hour counts at key locations to determine the peak hour, a classification count to determine heavy vehicle percentages and shuttle services, and turning movement counts to study the operations at individual intersections. Additionally, traffic-speed data was obtained to perform detailed traffic operational analysis of existing and future conditions using microscopic-simulation software VISSIM. Based on peak day and peak month determination described, these counts were collected on the Friday, July 21, 2017. To verify that Friday was the peak day, a set of seven-day 24-hour traffic counts were collected from July 28 through August 3, 2017, for the following intersections:

- SH 71 and Spirit of Texas Drive
- SH 71 and Presidential Boulevard
- Spirit of Texas Drive and Hotel Drive
- Employee Avenue and Hotel Drive
- Burleson Road at Emma Browning Avenue
- Spirit of Texas Drive and Spirit of Austin Lane

A mix of professional and experienced personnel travel in and out of the airport multiple times a day. ACRP Report40 recommends not using spot speeds as experienced drivers may go over the speed limit and new drivers may go too slow causing speed to vary significantly from driver to driver.[14] The proposed count plan consisted of turning movement counts, 24-hour traffic counts, and type of counts at specific locations as depicted in **Exhibit 2.5-10** and described in **Table 2.5-5**.

Exhibit 2.5-10: Traffic Count Locations



Source: Google Earth, 2017.

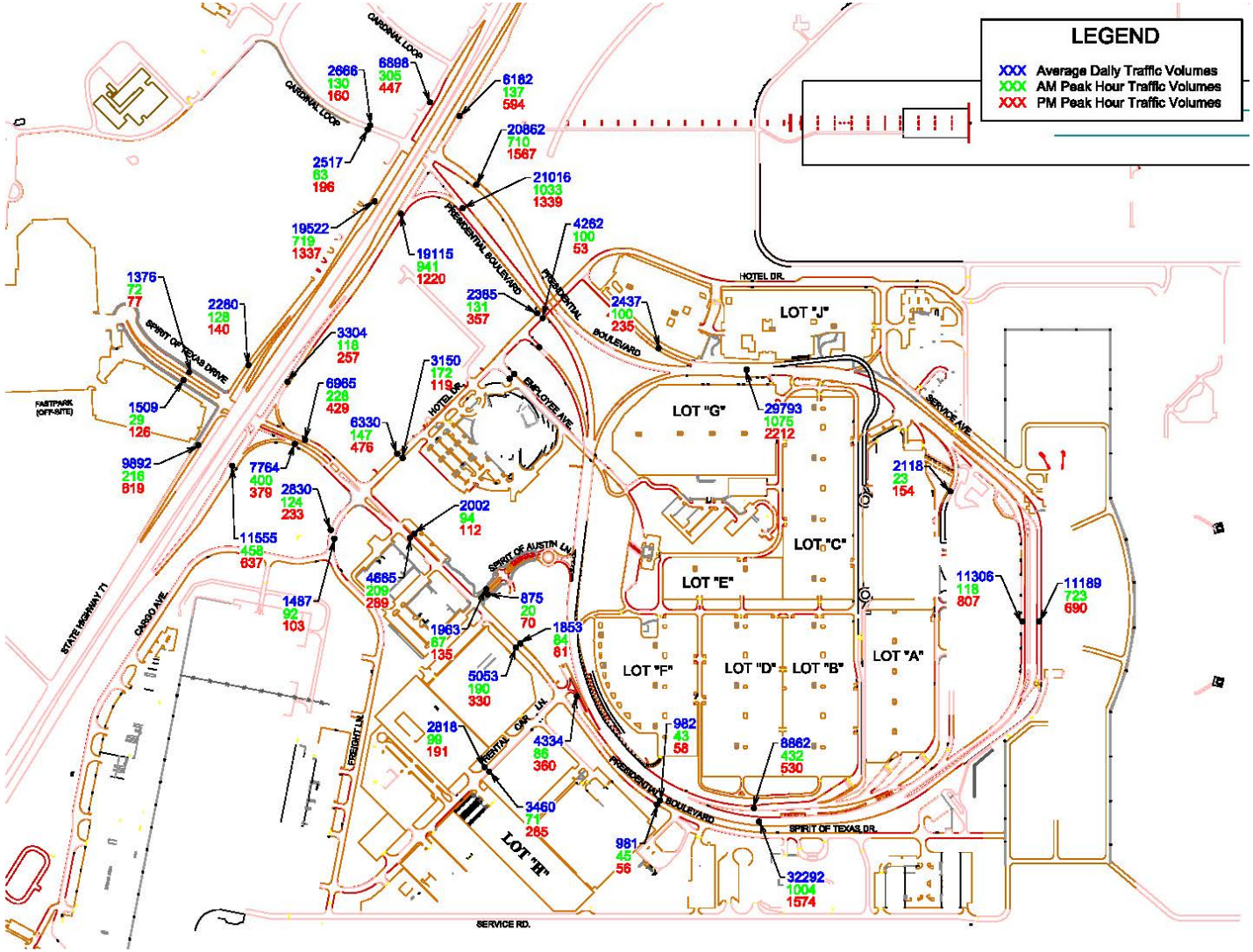
[14] Airport Cooperative Research Program Report – 40, Airport Curbside and Terminal Area Roadway Operations - by the Transportation Research Board, sponsored by the Federal Aviation Administration, 2010.

Table 2.5-5: Traffic Count Locations

LOCATION	DESCRIPTION	COUNT TYPE
TMC 1N	SH 71 northbound frontage road and Spirit of Texas Drive intersection	Turning-movement count
TMC 1S	SH 71 southbound frontage road and Spirit of Texas Drive intersection	Turning-movement count
TMC 2N	SH 71 northbound frontage road and Presidential Boulevard.	Turning-movement count
TMC 2S	SH 71 southbound frontage road and Presidential Boulevard.	Turning-movement count
TMC 3	Spirit of Texas Drive and Hotel Drive intersection.	Turning Movement Count
TMC 4	Hotel Drive and Employment Avenue intersection.	Turning-movement count
TMC 5	Hotel Drive and Presidential Boulevard intersection.	Turning-movement count
TMC 6	Spirit of Texas Drive and Rental car road intersection.	Turning-movement count
Loc 7	CONRAC facility exit	24-hour count
Loc 8	Presidential Boulevard exit for parking and rental car return	24-hour Count
Loc 9	Park and Zoom entry and exit	24-hour count
Loc 10	Spirit of Texas Drive south of SH 71 frontage road	24-hour count with vehicle classification
Loc 11	Presidential Boulevard south of SH 71 frontage road	24-hour count with vehicle classification
Loc 13	Presidential Boulevard near Lot G	24-hour count per lane
Loc 14	Presidential Boulevard	24-hour count per lane

Videos of curbside vehicular activities were collected from the airport for Friday, July 21, 2017. Twenty-four-hour traffic-count data was extracted from these videos to use for traffic-operation analysis as well as inventory of counts within ABIA circulation area. A summary of all collected traffic is presented in **Exhibit 2.5-11**.

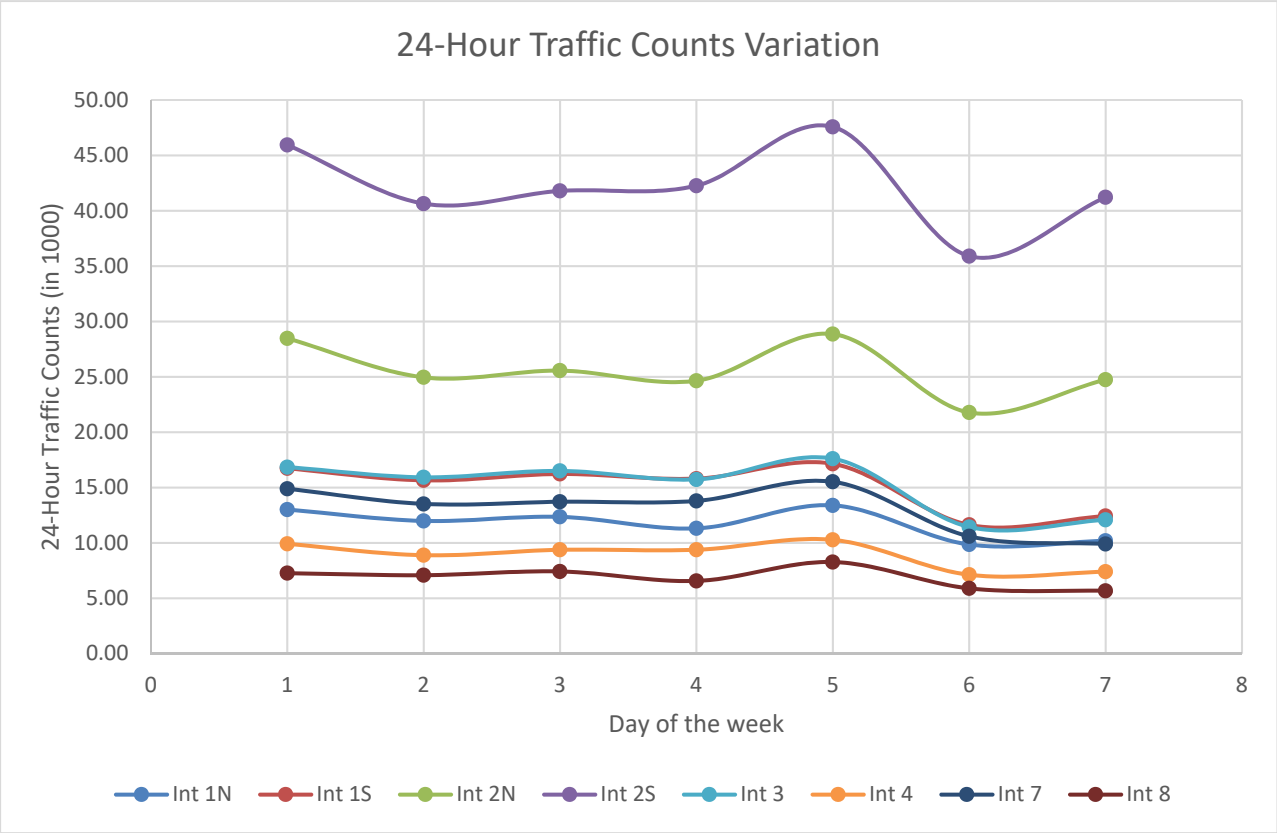
Exhibit 2.5-11: Summary of Collected Traffic Counts for Peak Weekday Friday, July 21, 2017



Source: Atkins, 2018

The 7-day, 24-hour traffic counts at intersections were analyzed to verify that Fridays in the peak month of July is indeed the peak day for vehicular traffic within the terminal area. The results are shown in **Exhibit 2.5-12**, confirming the previous analysis of peak day.

Exhibit 2.5-12: Weekly Variation of Daily Traffic Counts (July 28 through August 3, 2017)



Source: Atkins, 2018.

2.5.4.3 Terminal Roadway and Curbside Traffic Analysis

Traffic operations within the ABIA circulation area was evaluated for curbside and other road segments connecting SH 71 to the Barbara Jordan Terminal as well as the intersection of Emma Browning Avenue and Burleson Road at the South Terminal.

Existing-year traffic analysis was performed using collected traffic counts within the airport terminal area as shown in Exhibit 2.5-11 and as discussed in the previous section. The roadway characteristics information was gathered based on Google aerials and field inspections. The traffic analysis was performed in VISSIM 9 following the Federal Highway Administration (FHWA) Traffic Analysis Toolbox supplemented with curbside operational analysis as provided in ACRP 40 and standard industry practice. The AM peak hour of 5:30 AM–6:30 AM and PM peak hour of 4:30 PM–5:30 PM were used to conduct validation of the VISSIM simulation traffic models and to evaluate traffic conditions for the airport-circulation area study segments. The models were

validated based on factors such as traffic counts, travel speeds for study segments, and distribution of dwell times at the curbside. The VISSIM models were validated so that the models would yield traffic simulation results comparable to 2017 conditions. Per ACRP 40, the circulation area should be analyzed and reported using uninterrupted traffic flow (freeway) concepts as presented in the Highway Capacity Manual (HCM). Per HCM, LOS for intersections is defined based on intersection delay measure of effectiveness (MOE), while for uninterrupted flow, it is based on density. The acceptable LOS for urban intersections and freeways is set at D. As shown in **Table 2.5-6**, the VISSIM results of the existing traffic conditions at the study intersections show acceptable LOS D or better at all intersections. The results for roadway segments besides the curbside area are presented in **Table 2.5-7**.

Table 2.5-6: ABIA Circulation Area Intersection Traffic Operations MOEs

INTERSECTION	AM		PM	
	Delay	LOS	Delay	LOS
SH 71 WBFR at Spirit of Texas Dr. (unsignalized)	10	B	25	C
SH 71 EBFR at Spirit of Texas Dr. (unsignalized)	7	A	14	B
SH 71 WBFR at Presidential Blvd. (signalized)	20	C	30	C
SH 71 EBFR at Presidential Blvd. (signalized)	40	D	41	D
Spirit of TX Dr. at Hotel Dr. (unsignalized)	10	A	25	D
Hotel Drive at Employee Ave. (unsignalized)	1	A	2	A
Hotel Drive at Presidential Blvd. (unsignalized)	1	A	1	A
Spirit of Texas at Spirit of Austin Ln. (unsignalized)	7	A	10	B
Spirit of Texas Drive at Rental Car Rd (unsignalized)	2	A	6	A
Burleson Road at General Aviation Avenue (signalized)*	9	A	12	B

Note: *This intersection was not included in VISSIM models and was analyzed individually using Synchro software

Table 2.5-7: ABIA Circulation Area Roadway Segment Traffic Operations MOEs

SEGMENTS		AM			PM		
FROM LINK	TO LINK	AVERAGE MODELED SPEED [MPH]	AVERAGE DENSITY [VEH/MI/HR]	EQUIVALENT LOS BASED ON DENSITY	AVERAGE MODELED SPEED [MPH]	AVERAGE DENSITY [VEH/MIL/HR]	EQUIVALENT LOS BASED ON DENSITY
SH 71	Hotel Dr. exit	41	6	A	39	9	A
Hotel Drive exit	Hotel Dr. entrance	44	8	A	44	10	A
Hotel Drive entrance	Spirit of Austin Ln.	43	7	A	41	9	A
Spirit of Austin Ln.		43	8	A	42	11	A
		43	10	A	42	14	B
	Long-term Parking entrance	42	7	A	38	11	A
Long-term Parking entrance	Lower and Upper Curb diverge	41	6	A	36	12	B
Start of Lower Curbside roadway	Garage A Exit	31	3	A	23	23	C
Garage A exit	Start of Lower Curbside	30	2	A	11	72	F
Start of Upper Curbside roadway	Start of Upper Curbside	30	12	B	28	14	B
End of Lower Curbside		16	3	A	14	22	C
	Garage A entrance	16	4	A	14	33	D
End of Upper Curbside	Garage A entrance	20	18	B	19	20	C

SEGMENTS		AM			PM		
FROM LINK	TO LINK	AVERAGE MODELED SPEED [MPH]	AVERAGE DENSITY [VEH/MI/HR]	EQUIVALENT LOS BASED ON DENSITY	AVERAGE MODELED SPEED [MPH]	AVERAGE DENSITY [VEH/MIL/HR]	EQUIVALENT LOS BASED ON DENSITY
Garage A entrance	Parking Lot G exit	31	7	A	28	15	B
Parking Lot G exit	CONRAC entrance	44	6	A	44	12	A
CONRAC entrance	Hotel Dr. exit	42	5	A	41	11	A
Hotel Dr. exit	SH 71	43	5	A	31	17	B

Note: vehicles per mile per hour = VEH/MI/HR

As observed in the tables above, traffic conditions at all study intersections are at a satisfactory level of service D or better. Furthermore, all roadway segments operate at LOS D or better during both peak hours except for the segment between the entrance to the long-term parking and the diverge point for Upper and Lower Curbsides and continuing onto the segment leading to the Lower Inner Curbside. The ACRP Report 40 suggests a few microsimulation MOEs for the curbside, but it also notes that most of them do not directly correspond to quantitative values equaling a specific level of service and are more appropriate for alternative analysis. The report recommends using "time spent in queue" to evaluate curbside traffic conditions which relates to the wide range of motorist expectations regarding traffic conditions when they arrive at an airport curbside. The ACRP Report 40 criteria to define LOS based on "time spent in queue" measure is presented in **Exhibit 2.5-13**. It should be noted that the "small-hub and smaller medium-hub" option has been used for the ABIA analyses. For the purposes of this study, a "time spent in queue" has been identified as the time a vehicle waits to enter a curbside due to congestion on the curbside. The simulation results for "time spent in queue" measure and corresponding LOS are presented in **Table 2.5-8** and show consistency of entry segment (to curbside) LOS with LOS presented based on density in Table 2.5-7.

Exhibit 2.5-13: Time Spent in Queue LOS

	Small-hub and smaller medium-hub airports (*a*)			Large medium-hub and large-hub airports (*a*)		
	Given maximum acceptable time spent in queue in seconds (*a*)					
Level of service	60	120	300	600	900	1,200
Maximum for LOS E	60	120	300	600	900	1,200
Maximum for LOS D	47	93	233	465	698	930
Maximum for LOS C	33	66	165	330	495	660
Maximum for LOS B	20	39	98	195	293	390
Maximum for LOS A	6	12	30	60	90	120

Notes:

*Input data are to be taken from microsimulation modeling output.

(*a*) Analyst must first select a value for the maximum acceptable time spent in queue for the subject airport. Then, using queue length and average speed outputs from the microsimulation model, the level of service can be identified.

Source: ACRP Report 40 Table 5-4

Table 2.5-8: VISSIM Simulation Results for Time Spent in Queue and LOS

LOCATION	AM		PM	
	TIME SPENT IN QUEUES	LOS	TIME SPENT IN QUEUES	CURBSIDE LOS
Inner Curbside at Lower Level	0	A	135	F
Outer Curbside at Lower Level	0	A	102	E
Inner Curbside at Upper Level	2	A	4	A
Outer Curbside at Upper Level	18	B	18	B

The entry queue and delays result in large part from driver behavior at the curbside entrance as observed from the video surveys and simulated operations in VISSIM models. Many vehicles immediately maneuver into the two right lanes when entering the curbside to secure a place in one of those lanes and to look for their passengers. Then the vehicles slowly drive along the curbside with frequent but brief stops to look for their passengers, as they are not allowed to stop and wait.

Additionally, pedestrians have right-of-way at each crosswalk, and there is no signal that requires pedestrians to wait to cross the crosswalks. These uncontrolled pedestrian crossings cause significant delays to traffic at the curbsides.

The VISSIM traffic analysis was supplemented with the ACRP Report 40 analysis guidelines for the curbside traffic operations. This report provides several performance metrics to evaluate operations at the terminal curbside as used and described below. One MOE relates to curbside utilization and demand versus capacity ratios for inner curbsides. Criteria associated with these measures are presented in **Exhibit 2.5-14** and were applied for multiple-lane standards as is the current layout of both pick-up and drop-off areas. For both lower and upper levels, the inner curbsides are four-lane sections with two loading/unloading lanes and two through lanes. The inner through lane is usually used for maneuvering in and out of loading/unloading lanes. It should be noted that LOS for the outer curbsides has not been tracked as these are controlled commercial curbsides with zoned areas of usage. Operational rules and procedures prevent multilane parking that could impact drive lanes. The utilization factor is equal to the curbside design length divided by the existing curb capacity (or effective length) considering whether double parking is allowed by the airport operator. According to the guidelines, a curbside utilization factor equal to or less than 1.3 is considered acceptable for a new design or for existing small-hub and smaller medium-hub facilities as ABIA is categorized.

Exhibit 2.5-14: Level of Service Criteria for Airport Curbsides

Criteria	Airport curbside levels of service A	B	C	D	E	F
When double (and triple) parking is allowed at the curbside						
Maximum demand for curbside standing or parking/effective curbside length (*a*)	0.90	1.10	1.30	1.70	2.00	>2.00
Maximum service flow rate						
5-lane curbside roadway (vph)	3,400	3,280	3,100	2,710	2,400	Up to 2,400
4-lane curbside roadway (vph)	2,830	2,790	2,680	2,220	1,800	Up to 1,800
3-lane curbside roadway (vph)	2,200	1,950	1,580	860	750	Up to 750
When double parking is prohibited at the curbside						
Maximum demand for curbside standing or parking/effective curbside length (*a*)	0.70	0.85	1.00	1.20	1.35	>1.35
Maximum service flow rate						
4-lane curbside roadway (vph	2,830	2,830	2,800	2,730	2,600	Up to 2,600
3-lane curbside roadway (vph)	2,350	2,250	2,000	1,760	1,600	Up to 1,600
Maximum through lane volume/capacity ratio	0.25	0.40	0.60	0.80	1.00	1.00

vph = vehicles per hour

(*a*) The ratio between the calculated curbside demand and the available effective curbside length.

Source: Jacobs Consultancy, November 2009.

The number of parking spots for different vehicle types were collected in the field at the curbsides. Dwell time of different parking spots is calculated based on curbside videos from July 21, 2017. For lower-level curbside, 4:30 PM–5:30 PM is the peak hour, whereas for upper curbside 5:30 AM–6:30 AM is the peak hour. Average dwell time for upper curbside has been calculated for AM peak. Average dwell time for lower curbside has been calculated for PM peak. The analysis of loading/unloading curbside lanes showed a utilization factor of 0.91 or lower at upper curbside inner curb equivalent to a LOS B and a utilization factor of 1.5 or lower for lower curbside inner curb equivalent to a LOS D as shown in **Table 2.5-9**. The analysis of curbside thru lanes showed a LOS A for upper curb and a LOS B for lower curb as presented in **Table 2.5-10**. Per ACRP 40 guidelines, the capacity and LOS at the curbside is reported as the worst for the loading/unloading curb lanes and thru lanes. The resulting demand versus capacity and LOS for both upper and lower levels are presented in **Table 2.5-11**.

Table 2.5-9: Existing Year (2017) Loading/Unloading Curbside Lanes Utilization Factor and LOS

MODE	EXISTING PEAK-HOUR TRAFFIC VOLUME STOPPED AT CURBSIDE	AVERAGE SAMPLE DWELL TIME [SECONDS]	DEMAND IN LINEAR LENGTH [FT.]	CURBSIDE LOADING/ UNLOADING EFFECTIVE LENGTH [FT.]	CURB UTILIZATION RATIO	CURBSIDE LANES LOS BASED ON UTILIZATION FACTOR
Curbside Upper Level (Total)						
Individually owned vehicle	598	65	750	820	0.90	A
Taxi						
TNC						
Hotel shuttle						
On-site parking shuttle	24	125	114	200	0.57	A
Off-site parking shuttle	26	125	114	210	0.54	A
Transit						
Curbside Lower Level (Total)						
Individually owned vehicle	630	70	810	540	1.50	D
Taxi	87	375	720	590	1.22	C
TNC						
Hotel shuttle						
On-site parking shuttle	9	125	114	210	0.54	A
Off-site parking shuttle	39	130	228	210	1.09	B
Transit	4	300	114	180	0.63	A

Table 2.5-10: Existing Year (2017) Curbside Thru Lanes (Inner Curbside Only) Demand and Capacity and LOS

2017				
MODE	EXISTING PEAK HOUR VOLUME [VPH]	EXISTING CAPACITY [VPH]	V/C RATIO	LOS
Curbside upper level (Total)	631	2,790	0.23	A
Individually owned vehicle	803	2,220	0.36	B

Table 2.5-11: Existing Year (2017) Overall Curbside Capacity and LOS

2017					
MODE	NUMBER OF PARKING POSITIONS	AVERAGE SAMPLE DWELL TIME [SECONDS]	EXISTING PEAK HOUR VOLUME STOPPED AT CURBSIDE	EXISTING CAPACITY [VPH]	LOS
Curbside Upper Level (Total)					
Individually owned vehicle	61	65	598	2,790	A
On-site parking shuttle	6	125	24	170	A
Off-site parking shuttle (includes hotel shuttles)	4	125	26	120	A
Curbside Lower Level (Total)					
Individually owned vehicle	42	70	630	2,160	D
Taxi	8	375	87	80	C
On-site parking shuttle	6	125	9	170	A
Off-site parking shuttle (includes hotel shuttles)	6	130	39	170	B
Transit	2	300	4	20	A

While the utilization and demand/capacity analyses show acceptable levels of service at the curbside, the VISSIM analysis shows the degraded conditions at the entry point to the curbside area especially for the lower level during the PM peak hour. This indicates that the current design and geometrics on all roadway segments including the curbside layouts is adequate to accommodate the existing demand. However, potential options to address the lower-level inner-curbside entry queue should be studied to improve performance for the curbside. Additionally, better management of pedestrian crossings (e.g., restrictions, signalization) would significantly improve traffic operations at the terminal and thus alleviate adverse conditions at the entry points.

2.6 Airport and Airline Support Facilities

2.6.1 Catering

LSG Sky Chefs is the current catering company at ABIA. They are located in Building #7375, northeast of the passenger terminal facilities as shown on **Exhibit 2.6-1**. The current facility prepares 1,500 to 3,000 meals per day in approximately 65,000 sq.ft. of space and operates at about 90% capacity. They also remove trash (domestic and international) from the commercial aircraft upon arrival. The current catering demand warrants 14 employees who work a single eight-hour shift. The catering facility is located on the landside and requires security inspection at the truck dock prior to delivery to the aircraft.

Future expansion can be contained within the existing lease area and would require the following:

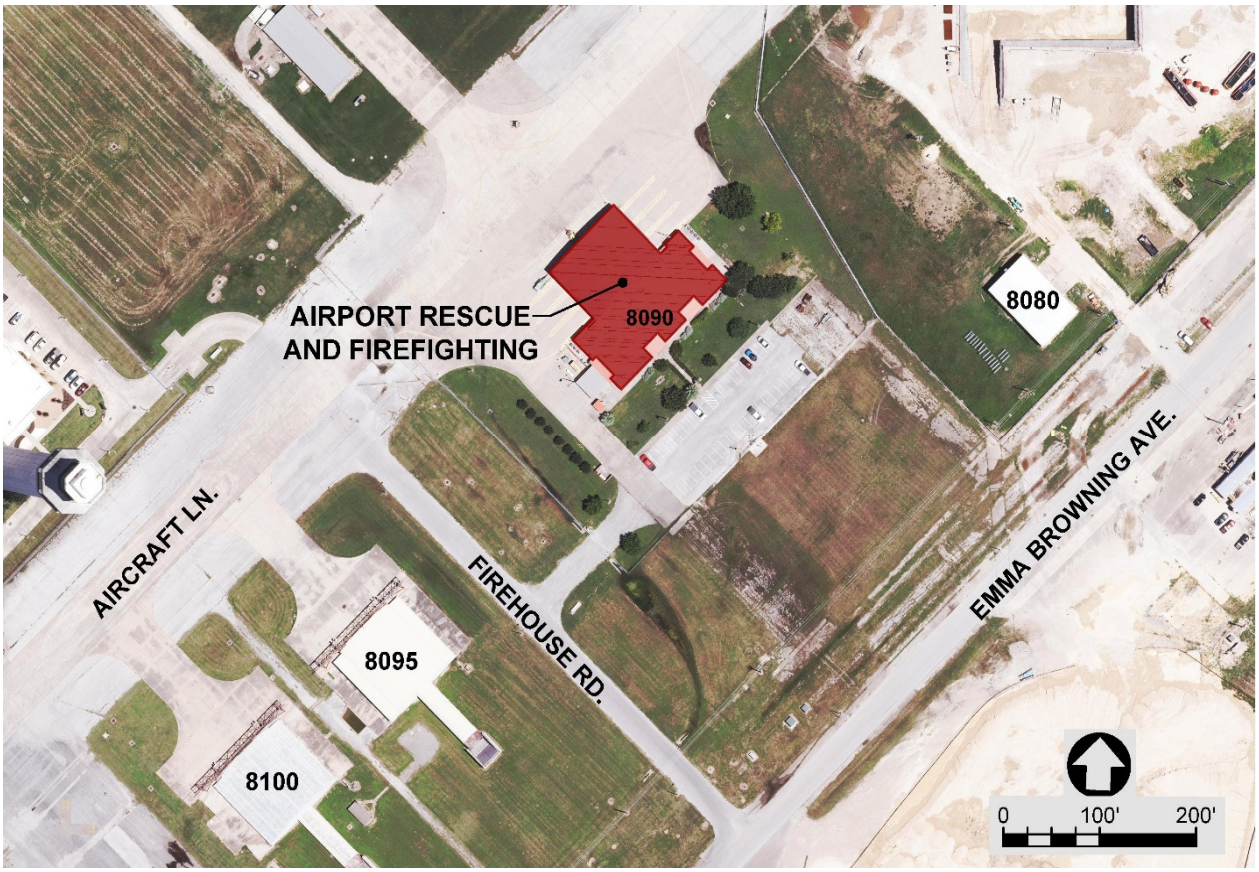
- Building expansion outward or on a second floor
- Building additional office space
- Adding additional 10–11-day dry storage on-site
- Anticipating serving 5,000+ meals if activity were to double
- Adding an additional Autoclave for sterilizing trash

Exhibit 2.6-1: LSG Sky Chefs Catering

2.6.2 Airport Rescue and Firefighting

The Airport Rescue and Firefighting (ARFF) facilities include structures and equipment necessary to respond to aircraft and structure firefighting and Emergency Medical Service (EMS) response at the airport. Approximately 95% of EMS responses are inside the terminal and do not require an ambulance, because they are treated on-site. The ARFF facilities at ABIA include storage areas and a single fire station. The ARFF building #8090 is located in the midfield area as shown on **Exhibit 2.6-2**.

Exhibit 2.6-2: ABIA Airport Rescue and Firefighting Facility



The ARFF facility currently occupies 2.5 acres of land, with 2.1 acres of potential expansion area. The ARFF facility provides a kitchen, a sleeping area for personnel, a training area, offices, and an exercise area within a 10,840 sq.ft. building. The facility contains three drive-through two-vehicle deep bays (5,530 sq.ft.). An inventory of equipment is shown in **Table 2.6-1**.

Table 2.6-1: ARFF Equipment Inventory

VEHICLE	TANK SIZE			
	WATER [GAL.]	AFFF [GAL.]	DRY CHEMICALS [LBS.]	ARGON [LBS.]
2003 Oshkosh Stryker 1500	1,500	200	450	460
2005 Oshkosh Stryker 3000	3,000	400	450	460
2013 Oshkosh Stryker 3000	3,000	420	N/A	460
1997 Oshkosh T-3000	3,000	420	450	N/A
2017 Ford Expedition – command unit				
2001 Ford F550 – command unit				
2016 Ford F550 – four-person rescue				
1983 Ford – air stairs				
1996 GMC 3500 – utility/spill response				

Notes: gallons = gal., pounds = lbs.
Sources: ABIA Airport, Omni Air International ARFF Status Report.

In addition, Austin Fire Department Station #42 is located off-airport to the north and serves as backup structural and EMS response for the airport.

ABIA ARFF is currently certified as Classification I, Index D. However, the airport anticipates needing to upgrade to Index E within the next five years due to the larger cargo aircraft. These future requirements will be evaluated in Chapter 4, *Demand/Capacity Facility Requirements*.

FAR Part 139.319 states the response time requirements in the event of an emergency at the airport. It states that within three minutes from the time of the alarm, at least one required aircraft rescue and firefighting vehicle must reach the midpoint of the farthest runway serving the air carrier aircraft from its assigned post, or reach any other specified point of comparable distance on the movement areas that is available to air carriers, and begin application of extinguishing agent. It also states that within four minutes from the time of alarm, all other required vehicles must reach this point. ABIA currently complies with all of these requirements.

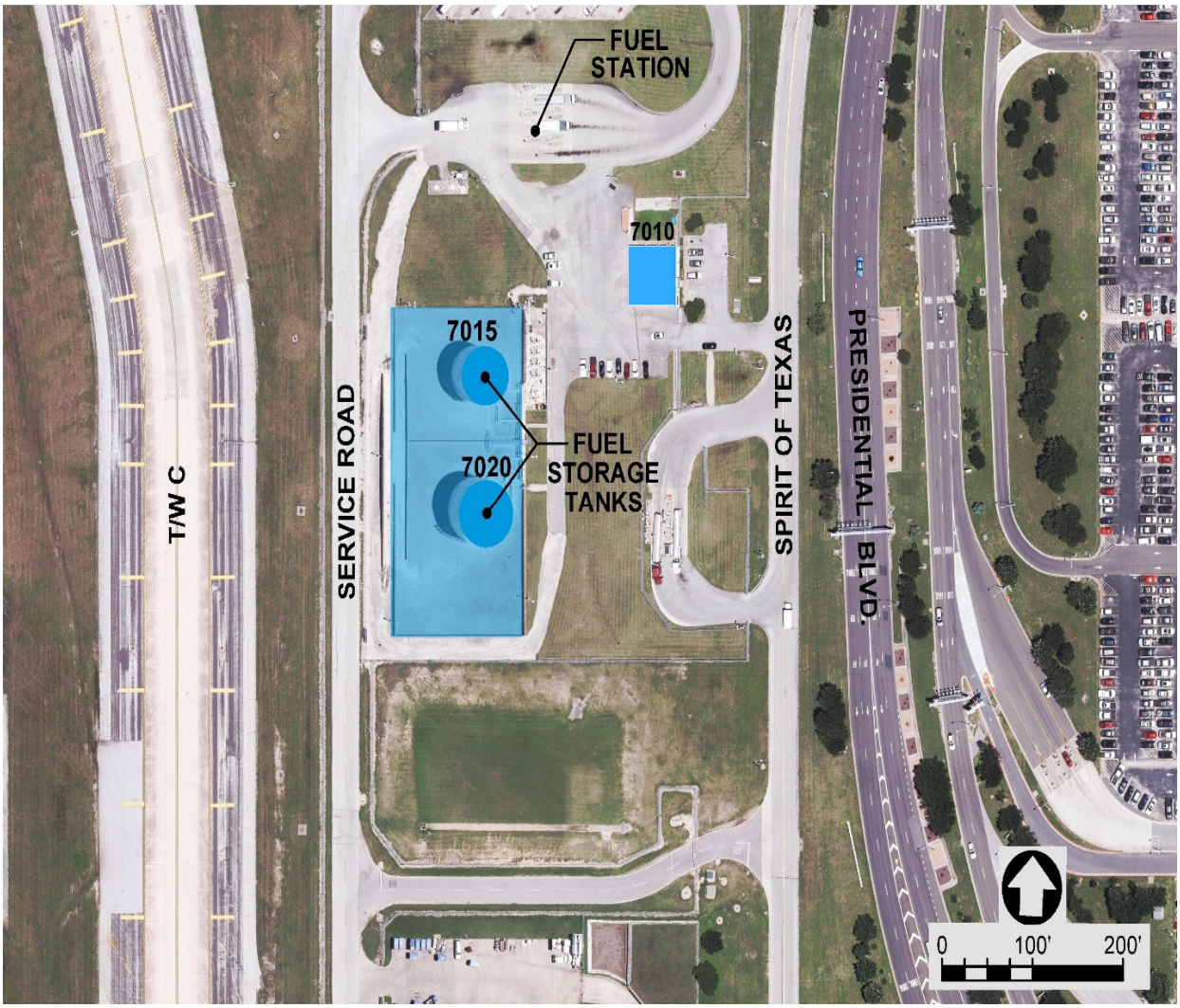
Future planning issues that were expressed by ARFF include the following:

- Addition of a west side fire station on the landside/airside boundary to respond to on- and off-airport incidents. This can serve as a joint-use facility for the future Tanker Base. The fire station would include staffing and crash trucks.
- Providing a permanent ARFF training facility that can be jointly used with the Forest Service. It should be able to accommodate a B-747 fuselage with a “fire retardant and foam” containment capability.

2.6.3 Aircraft Fueling

The aircraft fueling facility and tank storage facility is a 6.9 acres site located on Spirit of Texas Drive immediately northwest of the passenger terminal, as shown on **Exhibit 2.6-3**. The facilities include Building #7010, used for fuel operations and maintenance, as well as two fuel-storage tanks (Buildings #7015 and #7020). The two tanks offer 481,000 gallons and 691,700 gallons of capacity, respectively.

Exhibit 2.6-3: ABIA Aircraft Fueling Facility



2.6.4 Airport Maintenance and Police

Currently, airport maintenance facilities are in the south midfield area between the runways. Numerous airport maintenance facilities are in the old military buildings and include operational maintenance facilities, maintenance storage facilities and maintenance support, and K-9 facilities on the terminal bag-claim level.

Additionally, the police have storage bunkers in Buildings #3015 and #3020 located east of Runway 17L-35R along the Perimeter Road.

ABIA is constructing a proposed Consolidated Maintenance Facility (CMF) on the east side of Golf Course Road, northeast of the Runway 17L end. This facility will offer space for maintenance operations, a motor pool facility, a storage area, a truck wash, and even space for potential future expansion. In addition, a police department facility will be located on the north side of the site.

2.6.5 Ground Service Equipment Maintenance

The current Ground Service Equipment Maintenance (GSEM) facility is in Building #7005 along Spirit of Texas Drive. This area occupies 2.1 acres and includes a 10,228 sq.ft. building with a 668 sq.ft. auxiliary material storage building. **Exhibit 2.6-4** shows the GSEM facility.

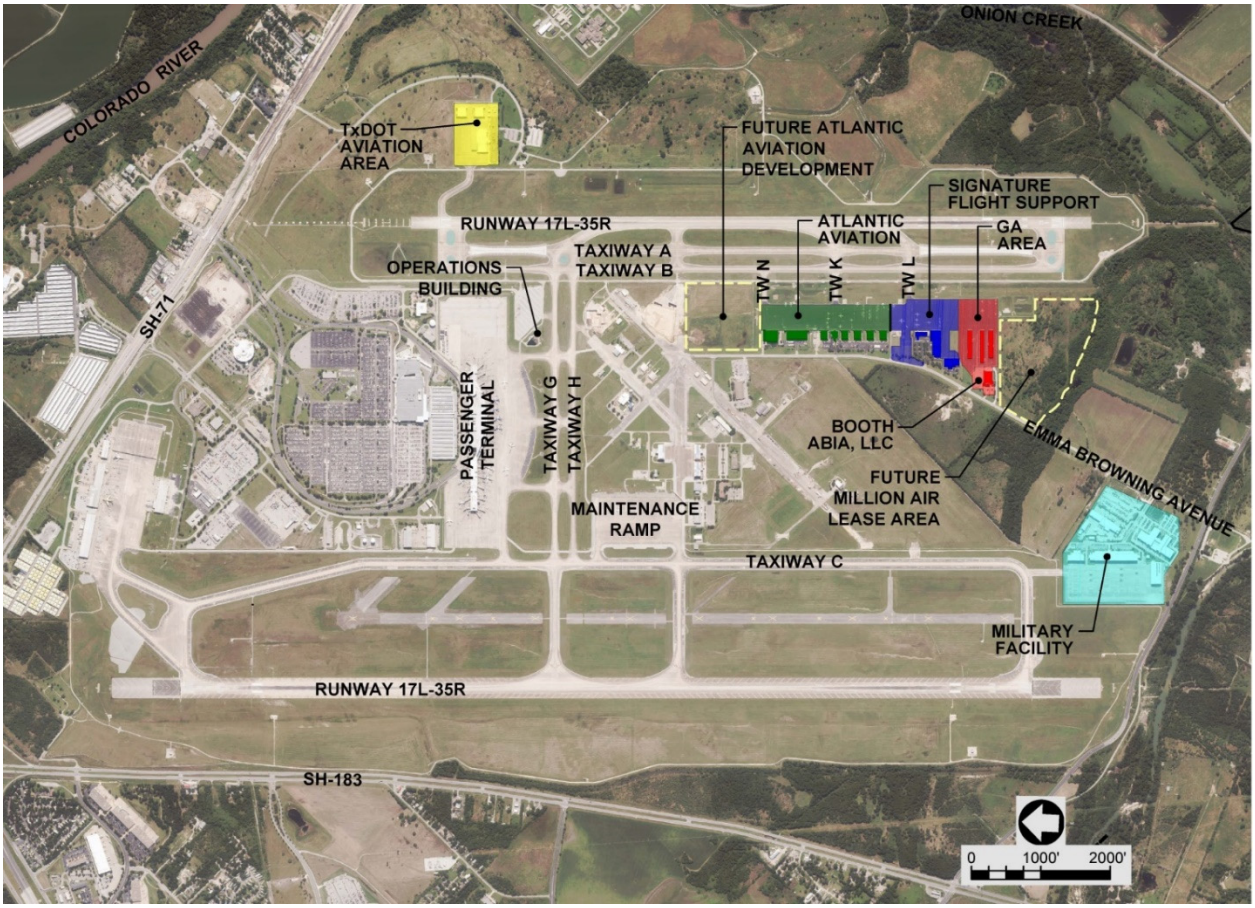
Exhibit 2.6-4: ABIA Ground Service Equipment Maintenance Facility

2.7 General Aviation/FBO/Military/TxDOT Facilities

2.7.1 Facility Overview and Description

This section provides an overview of the Fixed Base Operator (FBO) and General Aviation (GA) facilities established at ABIA including their layout, condition, use, and existing issues. ABIA has two GA developments on property: a primary area where the majority of all general aviation activity takes place and a secondary area occupied by the TxDOT Aviation, also known as TxDOT Flight Services. In addition to these general aviation facilities, the Texas Army National Guard – Austin Army Aviation Support Facility (AAASF), located at the corner of Burleson Road and Emma Browning Avenue, is discussed in this section. The location of these facilities is shown in **Exhibit 2.7-1**.

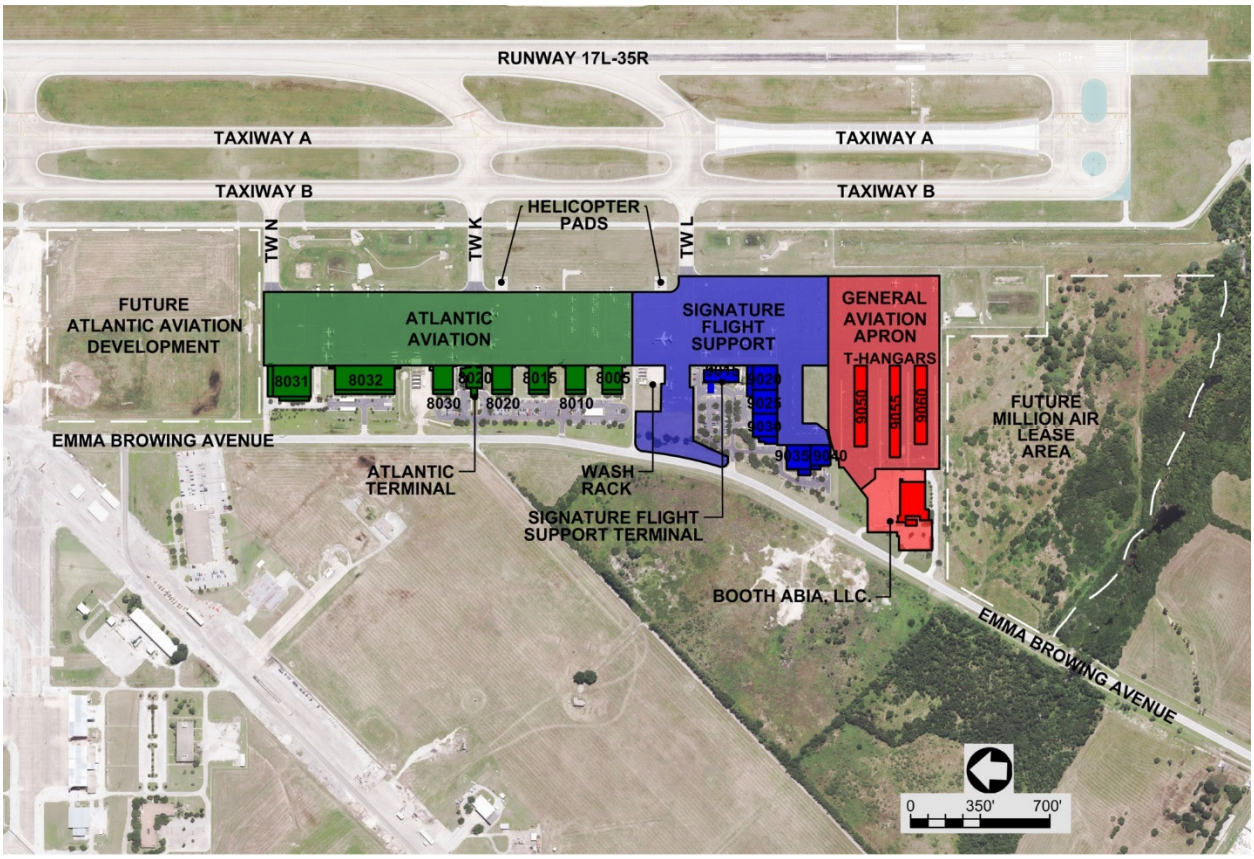
Exhibit 2.7-1: ABIA General Aviation/Military Areas



2.7.2 General Aviation Area Description

ABIA's main general aviation facility is located west of Runway 17L-35R along Emma Browning Avenue. The area is approximately 75 acres in size as shown in **Exhibit 2.7-2**.

Exhibit 2.7-2: ABIA General Aviation Areas



2.7.2.1 Facilities/Hangars

This GA area includes two FBO terminal facilities, 13 large corporate hangars, and three sets of T-hangars. The primary tenants are the two FBOs, Atlantic Aviation and Signature Flight Support. Each of these FBOs provide a full array of traditional FBO services and have multiple hangars that are used for their own operation or are subleased to other tenants. A new 40-acre FBO facility for Million Air/Capital Jet Center is planned for south of the existing GA ramp and is expected to be operational in 2019. Atlantic Aviation also has an option in their current lease to develop an additional 20-acre area north of the existing GA ramp. Both FBOs have fuel farm systems providing Jet A and 100LL that are in good condition and sufficiently meet current demand. All of the hangars for both of the FBOs are at 100% capacity. Vehicle access to the area is sufficient. Vehicle parking in the area is sufficient with the exception of the Signature Flight Support area, which is discussed later.

In addition to the FBOs, two large corporate hangars on the main general aviation ramp are occupied by private owners: Building #9035 and ABIA Booth Hangar. The three T-hangar Buildings are Buildings #9050, #9055, and #9060 located on the south end of the GA ramp provide a total of 54 T-hangar bays. The T-hangars are owned by the City of Austin but are managed by Signature Flight Support. The T-hangars are currently full and have a waiting list for future tenants. **Table 2.7-1** provides an overview of each GA facility.

Table 2.7-1: General Aviation Facility Inventory

BUILDING #	LEASEHOLDER	BUILDING DESCRIPTION	FACILITY SIZE [sq.ft.]	BUILDING CONDITION
8031	Raptor Hangar	Box hangar	36,408	Good
8032	Atlantic Aviation	Box hangar	42,683	Good
8030	Atlantic Aviation	Box hangar	14,173	Good
8025	Atlantic Aviation	Terminal building	10,752	Good
8020	Atlantic Aviation	Box hangar	14,173	Good
8015	Atlantic Aviation	Box hangar	14,173	Good
8010	Atlantic Aviation	Box hangar	14,173	Good
8005	Atlantic Aviation	Box hangar	14,173	Good
9015	Signature Aviation	Terminal building	11,754	Good
9020	Signature Aviation	Box hangar	19,331	Good
9025	Signature Aviation	Box hangar	14,732	Good
9030	Signature Aviation	Box hangar	17,680	Good
9035	Ford Smith	Box hangar	16,256	Good
9040	Signature Aviation	Box hangar	10,999	Good
9050	City of Austin	T-hangar	25,426	Good
9055	City of Austin	T-hangar	24,566	Good
9060	City of Austin	T-hangar	24,314	Good
Booth ABIA, LLC	Booth ABIA, LLC	Box hangar	25,964	Good

2.7.2.2 General Aviation Ramp

The GA ramp consists of approximately 187,777 square yards (1,689,993 sq.ft.) of pavement. The majority of the ramp is made of bituminous asphalt. The only area composed of concrete is adjacent to the ABIA Booth Hangar on the southern end of the ramp. The ramp meets the current needs of its users and is in good condition. Numerous tie-down spots exist at the southern end of the ramp, but these spaces are rarely used to tie down small aircraft. Instead, the area is typically used to park transient aircraft when the ramp is congested. Two helicopter-landing sites are located along the eastern edge between the ramp and Taxiway Bravo. An aircraft wash rack is also located north of Signature Flight Support's terminal facility but is infrequently used for this purpose. Signature Flight Support also has a U.S. Department of Defense (DOD) fuel contract, so they frequently have larger military aircraft parked on their ramp, e.g. C-130, KC-135.

2.7.3 GA Facilities Current Issues

The following are current issues related to the existing GA facilities at ABIA.

2.7.3.1 Larger Aircraft/Hangar Capacity

The FBOs have reported an increase in larger aircraft traffic, both based and transient, over the past few years. Many of their existing hangars are unable to accommodate those larger aircraft. Consequently, the FBOs want to build larger hangars or expand their facilities and/or lease limits.

2.7.3.2 General Aviation U.S. Customs Clearance

Currently, U.S. Customs and Border Protection sends a mobile officer over to an FBO when an international aircraft arrives that needs to clear Customs. Due to USCBP staffing constraints and the response distance, aircraft operators and passengers have had to wait an extended amount of time to clear Customs. USCBP advises aircraft operators to land at certain times to try to reduce wait times.

2.7.3.3 Vehicle Parking

Signature Flight Support wants additional vehicle-parking space adjacent to their leased hangars. It was reported that the parking lot is congested even during non-peak times.

2.7.3.4 Ground Support Equipment Maintenance Facility

Signature Flight Support wants to add a Ground Support Equipment (GSE) maintenance facility in the future. Currently, Signature uses a small building adjacent to their fuel farm and a portion of their aircraft wash rack to perform GSE maintenance. The expansion would include a garage (approximately 1,000 sq.ft. in size) where Signature could park GSE inside to perform routine maintenance. This facility could be located in the area where GSE maintenance is currently performed.

2.7.3.5 Grass Area South of Hangar #9040

A small area of grass between Hangar #9040 and Hangar #9050 currently restricts aircraft movements on the ramp. As a result, the only way aircraft can access the ABIA Booth Hangar is by traversing the ramp immediately north of T-Hangar #9050. Consequently, congestion can occur in that area when smaller aircraft using T-Hangar #9050 are temporarily parked on the ramp and other aircraft need to transition to or from the ABIA Booth Hangar.

2.7.4 TxDOT Aviation Services Department Development

The Department of Transportation Aviation services facility is located east of Runway 17L-35R along Golf Course Road on the north end of the airport. The tenant in this area is the TxDOT Flight Services Department, which operates a number of aircraft for the State of Texas. The Flight Services Department facility is approximately 13 acres in size. The facility consists of four hangars, a terminal/office building, an aircraft wash rack, a maintenance facility, and a fuel farm.

2.7.5 Military Facility

ABIA is home to a United States Army Reserve Center that is located east of Runway 17R/35L on the south end of Runway 35L. This area is approximately 57 acres in size. The facility consists of approximately 87,777 square yards (789,993 sq.ft.) of concrete ramp, a fuel farm, an aircraft wash rack, three hangars, and administrative and maintenance buildings. Twenty-three helicopter-parking positions are provided on the ramp area, along with a single helipad located on Taxiway Z.

2.7.6 Austin Executive Airport Overview

Austin Executive Airport (EDC) is located approximately 13 nautical miles Northeast of ABIA, making it ABIA's closest general aviation airport. Since its opening in 2011, EDC has seen continuous growth in annual aircraft operations and based aircraft. EDC currently has 105-based aircraft, including 16 jets, and averages approximately 75–200 aircraft operations per day and 2,500 aircraft operations per month. In recent years, EDC has seen an increase in the number of large corporate aircraft using their facility. EDC is equipped with a full-service FBO that provides both 100LL and Jet-A fuel. The primary runway at EDC is Runway 13/31 measures 6,025 ft. x 100 ft., is made of asphalt and has RNAV/GPS approaches to each runway end with LPV minimums. The approach minimums for each runway end are as follows: Runway 13 with 250 feet Decision Altitude and one-mile visibility and Runway 31 with 200 feet Decision Altitude and ¾-mile visibility.

EDC currently plans to extend Runway 13/31 to the south an additional 1,075 feet, which will bring the total runway length to 7,100 feet. The runway currently has a 600-foot displaced threshold on the north end that is expected to remain after the runway is extended. EDC also has a 2,000-foot grass strip and the original 1,550-foot runway that was constructed when the Austin Bird's Nest airport was built at this site in the 1960's. Both runways are rarely used but expected to remain.

EDC has five T-hangar buildings and five corporate hangars on the field and is at full capacity, with approximately 80 people on the T-hangar waiting list. EDC has approximately 100 acres of additional land that it plans to use for hangar development, most for corporate hangars.

EDC is currently developing an Air Traffic Control Tower facility that will be operational by the end of 2017. It is expected that the airspace surrounding EDC will be classified as Class D airspace.

2.8 Air Cargo Facilities

The air cargo facilities at ABIA are located on the north side of the airfield, and northeast of the Runway 17R end. Aeroterm and City of Austin Department of Aviation (COA-DOA) operate the cargo facilities at ABIA. There is approximately 1.3 million sq.ft. of aircraft ramp area available, which includes a taxilane and the overflow auto parking area. In 2017, air cargo totaled 189.36 million lbs. Each of the cargo facilities are described in this section.

2.8.1 Aeroterm

Aeroterm is a real estate investor company and manages the south cargo Building # 6040. The total Aeroterm building is 51,000 sq.ft. and is leased to four tenants as shown on **Exhibit 2.8-1**.

- **City of Austin Department of Aviation** leases 24,000 sq.ft. of space in Building # 6040 for the storage of airport maintenance equipment and materials. It plans to relocate this operation to the proposed new Airport CMF on the east side of the airport. The new CMF will provide space for airport maintenance, motor pool, warehouse, truck wash, recycling and fueling facilities. The CMF facility will also provide space for the Airport Police Department.
- **United Parcel Service (UPS)** leases 9,000 sq.ft. of space in Building # 6040. The majority of cargo is processed from commercial aircraft to truck and vice-versa. In 2016, UPS carried 28.3 million lbs. of cargo.
- **Air General** leases 6,000 sq.ft. of space in Building #6040 and is a third-party air cargo operator that provides service for British Airways (BA) and Alaska Airlines. Their facility has cargo-screening machines and requires Customs inspections for their international cargo operations on BA.
- **Worldwide Flight Services (WFS)** leases 12,000 sq.ft. of space in Building #6040 and is a cargo and mail handler for the U.S. Postal Service (USPS) and Federal Express (FedEx). Mail is tugged from the commercial aircraft or FedEx cargo ramp to the north. WFS has some minor charter services that use the ramp during special events (SXSW and Formula 1).

Exhibit 2.8-1: Aeroterm Cargo Facilities

There are no scheduled cargo operations using the Aeroterm usable ramp area of approximately 407,800 sq.ft. All cargo comes from other cargo operators or the commercial aircraft (belly freight/mail). The landside has 29 truck docks; three have ramps into the building.

The Aeroterm cargo Building #6040 is currently 100% occupied. Aeroterm has an option for approximately 212,000 sq.ft. of expansion area to the immediate west of the cargo building.

The following issues are noted if cargo activity were to expand in the future:

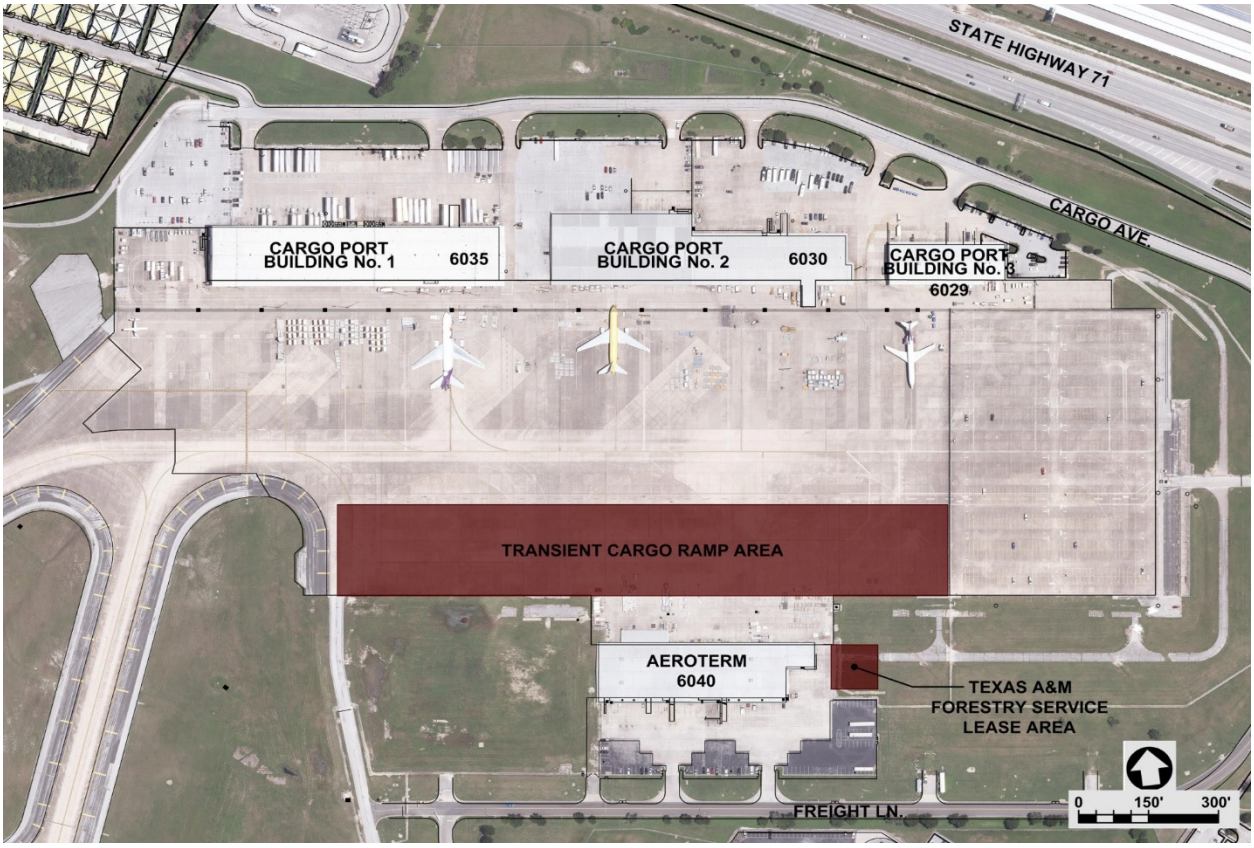
- Anticipate the need for 10-20 percent expansion in the next 5-10 years.
- Contain expansion within the current facilities and 212,000 sq.ft. expansion area to the west.

Relocate the City of Austin Department of Aviation (24,000 sq.ft.) to a separate facility for additional cargo capacity.

2.8.2 Aerial Fire Fighting Facility

ABIA has leased a 1,000 sq.ft. area adjacent to Building #6040 on its Air Cargo Ramp for use by the Texas A&M Forestry Service to use as a base of operations for aerial firefighting operations. The lease also allows the use of the cargo ramp in front of Building #6040 for the operation of tanker aircraft for aerial firefighting. The area is shown in **Exhibit 2.8-2**.

Exhibit 2.8-2: Aerial Fire Fighting Facility



2.8.3 City of Austin Department of Aviation Cargo

City of Austin Department of Aviation manages the entire north side of the cargo area, which includes the aircraft ramp and three cargo Buildings #6029, #6030, and #6035 as shown on **Exhibit 2.8-3**. The COA-DOA owns and operates the ramp area three cargo buildings. The total COA-DOA building area is approximately 194,500 sq.ft. and is leased to four tenants.

- **FedEx** leases approximately 75,000 sq.ft. of space in Building #6035. All cargo is containerized off the cargo aircraft and trucks. There is no processing of belly freight in this facility. FedEx uses two wide-body aircraft positions and carried 99.4 million lbs. in

2016. They have a 10-year lease term that expires on June 30, 2022, with a five-year renewal option.

Exhibit 2.8-3: City of Austin Department of Aviation Cargo

- **DHL** leases approximately 31,500 sq.ft. of space in Building #6030. They are currently in negotiations to get back 9,000 sq.ft. of building space to the east. DHL is at 100% capacity in their current lease area. They operate a B-767-300 with one turn per day, Monday through Friday. There is no activity on Saturday or Sunday. Most of the DHL cargo is containerized with small packages and Amazon is their main customer. They occupy six truck docks on the landside of the building. They have a five-year lease term that expires on October 31, 2022, with a five-year renewal option.
- **UPS** leases approximately 2,500 sq.ft. of space in Building #6030. They have a five-year lease term that expires on June 30, 2022, with a five-year renewal option.
- Approximately 22,080 sq.ft. of space in Building #6029 is leased for non-cargo activity and could be moved off-airport if there is future cargo demand for this space. In addition, approximately 52,580 sq.ft. of space in building #6030 is leased for non-cargo activity. **Table 2.7-2** provides details of the non-aviation tenant areas.

Table 2.7-2: Non-Aviation Lease Areas

TENANT	LEASE AREA [SQ.FT.]	TENANT [YEARS]	RENEWAL OPTION [YEARS]	LEASE END DATE
IAS Logistics	7,500	2	-	6/30/18
Ground Service International	2,500	3	-	8/31/18
ATX Fulfillment	18,000	6.25	2	2/28/18
ASIG	2,500	3	-	5/1/19
True Lee Loudspeakers	4,560	3	-	5/31/19
Bradford Airport Logistics	10,000	6.9	-	5/31/20
Triumph Aviation	4,300	3	-	7/31/20
Elegant Limousine & Charter	2,000	5	-	10/31/17
Elegant Limousine & Charter	260	4	-	10/31/17
Encompass Air	7,500	2	-	6/30/18
Menzies Aviation USA, Inc.	2,500	3	-	8/31/18

Source: City of Austin Department of Aviation

The COA-DOA Cargo usable ramp area is approximately 410,700 sq.ft. and can accommodate smaller cargo aircraft such as the Cessna 208 up to wide-body aircraft design group IV and V aircraft. Parking B-747 cargo aircraft on the ramp area during the Formula 1 event is not feasible the ramp is too small for the specific Formula 1 aircraft used for transporting Formula 1 equipment (cars, parts, etc.).

The following issues are noted if the cargo activity were to expand in the future:

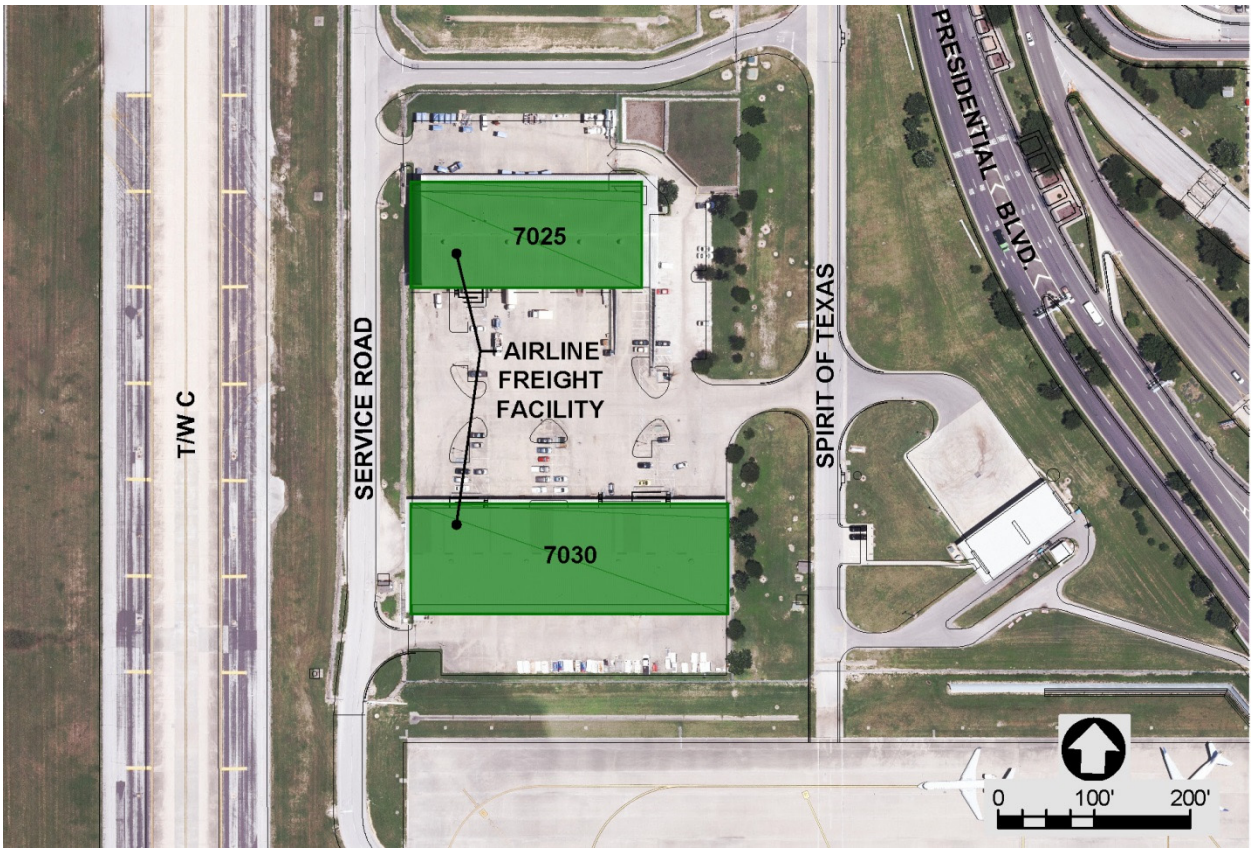
- Use of the non-aviation tenant space (22,500 sq.ft.) for cargo expansion
- Use of the auto parking area for aircraft ramp parking (originally designed for aircraft parking)
- Extension of existing cargo buildings for increased capacity
- Addition of a truck-staging area

2.8.4 Airline Freight Facility

In addition, belly freight is handled along Spirit of Texas Drive in Buildings #7025 (24,000 sq.ft.) and #7030 (33,000 sq.ft.) as shown on **Exhibit 2.8-4**. These two facilities offer approximately 57,000 sq.ft. of cargo handling area. Landside access is via Spirit of Texas Drive, while airside access to the terminal aircraft gates is via the Service Road just east of Taxiway C.

Cargo facilities at ABIA are conveniently located near State Highway 71 (SH 71) and within minutes of the NAFTA Highway Interstate 35, which makes ground access easily accessible and transfer of cargo from air to land expedient.

Exhibit 2.8-4: Airline Freight Facility



2.9 Site Utilities

Utilities for potable water, wastewater, and reclaimed water to ABIA are provided entirely by Austin Water Utility (AWU), which is owned and operated by the City of Austin. Since ABIA was converted from Bergstrom Air Force Base, many utilities have been added and replaced, although several of the onsite utility lines pre-date ABIA. The utility infrastructure is contained and managed within utility corridors throughout ABIA.

2.9.1 Potable Water & Fire Supply Facilities

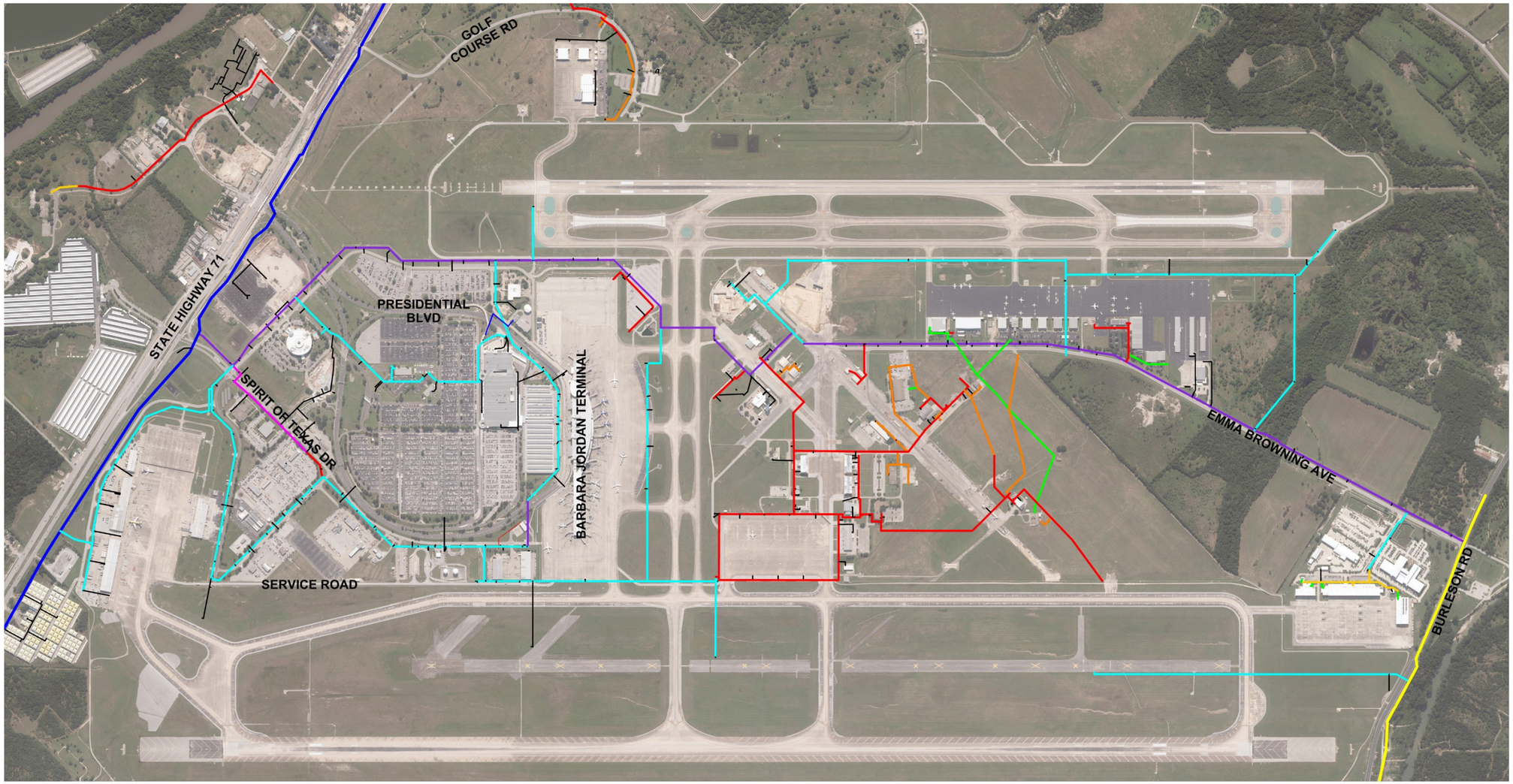
Potable water is supplied to the ABIA facilities through numerous water mains that surround and are looped through the site. The water system at ABIA is on the Central Pressure Zone within the Austin Water Utility system, which operates from existing storage tanks with operating elevations between 690 and 720 feet MSL. **Exhibit 2.9-1** depicts the overall water-system layout in and surrounding ABIA. Primary delivery of potable water to ABIA is provided by a 24-inch concrete steel cylinder (CSC) Main in SH 71 (89-0010), which provides service for the terminal area, the cargo ramp area, and to many of the landside facilities on the north side of ABIA and a 36-inch CSC Main along Burleson Road (88-0015), which provides service to the facilities on the south side of ABIA.

Internally to the ABIA site, potable water is delivered to the terminal area, cargo ramp, and other landside facilities on the north side of ABIA via 12-inch- and 16-inch-diameter mains connected to the 24-inch main in SH 71. Additional looping with smaller diameter pipes to serve all of the areas on the north side of ABIA is also provided. Based on current demands on this portion of ABIA, existing facilities appear to be adequate to provide service, although certain mains within this area may require replacement due to age and condition. The terminal is not part of a loop and connecting it to a loop system will be evaluated in Chapter 4, *Demand/Capacity Facility Requirements*.

The south side of ABIA is served primarily through a 16-inch main running down Emma Browning Avenue that connects to the 36-inch main in Burleson Road. Due to the orientation of the airfield, there is limited looping of this portion of the system, which can present an issue as further development occurs on this portion of ABIA.

Water meter data has been collected for each of the water meters that serve ABIA to establish current airport-wide demands for various uses. This data will be analyzed to predict additional potable water and wastewater demands for the study period.

Exhibit 2.9-1: Existing Water Service Layout



Source: ABIA Airport Layout Plan Utility Base Map and Austin Water Utility GIS Mapping.

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2.9.2 Wastewater Facilities

Sanitary sewer service is provided to the ABIA facilities through surrounding gravity wastewater mains and interceptors. Discharges from ABIA flow to the Austin Water Utility owned and operated South Austin Regional Wastewater Treatment plant located to the east of ABIA. **Exhibit 2.9-2** depicts the overall wastewater system layout in and surrounding ABIA. Primary conveyance of wastewater flows from ABIA are provided by a 96-inch Concrete Govalle Wastewater Tunnel in SH 71 (87-0037), which provides service for the terminal area, the cargo ramp area, and to many of the landside facilities on the north side of ABIA, and the 84-inch Concrete Onion Creek Wastewater Tunnel along Burleson Road & Onion Creek (84-1500), which provides service to the facilities on the south side of ABIA

Internally to the ABIA site, collection mains of sizes varying from six- to 21-inch diameter convey flows to the surrounding Austin Water Utility-owned collection system. Where development of the campus has occurred, the sanitary wastewater systems have been expanded and new branches established.

On the north side of ABIA, a 20-inch-diameter main collects flows from the terminal area, the cargo ramp area, and other landside facilities on the north side of ABIA and connects to the 96-inch gravity interceptor in SH 71 (Govalle Tunnel) to the east of Presidential Boulevard.

On the south side of ABIA, a 21-inch-diameter main collects flows from the facilities on the south side of ABIA and connects to the 84-inch gravity interceptor (Onion Creek Tunnel) near the southern end of Runway 17L-35R. A series of gravity wastewater mains collect flows from the buildings on the south side of the airport ranging in size from six inches to 18 inches in diameter before flowing into the 21-inch main. Most of these lines were constructed in the 1990s and are PVC or vitrified clay pipe. It is anticipated that significant development of the south side of the airport will result in rerouting and/or upsizing many of these collection lines.

ABIA as-built data for the existing mains have been collected, and the capacities of each facility has been calculated and will be included in Chapter 4, *Demand/Capacity Facility Requirements*. Existing flows in these mains have been estimated based on water meter data.

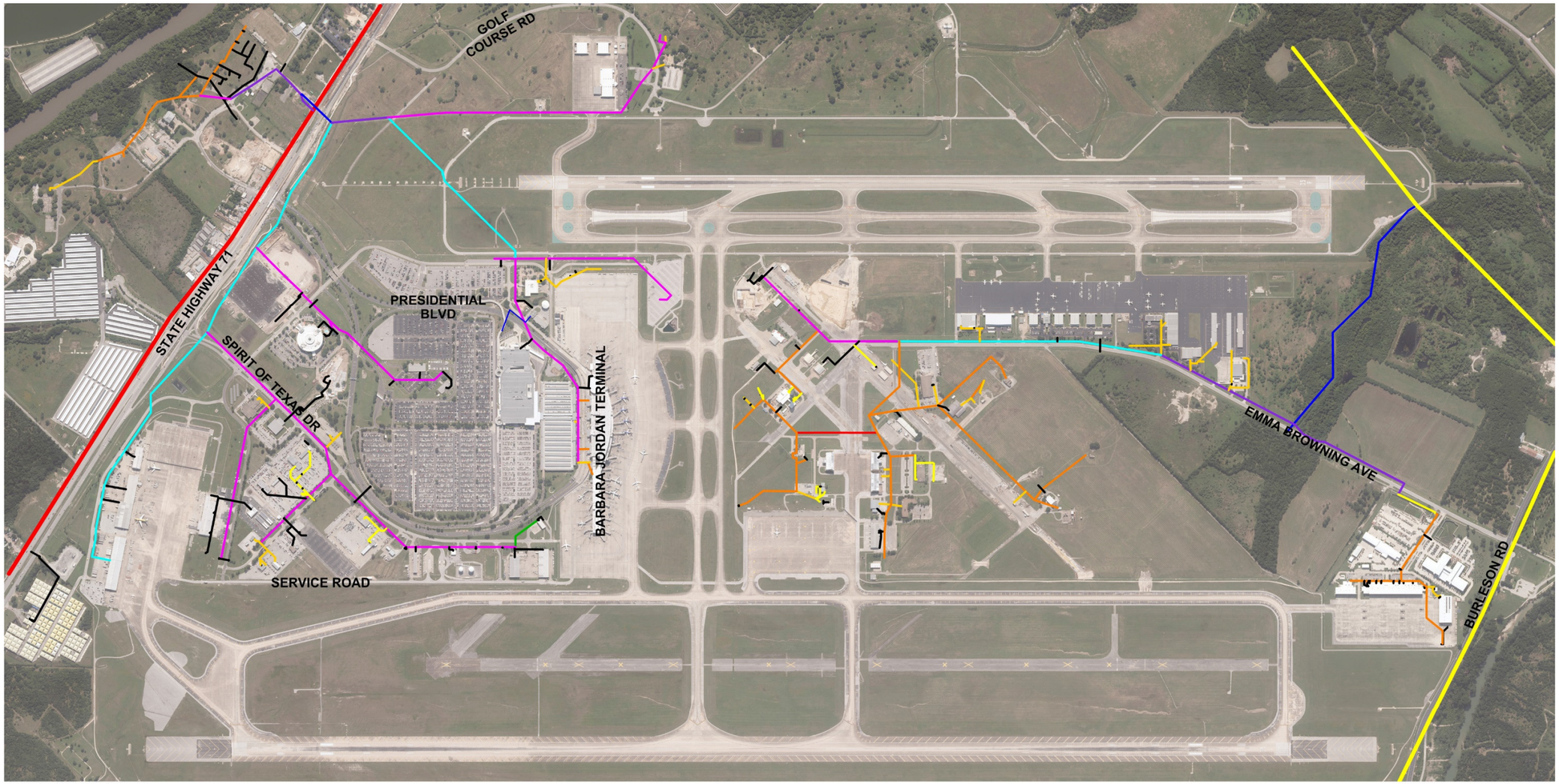
2.9.3 Reclaimed Water Facilities

Reclaimed water service was extended to ABIA by Austin Water Utility in 2012. The reclaimed water is provided through the Central Low Service Area pressure plane. A 16-inch diameter reclaimed water main (2010-0088) was connected to the previously existing ABIA irrigation meter serving ABIA at the intersection of SH 71 and Presidential Boulevard to convert from potable to reclaimed water service. Reclaimed water is currently used for irrigation service for the areas around the terminal and parking areas through an eight-inch diameter loop that runs around the parking areas.

Additionally, in 2012 reclaimed water service was also extended to the central plant for use as the terminal backup system for the makeup water for the cooling towers in case of a critical need to keep the cooling towers operational in the event of a system outage on the tower makeup water system. For the backup makeup water system to operate efficiently without contaminating the condenser water system, the reclaimed water needs to be routed through a clarifier before being used on the towers. An economic feasibility analysis was performed on the additional clarifier system that determined the cost was not justified. Thus, ABIA decided to continue to use potable water for this purpose due to treatment, operational, and health concerns.

The Consolidated Maintenance Facility, currently under design on the northeast portion of ABIA, has proposed to extend reclaimed water service to this facility from an existing main on the Travis County property to the east of ABIA. This reclaimed water service is proposed to provide water for irrigation and vehicle wash facilities. **Exhibit 2.9-3** depicts the reclaimed water system layout in and surrounding ABIA.

Exhibit 2.9-2: Existing Wastewater Service Layout



Source: ABIA Airport Layout Plan Utility Base Map and Austin Water Utility GIS Mapping

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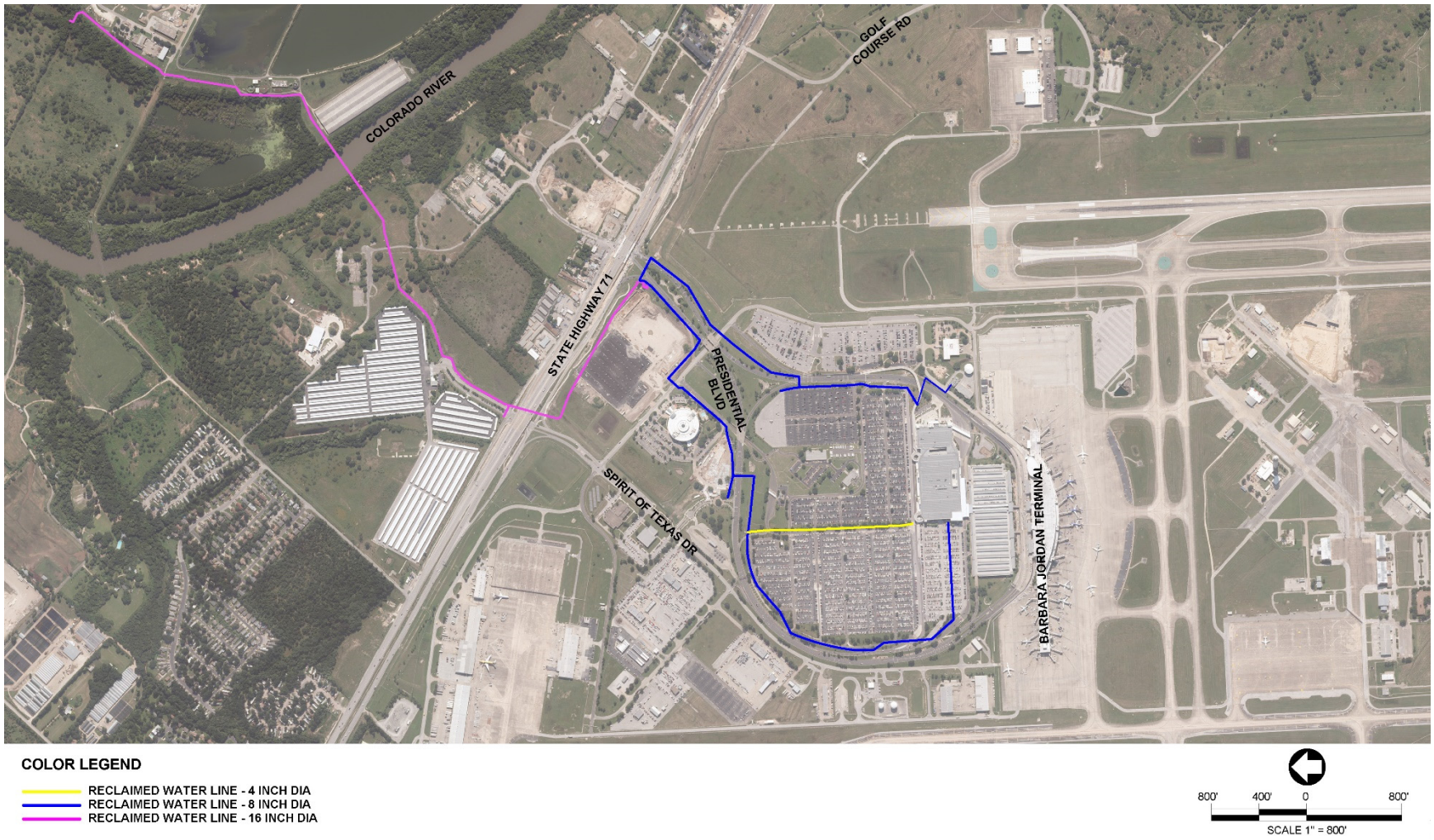
Exhibit 2.9-3: Existing Reclaimed Water Service Layout



Source: ABIA Airport Layout Plan Utility Base Map and Austin Water Utility GIS Mapping.

2.9.4 Electrical Power Utilities Inventory

2.9.4.1 Circuitry

Austin Energy (AE), the local publicly owned electrical utility company, is the electrical service provider for ABIA. The main portion of the Airport campus is fed from two 12.47-kilovolt (kV) underground electrical circuits (BE-1 and BE-4). Multiple primary switches and transformers off these circuits serve the Terminal building and supporting buildings on the north side of the campus.

Multiple Automatic Throw-Over (ATO) switches and transformers currently feed the Terminal Building so that if the preferred circuit (BE-1) is lost, up to two mega volt-amps (MVA) of power is available by switching to the standby circuit (BE-4). The high-voltage switches and transformers are owned and maintained by AE.

The south side of the campus is fed from one 12.47 kV overhead electrical circuit (CC-1), with a switch off Burleson Road at Highway 183. This circuit also is routed to the ATO and can provide a second back-up if BE-4 is lost. Austin Energy has noted, “Load is not reserved on the CC-1 feeder since the transfer cannot be done automatically, but the feeder has the capacity to serve the load from the [Terminal] ATO.”

2.9.4.2 Redundancy and Reliability

Redundancy can be defined as “the state of serving as a duplicate for preventing failure of an entire system upon failure of a single component.” The Terminal Building has a high level of redundancy with two circuits, multiple switches and transformers, and dual-fed switchboards. But for the north side of the ABIA campus, since both circuits originate from the Bergstrom substation. A catastrophic failure at that substation would leave the support buildings without utility power and the Terminal Building would have limited utility power from the Carson Creek substation back-up circuit.

The south campus has no redundancy since it is fed from a single overhead circuit and switch. Since it is routed overhead, it is vulnerable to outages caused by natural conditions such as high winds, lightening, or ice.

According to ABIA staff, the back end of the campus needs an upgrade. The airport has lost that side several times with no backup. The two-circuit method for the terminal has worked great several times when needed.

2.9.5 Central Utility Plant Capacity

This section provides a summary of the current utility conditions at the Central Utility Plant (CUP).

2.9.5.1 Operating Capacity

The existing CUP has been in operation since 1999. Currently, the CUP houses five chillers and has a total installed cooling capacity of 3,730 tons shown in **Table 2.9-1**. The existing CUP, as shown in **Exhibit 2.9-4** is currently being upgraded to add more pumping and pressure capacity to the existing infrastructure. The East Terminal Expansion replaced the secondary chilled water loop pumps with new pumps rated for 5070 gpm @ 294 TDH-Ft of head that is a 1038 gpm @ 14 TDH-Ft. of head pressure increase. This equates to approximately 650 tons @15°F ΔT of cooling capacity over the previous system capacity.

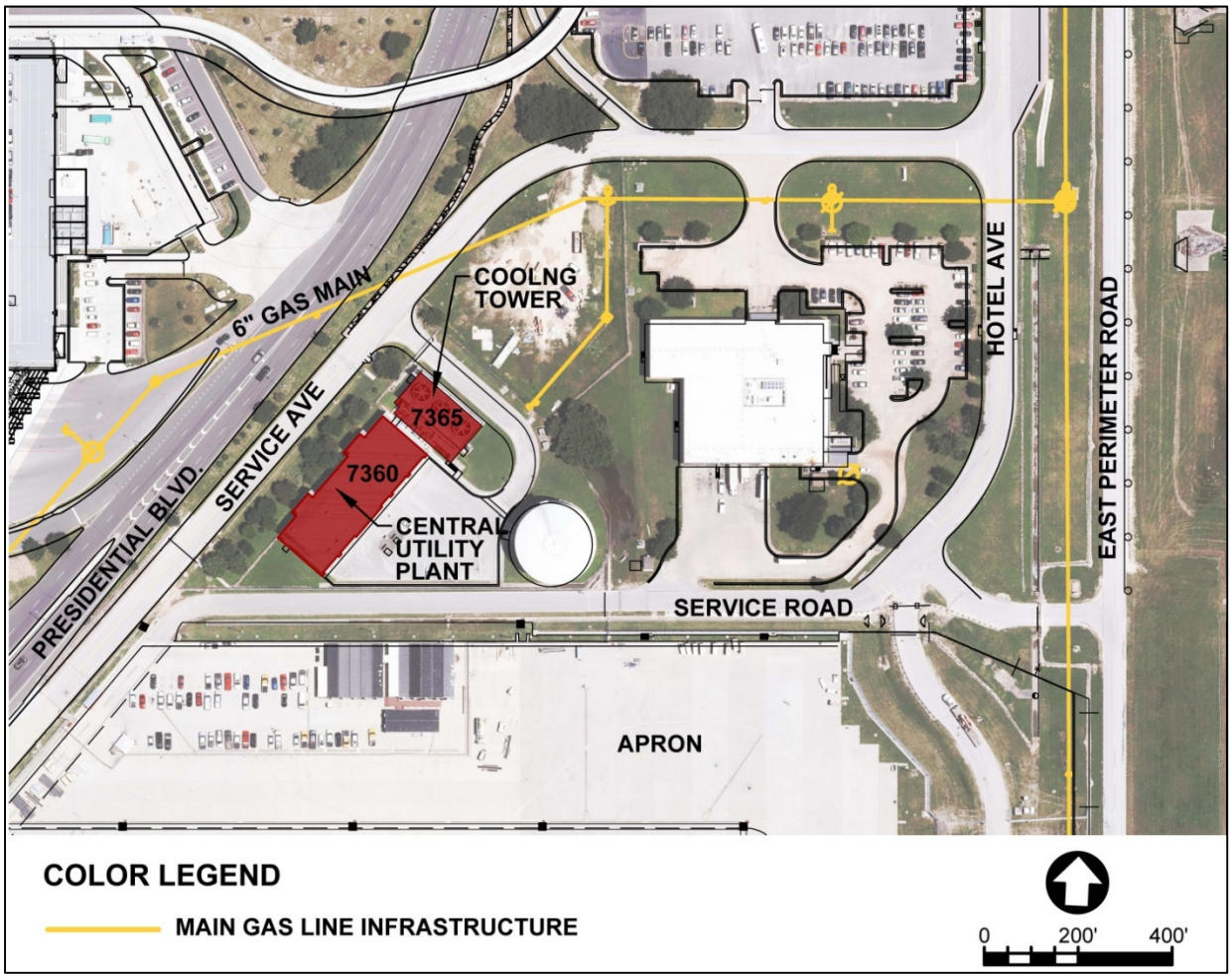
Table 2.9-1: Chiller Capacity

MARK NO.	TYPE	LOCATIONS	CAPACITY [tons]
CH-1	centrifugal	CUP	370
CH-2	centrifugal	CUP	840
CH-3	centrifugal	CUP	840
CH-4	centrifugal	CUP	840
CH-5	centrifugal	CUP	840
Total			**3,730**

During a chilled water thermal storage study performed by Burns-McDonnell in August 2015 an evaluation of the CUP's capacity versus the overall peak cooling load was performed that determined the cooling load to be 3,290 tons. This included the added load from the East Infill and the East Terminal Expansion Projects that totaled 1,040 tons. Although the CUP has adequate capacity to provide chilled water for the existing and projected loads, the plant does not have full redundancy.

Hydronic heating is used throughout the terminal. Two large 350-horsepower boilers and two smaller pony boilers are housed at the CUP. During the peak of the heating season, only one of the 350-horsepower boilers provides enough capacity to serve the heating loads for the entire terminal. It is the COA-DOA Facility Management's opinion the heating plant capacity, as originally designed, was greatly oversized. The two pony boilers were added under a SECO Energy Conservation Measure to provide heat during low load conditions without having to fire one of the larger boilers, reducing the gas consumption necessary to meet the reduced heating load requirements. Currently, the boilers are adequate to handle the existing loads and any additional heating loads for the near future.

Exhibit 2.9-4: Central Utility Plant



2.9.5.2 Thermal Storage Capacity

The CUP thermal storage is provided in **Table 2.9-2**. The CUP currently uses thermal storage through use of a Thermal Energy Storage (TES) tank. The TES tank has cooling capacity of 16,500 ton-hours of cooling when the tank is fully charged. Consideration was given to providing additional storage, hence the commissioning of the thermal storage study as previously noted. It was determined through the study that the existing TES tank had adequate capacity to provide on-peak cooling to the terminal of approximately 3.8 hours. This exceeded the current AE requirements for On-Peak Summer Thermal Energy Storage Period, which is currently set at three hours. Therefore, ABIA has opted not to add additional thermal storage. AE has provided ABIA with a new rate structure for TES on peak cooling usage.

According to ABIA staff, the CUP thermal storage uses more energy due to heat gain during the thermal storage process of pumping the chilled water (CHW) into a storage tank and then out of the tank later, thereby resulting in the chillers operating less efficiently than they would if operated during heat load-peak hours. The thermal storage system actually lowers the CUP electrical consumption during summer peak power use periods; therefore, reducing the need for AE to build more power-generation capability to meet peak power-demand loads.

Table 2.9-2: Thermal Storage Capacity

MARK NO.	TYPE	LOCATION	STORAGE CAPACITY [gal.]	THERMAL STORAGE [ton-hrs.]	USEABLE CAPACITY [ton-hrs.]	PEAK LOAD AFTER DIVERSITY [tons]	TANK DISCHARGE TIME [hrs.]
TES-1	Vertical Round	CUP	1.6 MM	15K	11.6K	3,115	3.8

Notes: million = MM, Thousand = K, hours = hrs.

2.9.6 Natural Gas Utilities

This section provides a summary of the current natural gas service conditions for the CUP and the rest of the campus facilities.

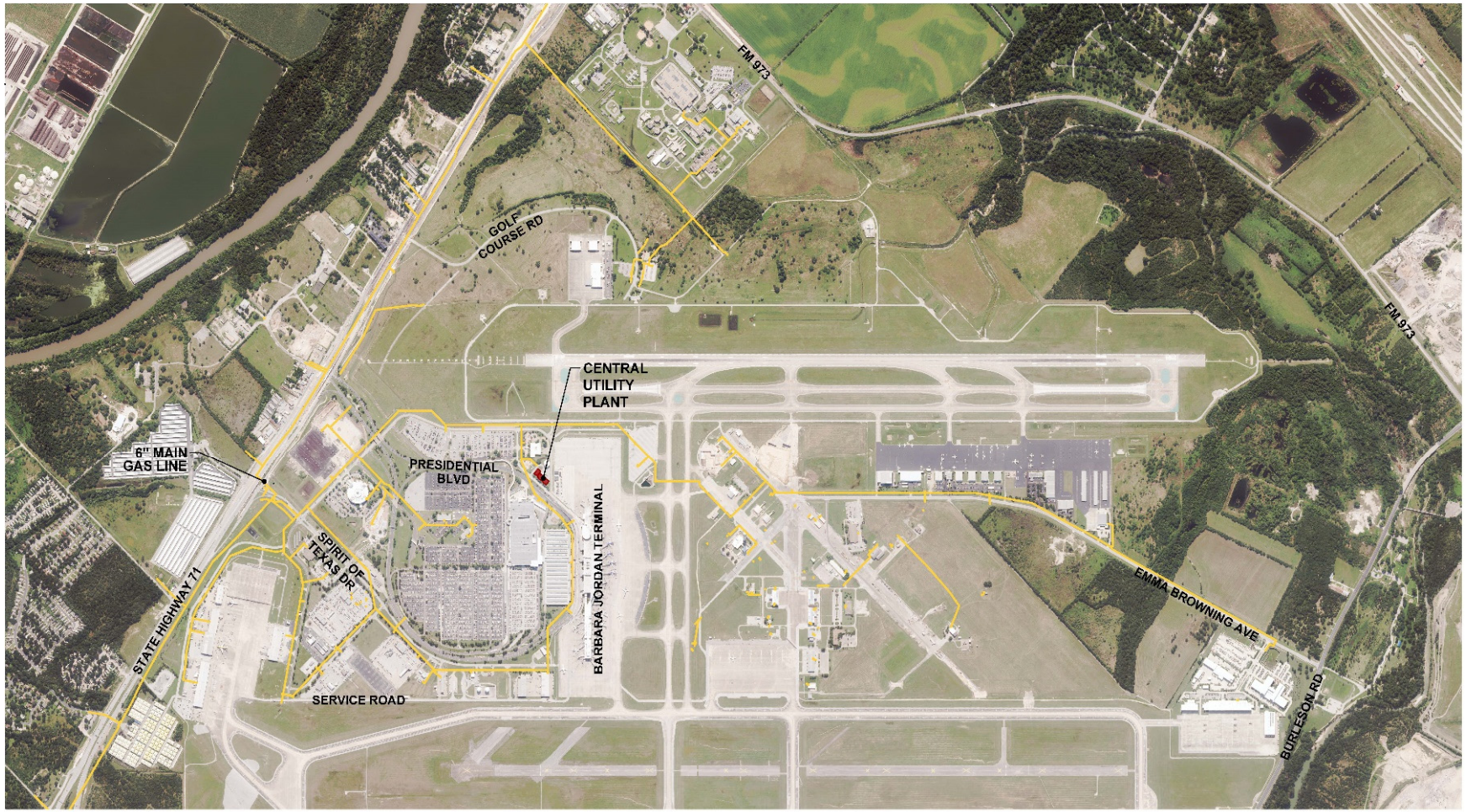
2.9.6.1 Natural Gas Line Infrastructure

The airport is provided gas service by Texas Gas and the service main located in the right-of-way on State Highway 71 and enters the campus along Spirit of Texas Drive. A six-inch main loops around the airport and provides gas to the CUP, to the terminals, and to the peripheral buildings through various branches off this main loop, as shown in **Exhibit 2.9-5** and **Exhibit 2.9-6**. Currently, gas service is provided to all the peripheral buildings on campus.

The boilers, which provide hydronic heating to the terminal, are located at the CUP. All other out-buildings requiring heat are provided heat from boilers located at the individual out-building site. The airport owns the existing gas lines and are in the process of negotiating the sale of these lines to Texas Gas Service.

Exhibit 2.9-5: Main Gas Line to Central Plant

Exhibit 2.9-6: Main Gas Line Infrastructure



2.9.6.2 Natural Gas Usage

The natural gas usage for calendar year 2012 through 2016 is shown in **Table 2.9-3**. The values are for the campus to include the terminals and peripheral buildings and excludes the Maintenance Complex. An approximate 30% increase was experienced in 2013 with modest gains shown through 2015 where the campus experienced an approximate 12% decrease in consumption. A discovery was made at the building located at 3011 Employee Ave., where the boiler was operating more frequently than necessary because of control issues. The usage was approximately 13 times that of another comparable building on campus. These control issues were corrected, and the result was a 12% decrease in consumption. One of the largest consumers of natural gas are the boilers located at the CUP, which provide hydronic heating to the terminal. The boilers, as an example, over the past five-year billing records account for 40% of the gas used on campus (see **Table 2.9-4**).

The airport owns the existing gas lines and are in the process of negotiating the sale of these lines to Texas Gas Service.

Table 2.9-3: Total Gas Usage

CALENDAR YEAR	USAGE [CCF]	% CHANGE
2012	144,421	0
2013	187,207	29.6
2014	197,246	5.4
2015	206,327	4.6
2016	180,860	-12.3
Totals	**916,061**	**27.2**
Avg./yr.	**183,212**	**5.4**

Notes: average = Avg., centum cubic feet = CCF, British Thermal Unit = BTU, 1 CCF = 1 Thermal = 10,000 BTU

Table 2.9-4: Terminal and CUP Gas Usage

CALENDAR YEAR	CAMPUS USAGE [CCF]	TERMINAL USAGE [CCF]	CUP USAGE [CCF]	TERMINAL % OF CAMPUS	CUP % OF CAMPUS
2012	144,421	52,614	47,162	36	33
2013	187,207	53,576	83,696	30	45
2014	197,246	62,482	78,725	32	40
2015	206,327	63,448	86,798	31	42
2016	180,860	60,430	73,359	33	41
Total	**916,061**	**292,550**	**369,740**	**162**	**201**
Avg./yr.	**183,212**	**58,510**	**73,948**	**32**	**40**

Notes: CCF = Thermal = 10,000 BTU

2.10 Stormwater

The current ABIA property boundary lies within three watershed boundaries: the Colorado River watershed, the Carson Creek watershed, and the Onion Creek watershed. The majority of ABIA is within the Onion Creek watershed where water flows south towards Onion Creek, which runs through the southeast part of the airport property. The northwestern portion of ABIA drains into Carson Creek to the north. The northeastern part of the airport property drains east, connecting directly to the Colorado River. Throughout the ABIA property there is also an extensive network of various drainage and water quality features. **Exhibit 2.10-1** provides an overview of the primary drainage and water quality facilities on and surrounding ABIA.

An ABIA Stormwater Drainage Master Plan Update was completed by Camp Dresser McGee (CDM) in 2011. This document provided an updated hydrologic/hydraulic stormwater model for the entire airport, incorporated ABIA's participation in the Regional Stormwater Management Program for Onion Creek and provided guidance for the future development of stormwater detention, conveyance, and water quality controls at ABIA.

This section discusses the following existing drainage and water quality features:

- Watersheds and outfalls
- Existing drainage overview
- Water quality and detention ponds
- Regional Stormwater Management Program

2.10.1 Watersheds and Outfalls

ABIA is within the boundaries of three watersheds that include the Onion Creek, Carson Creek, and Colorado River watersheds. The majority of ABIA property (3,400 acres) is within the Onion Creek watershed. Approximately 350 acres on the northwestern side of the airport property is within the Carson Creek watershed and about 500 acres on the northeast side of ABIA are within the Colorado River watershed.

A total of 25 outfalls to these three watersheds are located around ABIA property. Six outfalls are located within the Carson Creek watershed directing flow north and east of the property. The three outfalls within the Colorado River watershed flow into an unnamed tributary of the Colorado River at the northeast corner of ABIA property. The remaining 16 outfalls are located within the Onion Creek watershed, and the majority flow directly into Onion Creek, which leads to the Colorado River east of ABIA property.

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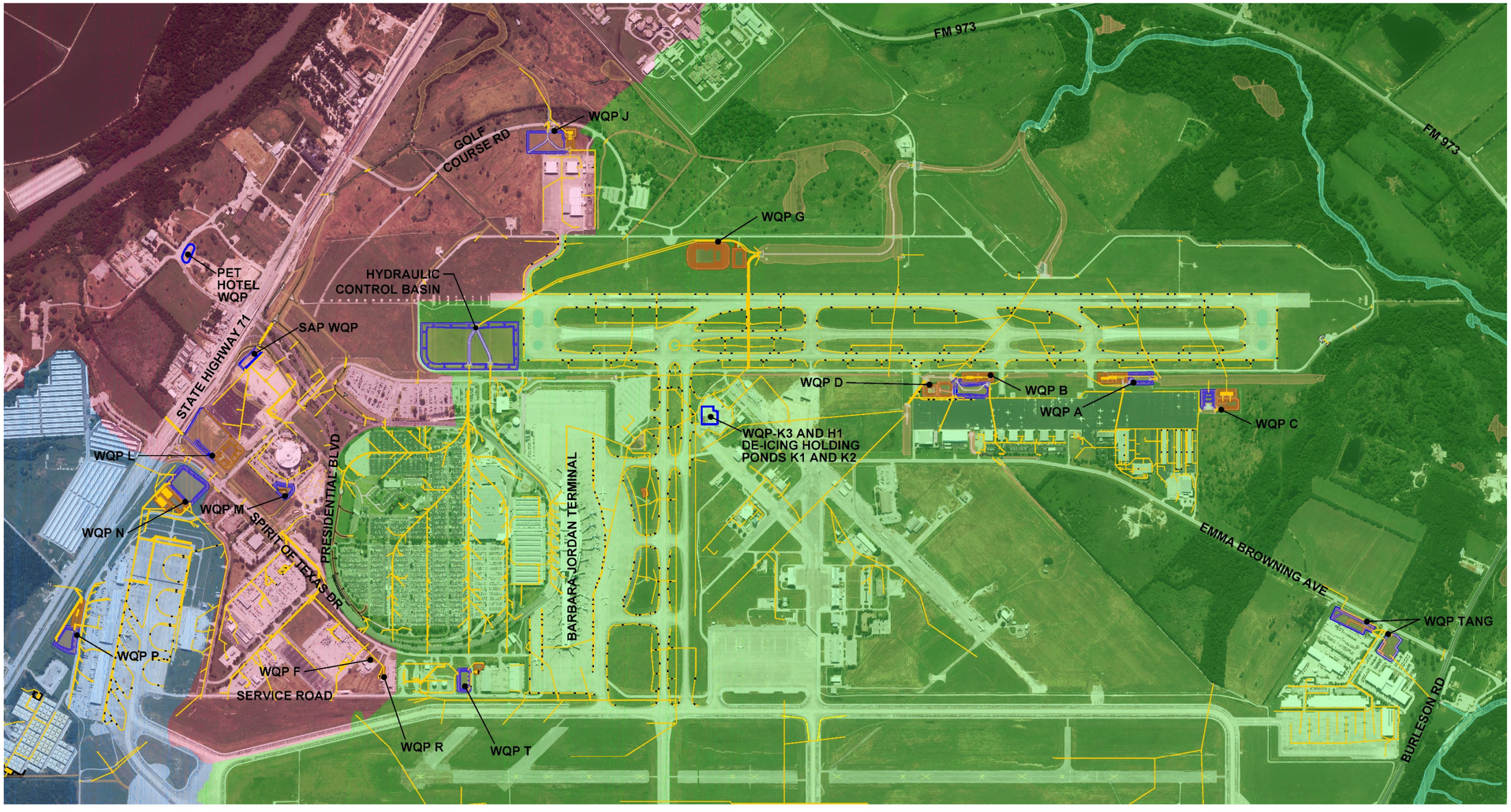
Exhibit 2.10-1: Existing Storm Sewer, Detention, and Water Quality Ponds



COLOR LEGEND

- DETENTION POND
- SEDIMENTATION/FILTRATION POND
- STORM SEWER PIPE
- ONION CREEK WATERSHED
- CARSON CREEK WATERSHED
- COLORADO RIVER WATERSHED

1200' 600' 0 1200'

SCALE 1" = 1200'

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2.10.2 Water Quality and Detention Ponds

ABIA has 17 existing water quality ponds throughout the property. **Table 2.10-1** lists each pond and describes whether it provides detention, filtration, and/or sedimentation basins; gives the total volume of each pond; and specifies where each pond outfalls. The future ABIA Consolidated Maintenance Facility project located on the northwest side of the airport property will include two additional water quality/detention ponds and will increase the volume of the existing WQP-J detention basin.

Table 2.10-1: Water Quality and Detention Ponds

WATER QUALITY POND ID	ABIA OUTFALL ID	TYPE	PROVIDED WQ VOLUME [CF]	AIRSIDE/ LANDSIDE
WQP-A	13	Detention Filtration Sedimentation	52,425	Airside
WQP-B	16	Detention Filtration Sedimentation	46,141	Airside
WQP-C	13	Detention Filtration Sedimentation	108,086	Airside
WQP-D	16	Detention Filtration Sedimentation	110,591	Airside
WQP-F	21	Sedimentation Filtration	3,489	Landside
WQP-G	16	Sedimentation Filtration	345,463	Landside
WQP-J	19	Detention Filtration Sedimentation	25,872	Landside
WQP-K1	16	De-icing	78,588	Airside
WQP-K2	16	De-icing	80,379	Airside
WQP-K3	16	De-icing/Sedimentation Filtration	75,214	Airside
WQP-L	21	Detention Filtration Sedimentation	488,240	Landside
WQP-M	20	Sedimentation Filtration	137,500	Landside
WQP-N	1	Detention Sedimentation/Filtration	70,656	Landside
WQP-N	1	Detention Sedimentation Filtration Holding	78,614	Airside
WQP-P	2	Detention Filtration Sedimentation	44,060	Landside
WQP-R	21	Sedimentation/Filtration	7,023	Landside

WATER QUALITY POND ID	ABIA OUTFALL ID	TYPE	PROVIDED WQ VOLUME [CF]	AIRSIDE/ LANDSIDE
WQP-T	16	Detention Filtration Sedimentation	16,594	Landside
WQP-TANG	22	Sedimentation/Filtration Detention	214,918	Landside
WQP-H1	16	Sedimentation Filtration	48,738	Airside
SAP WQP	19	Sedimentation/Filtration Detention	35,421	Landside
Pet Hotel WQP	19a	Sedimentation/Filtration Detention	38,229	Landside

Note: cubic feet = CF
Source: ABIA Stormwater Drainage Master Plan Update" (CDM, 2011) with updates from ABIA Staff

2.10.3 Drainage Overview

Existing airside drainage largely travels south and east toward various outfalls to Onion Creek. The cargo ramp drainage system flows to Carson Creek and the TxDOT Aviation ramp flows to the Colorado River. The existing network of drainage pipes, culverts, and channels are used to direct flow toward Onion Creek, Carson Creek, and the Colorado River. There are nine airside water quality ponds included in Table 2.10-1. WQP-K3 and WQP-N both capture de-icing fluid runoff during storm events when aircraft de-icing has occurred. WQP-N consists of landside and airside portions. The airside portion of WQP-N is a holding pond that captures de-icing fluid runoff from the air cargo apron in the north part of ABIA. Runoff from the landside portions of the air cargo areas are routed to the sedimentation/filtration basins, which are part of the landside portion of WQP-N. If de-icing fluids captured in the holding pond are detected to be close to target concentration levels, the holding pond is discharged to Austin Water Utility for treatment. If concentration levels are below target levels, the holding pond discharges to the sand filter of the landside portion of the pond.

Existing landside drainage consists of various pipes, culverts, and channels leading to different outfalls around the property. At the north side of the property, flows are directed north, crossing SH 71 through one of the four drainage culverts, or to the east where they outfall into an unnamed tributary of the Colorado River. The northeast portion of ABIA property also outfalls into the unnamed tributary. The landside portion of the Cargo area at the northwest of ABIA flows to the north across SH 71 to an unnamed tributary to Carson Creek. The majority of landside flows travel south towards Onion Creek. There are also 12 water quality ponds located on the landside portions of ABIA property. A list of these ponds is given in Table 2.10-1. WQP-N captures both airside and landside runoff. The landside portion of the pond consists of the sedimentation/filtration basin and captures runoff from the southern cargo ramp warehouses and Freight Lane.

The terminal apron that includes ABIA terminal and surrounding area, drains south and east. Various drainage pipes and culverts are located within the terminal apron to direct water toward a channel located east of the terminal that outfalls into Onion Creek. WQPs K3 and H1 collect and treat stormwater run-off from the terminal gate areas and the new east ramp expansion area within the terminal apron. These ponds consist of sedimentation and filtration basins and have a combined water quality volume of approximately 127,326 cubic feet. WQP-K3 captures runoff from the surrounding areas where primary aircraft fueling, and de-icing activities occur. The ramp pond system includes WQP-K1 and WQP-K2 that are used to store stormwater contaminated with aircraft de-icing chemicals. Their combined capacity is 2,212,848 gallons.

2.10.4 Regional Stormwater Management Program

In 2011, ABIA received approval to participate in the Regional Stormwater Management Program (RSMP) for the Onion Creek watershed.[15] ABIA was approved for 300 acres of net impervious cover as a part of the program. Records are kept that document the amount of impervious cover that has been used within the Onion Creek watershed since ABIA began participating in the RSMP. According to these records, approximately 70.24 acres of impervious cover has been added within the Onion Creek watershed to date. This leaves 229.76 acres of remaining impervious cover out of the total allowable 300 acres.

[15] Jose M. Guerra, P.E. (Office of the Director, City of Austin Watershed Protection Department) to Joseph Medici, P.E. (City of Austin Aviation Department), April 12, 2011, RE: RSMP (Regional Stormwater Management Program) Request Austin Bergstrom International Airport (ABIA), State Highway 71 at U.S. Highway 183 Onion Creek Watershed, (ONI-RS-2010-0012R).

2.11 Environmental Overview

The purpose of this environmental overview is to provide a general summary of environmental conditions and to identify sensitive environmental resources specific to ABIA that should be considered during the alternative's development process. The inventory of environmental resources will also serve as the baseline condition for evaluation of the potential effects of airport development alternatives on sensitive environmental resources.

2.11.1 Regulatory Overview

FAA has issued a number of guidance documents and memoranda associated with the consideration of environmental impacts of aviation-related actions under the National Environmental Policy Act (NEPA) of 1969 and implementing regulations. At the master planning level, FAA released Advisory Circular 150/5070-6B regarding Airport Master Plans on January 27, 2015.[16] This document outlines the environmental considerations that should be considered in the master planning and alternatives development processes. These considerations, along with other FAA and COA resources, serve as a guide for the discussion provided below. Resource-specific regulations that would apply to federal aviation-related actions, such as the Endangered Species Act 16[17] and National Historic Preservation Act[18] et seq. are also referenced throughout this section as they pertain to development of the inventory of environmental resources. Compliance with these and other federal, state, and local regulations and requirements is addressed in Chapter 8, *Implementation Plan,* in the context of the potential impacts of the development alternatives.

16 FAA. 2015a. Advisory Circular 150/5070-6B, Change 2. Subject: Change 2 to Airport Master Plans. January 27, 2015. Available at: https://www.faa.gov/documentLibrary/media/Advisory_Circular/150-5070-6B-Change-2-Consolidated.pdf. Accessed June 22, 2017.

17 16 U.S.C. §§1531–1544

18 54 U.S.C. § 300101

2.11.2 Methodology

In order to develop a comprehensive inventory of environmental resources, study areas were identified for the individual resource categories discussed in this section. **Table 2.11-1** lists the resources included in the environmental overview and their corresponding study areas.

Table 2.11-1: Environmental Resource Study Areas

RESOURCE CATEGORY	STUDY AREA
Land use & noise compatibility	COA Airport Overlay Zones
Socioeconomic & community resources	0.5 mile from 65 decibel (dB) contour
Ecological resources (including vegetation & wildlife, threatened & endangered species, and water resources, including wetlands)	ABIA property boundaries
Air quality & climate	N/A
Cultural resources	ABIA property boundaries
Hazardous materials	ABIA property boundaries

Source: ABIA MP Study Team 2017.

Various data sources were used to develop the environmental resources inventory, including:

- Previously developed reports
- Documents
- Maps
- Online datasets from ABIA and the City of Austin (COA)
- Data from the U.S. Census Bureau (USCB)
- U.S. Bureau of Labor and Statistics (BLS)
- U.S. Geological Survey (USGS)
- Texas Historical Commission (THC)
- Geologic Atlas of Texas (GAT)
- Information collected during June 2017 field investigations of potential waters of the U.S. and wetlands on ABIA property

Additional detail regarding each of the resource categories is included in Chapter 8, *Implementation Plan,* as it pertains to the potential environmental impacts specific to the alternatives assessed in this master plan. Further field investigations will be conducted as necessary to support the alternatives analysis and Environmental Action Plan. The following resource categories are not included in the inventory but will be considered during evaluation of the airport development alternatives: prime farmland and potential permitting requirements.

2.11.3 Land Use and Noise Compatibility

Compatibility of existing and planned land uses with aviation-related actions is typically assessed within the context of noise impacts.[19] In addition to noise impacts, land-use changes associated with FAA actions can include socioeconomic impacts, displacements, and effects to community cohesion. Baseline information for these types of potential impacts is provided in the next section. For the purposes of this overview, the environmental categories of land use and noise are considered to be interconnected and are discussed within the same study area as shown on **Exhibit 2.11-1**.

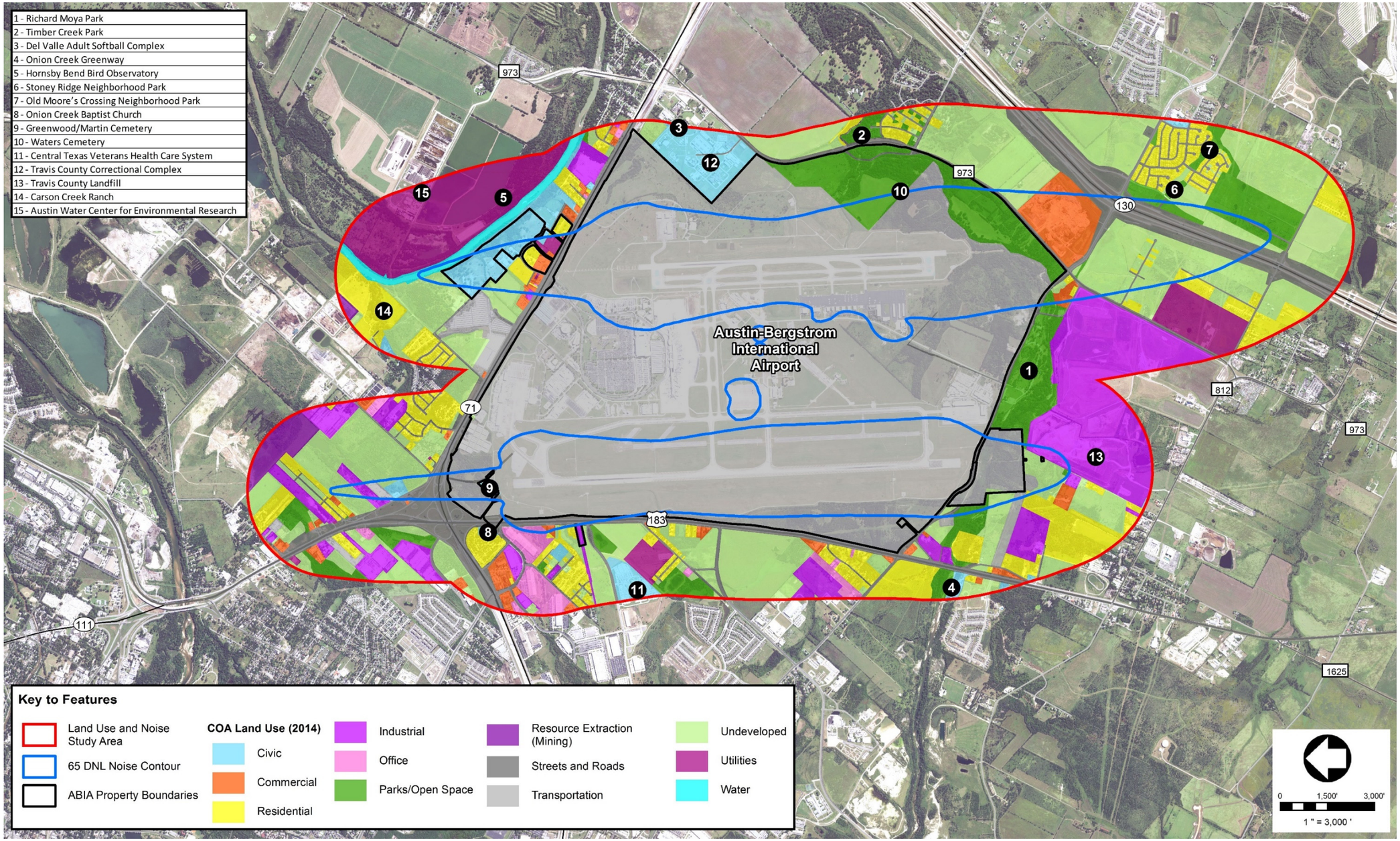
This study area includes the COA's Airport Overlay Zones, which are based on contour lines for 65, 70, and 75 dB for the yearly Day-Night Average Sound Level (DNL), in addition to the ABIA property boundaries. This section provides an overview of current COA zoning, existing and future land uses, identification of notable land-use features for consideration during ABIA's Master Plan alternatives development and evaluation, and a brief overview of the current noise-related initiatives implemented at ABIA. Also included is a brief description of the properties that would potentially be afforded protection under Section 4(f) of the U.S. Department of Transportation (USDOT) Act 49 U.S.C. § 303, referred to as Section 4(f), and Section 6(f) of the Land and Water Conservation Fund Act of 1965 16 U.S.C. §§ 4601 et seq., referred to as Section 6(f).

Several statutes and regulations relate to land-use changes associated with FAA actions, including:

- Airport and Airway Improvement Act of 1982 and subsequent amendments, 49 U.S.C. § 47107(a)(10)
- Airport Improvement Program, 49 U.S.C. § 47106(a)(1)
- Airport Safety, Protection of Environment, Criteria for Municipal Solid Waste Landfills, Title 40 Code of Federal Regulations (CFR) § 258.10
- U.S. Department of Transportation Act 49 U.S.C. § 303, Section 4(f)
- Land and Water Conservation Fund Act of 1965 16 U.S.C. §§ 4601 et seq., Section 6(f)
- Local and state regulations

[19] FAA. 2015b. FAA Order 1050.1F Desk Reference. Subject: Environmental Impacts: Policies and Procedures. July 16, 2015. https://www.faa.gov/about/office_org/headquarters_offices/apl/environ_policy_guidance/policy/faa_nepa_order/desk_ref/media/desk-ref.pdf. Accessed June 22, 2017.

Exhibit 2.11-1: Land Use and Noise Study



Source: City of Austin Planning and Development Review Department, 2014; Aerial Photography NAIP, 2016

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Noise-sensitive areas typically include residential uses, schools, health services, churches, and parks.[20] However, Title 14 CFR Part 150 Airport Noise Compatibility Planning specifies that it is the responsibility of local authorities to determine acceptable and permissible land uses within specific noise contours, and that while all land uses are considered compatible with noise levels less than 65 dB, "local needs or values may dictate further delineation based on local requirements or determinations." The COA has determined those land uses that are compatible within the COA Airport Overlay Zones (see **Table 2.11-2**). In addition to COA zoning requirements, the following statutes and regulations apply to noise and noise-compatible land use:

- Control and Abatement of Aircraft Noise and Sonic Boom Act of 1968
- Noise Control Act of 1972
- Aviation Safety and Noise Abatement Act of 1979
- Airport and Airway Improvement Act of 1982
- Airport and Noise Capacity Act of 1990

Table 2.11-2: COA Airport Overlay Zones

AIRPORT OVERLAY ZONE	YEARLY DAY-NIGHT AVG. SOUND LEVEL	RESTRICTED (R) OR PROHIBITED (X) LAND USES
Airport Overlay Zone 1 (AO-1)	70–75 dB	All residential (X) Schools (X) Outdoor music shells, amphitheaters (X) Nature exhibits and zoos (X)
Airport Overlay Zone 2 (AO-2)	65–70 dB	All residential (X) Schools (X) Outdoor music shells, amphitheaters (X)
Airport Overlay Zone 3 (AO-3)	<65 dB and within 0.5 mile of 65 dB contour line	All residential (R) Schools (R) Outdoor music shells, amphitheaters (X)

Source: COA LDC §§ 25-13-41, COA LDC §§ 25-13-44.

[20] FAA. 2006. U.S. Department of Transportation. FAA Order 5050.4B. Subject: National Environmental Policy Act Implementing Instructions for Airport Actions. Effective April 28, 2006. https://www.faa.gov/airports/resources/publications/orders/environmental_5050_4/media/5050-4B_complete.pdf. Accessed June 10, 2017.

2.11.3.1 COA Zoning

ABIA is zoned as an Aviation Services (AV) District Use, a special purpose district in which certain land uses are permitted, restricted, or prohibited.[21] Compatible land uses are defined within three Airport Overlay Zones created by the COA Department of Aviation.[22] Table 2.11-2 summarizes the details of the Airport Overlay Zones and their associated land-use restrictions. The land-use and noise study area and the current land-use inventory within this area are shown on Exhibit 2.11-1. It should be noted that the COA land-use categories shown on Exhibit 2.11-1 differentiate major streets and roads (such as SH 130) from other types of transportation use, which, in this case, includes the entire ABIA property. However, the COA Land Development Code (LDC) typically identifies the ABIA property as an aviation use in its zoning.

Some land uses, such as hospitals, churches, and government service buildings, require noise reduction measures based on the ABIA Overlay Zone in which they would be constructed. While all residential land uses and schools are prohibited in AO-1 and AO-2, some exceptions apply within AO-3, including permitted properties or neighborhoods that were in a recorded final plat on August 20, 2001.[23] It should be noted that the COA does not have jurisdiction to establish zoning in ABIA Overlay Zones outside of the city limits. Portions of the study area south and east of ABIA are located outside of the city limits within the COA extra-territorial jurisdiction (ETJ). In these areas, Travis County has the jurisdictional authority to establish zoning; however, the COA, through LDC § 25-13, does have the land-use controls to minimize future incompatible land uses.[24]

The LDC also identifies airport hazards that are prohibited within the compatible land use area, a broader area that extends outside of the three Airport Overlay Zones. These hazards are defined as those that exceed defined height limits; interfere with systems for tracking, monitoring, or controlling aircraft; interfere with the pilot's ability to distinguish airport lights from other lights; create a wildlife hazard; or otherwise endanger or interfere with aircraft operations.[25]

[21] COA's Land Development Code § 25-2-622
[22] COA's Land Development Code § 25-13-41
[23] COA's Land Development Code § 23-13-45
[24] COA. 2007. Austin-Bergstrom International Airport FAR Part 150 Noise Compatibility Study Update report. Approved December 7, 2007.
[25] COA's Land Development Code § 25-13-23.

2.11.3.2 Existing Land Use

According to the COA's 2014 land-use data, nearly half of the land-use study area is comprised of transportation uses, including the ABIA property and nearby streets and roadways. See **Table 2.11-3** for a breakdown of land-use types, from most to least prevalent.

Table 2.11-3: Land Use Types within the Study Area

LAND-USE TYPE	ACREAGE	TOTAL % OF LAND-USE STUDY AREA
Transportation	4,807	49.7
Undeveloped	1,658	17.1
Residential	710	7.4
Industrial	693	7.2
Parks/Open Space	662	6.8
Utilities	435	4.5
Civic	283	2.9
Commercial	203	2.1
Office	86	0.9
Water	63	0.7
Resource extraction (mining)	57	0.6
Total Land-Use Study Area	**9,657**	**99.9**

Notes: Acreages and percentages rounded to the nearest whole number and nearest tenth, respectively. Transportation includes ABIA property, streets, roads, etc. Residential includes single family, multi-family, duplex, mobile homes, etc.
Source: COA. 2014. Land Use Geodata. Available at: https://data.austintexas.gov/Geodata/2010-Land-Use/ujet-yfq2. Accessed June 20, 2017.

Both Exhibit 2.11-1 and **Table 2.11-4** include a list of notable land uses within the land-use and noise-study area that should be considered during development of the airport alternatives assessed in this master plan. These land uses were identified based on the description of a "noise sensitive area" in Paragraph 11-5.b(8) of FAA Order 1050.1F, which includes "area(s) where noise interferes with normal activities associated with its use," in addition to the requirements outlined in Title 40 CFR Part 150. According to Order 1050.1F. These areas can include "residential, educational, health, and religious structures and sites, and parks, recreational areas, areas with wilderness characteristics, wildlife refuges, and cultural and historic sites."[26]

Table 2.11-4: Non-Residential Notable Land Use Features

MAP ID	NOTABLE LAND USE NAME	LAND USE TYPE
1	Richard Moya Park	Recreational area
2	Timber Creek Park	Recreational area
3	Del Valle Adult Softball Complex	Recreational area
4	Onion Creek Greenway	Recreational area
5	Hornsby Bend Bird Observatory	Recreational area
6	Stoney Ridge Neighborhood Park	Recreational area
7	Old Moore's Crossing Neighborhood Park	Recreational area
9	Onion Creek Baptist Church	Religious
10	Greenwood/Martin Cemetery	Cemetery
11	Waters Cemetery	Cemetery
12	Central Texas Veterans Health Care System	Healthcare
13	Travis County Correctional Complex	Government
14	Travis County Landfill	Industrial
15	Carson Creek Ranch	Open Space
16	Austin Water Center for Environmental Research	Utilities

Source: Google Maps and Google Earth aerial photography and COA. 2017a. Web Development Map. Available at: http://www.austintexas.gov/GIS/developmentwebmap/Viewer.aspx. Accessed June 12, 2017.

A number of residential neighborhoods exist within the land use study area and in the general vicinity. These include the Montopolis, Del Valle, and Southeast neighborhoods, among others, and are discussed in more detail in Section 2.11.4.1.

[26] FAA. 2015b. FAA Order 1050.1F Desk Reference. Subject: Environmental Impacts: Policies and Procedures. July 16, 2015. https://www.faa.gov/about/office_org/headquarters_offices/apl/environ_policy_guidance/policy/faa_nepa_order/desk_ref/media/desk-ref.pdf. Accessed June 22, 2017

2.11.3.3 Future Land Use

The COA 2015 *Future Land Use Map Composite* includes the Southeast neighborhood, which is located immediately west of the ABIA property boundary. The map, which illustrates recommendations for future growth patterns, shows the Southeast neighborhood as mostly comprised of industrial and commercial development, with mixed-use development, civic uses, and recreation and open space interspersed throughout the area. The Future Land Use Map also includes Montopolis, which includes single-family residential, mixed-use development, commercial development, and warehouse/limited office uses. Del Valle is located outside of the COA Future Land Use Map Neighborhood Planning Areas; however, current development projects in Del Valle are discussed below.

As part of the 2012 *Imagine Austin Comprehensive Plan*, the COA conducted a "susceptibility to change analysis" based on population and employment projections over the next three decades and factors considered to influence development, including land value, zoning, road access, and others. This analysis includes the entire land-use and noise-study area. According to this analysis, the land around ABIA is considered "most susceptible to change" or "moderately susceptible to change" in the future compared to the rest of the City of Austin.[27] Land uses closer to ABIA and along major corridors such as SH 130, US 183, and SH 71 are depicted as being more susceptible to change than land further away from ABIA or along smaller roadways.

In addition to this analysis, the COA has also identified growth-concept centers, or areas within which the COA has identified specific future development types. The primary growth-concept center located near ABIA includes the area immediately west of the ABIA property along SH 71. This area is identified as a Job Center and is depicted as containing office parks, manufacturing, warehouses, and other similar types of businesses in the future. A small portion of land near the northwest corner of the ABIA property is identified as a Town Center, which is anticipated to include both large and small employers, residential uses, and various mixed uses. This type of center is also considered to be an important hub for the future transit system.[27]

While much of the land south and east of ABIA is depicted as future open space, new development has recently begun near the northeast corner of the ABIA property. In late 2016, HEB Grocery Co. purchased 17 acres at FM 973 and SH 71 in the Del Valle area adjacent to the Travis County Correctional Complex. This land is part of a larger, 390-acre tract currently zoned for a planned mixed-use development complex to be named Velocity Crossing.[28] This mixed-use site is expected to include multi-family residential, industrial uses, hospitality and medical uses,

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27 COA. 2012. *Imagine Austin Comprehensive Plan*. Adopted June 15, 2012. https://www.austintexas.gov/sites/default/files/files/Planning/ImagineAustin/webiacpreduced.pdf. Accessed June 20, 2017.

28 Novak, Shonda. 2016. Grocery chain H-E-B buys property in Del Valle area. Austin American-Statesman. December 20, 2016. http://www.statesman.com/business/grocery-chain-buys-property-del-valle-area/u5jYUwE4AQdWCf1kQcdckM/. Accessed June 24, 2017.

an entertainment area, and retail space.[29] This area would be located just north of a 124-acre tract currently owned by Austin Community College District[30]. It should be noted that as of 2017, Del Valle, along with the areas north and northeast of the land-use and noise-study area, are considered by the U.S. Department of Agriculture (USDA) to be low-access areas in terms of food availability.[31]

2.11.3.4 Current Noise-Related Initiatives at ABIA

In compliance with 14 CFR 150, the 2007 Noise Compatibility Study Update Report outlines current and future non-compatible land uses as part of the ABIA's Noise Compatibility Program (NCP). The NCP recommends operational noise abatement and land-use mitigation measures to reduce noise impacts and promote land-use compatibility within the area surrounding ABIA.[32] Per the recommendations made in the NCP, ABIA implements the following procedures, as reported in the most recent ABIA Quarterly Noise Report, 4th Quarter 2016:

- A preferential runway system, a voluntary program that outlines runway use based on the time of day and non-compatible land uses beneath the approach and departure paths.
- Modification of flight tracks, which reduces the amount of over-flights in more populated areas around ABIA.
- Use of the maintenance ramp as a run-up area to address concerns regarding noise related to run-up procedures.
- Use of ABIA Noise and Operations Monitoring System (ANOMS), which collects data regarding flight tracks and noise levels. This data is collected from remote noise monitoring terminals around ABIA and is used in the monthly reports produced by ABIA summarizing the noise impacts of airport operations on surrounding communities.[33]

In addition to the measures above, a total of 65 parcels, including 197 housing units and Austin First Church, were recommended for acquisition as part of the NCP. This included Linda Vista Road and Towery Lane neighborhoods south of the ABIA property, Sunscape Apartments north of ABIA, and various other properties on the south side of ABIA[34].

29 Marketplace Real Estate Group. 2017. Velocity Crossing. Available at: http://marketplacetexas.com/velocity-crossing/. Accessed June 28, 2017.
30 Travis Central Appraisal District. 2017. Property Search. http://propaccess.traviscad.org/clientdb/?cid=1. Accessed June 12, 2017.
31 United States Department of Agriculture. 2017a. Food Access Research Atlas. https://www.ers.usda.gov/data-products/food-access-research-atlas/. Accessed June 28, 2017.
32 City of Austin. 2007. Austin-Bergstrom International Airport FAR Part 150 Noise Compatibility Study Update report. Approved December 7, 2007.
33 COA. 2017b. ABIA Quarterly Noise Report – 4th Quarter 2016. Department of Aviation. Prepared on March 13, 2017
34 City of Austin. 2007. Austin-Bergstrom International Airport FAR Part 150 Noise Compatibility Study Update report. Approved December 7, 2007.

2.11.3.5 Section 4(f) and Section 6(f) Properties

Section 4(f) of the USDOT) Act of 1966 prohibits DOT agencies from using publicly owned land of a public park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance, or land of a historic site of national, state, or local significance, for a transportation project unless (1) there is no feasible and prudent alternative to using the land and the project includes all possible planning to minimize harm to the property resulting from the use, or (2) the impact is *de minimis*.

In addition to the requirements in DOT Order 5610.1C, the FAA uses the Federal Highway Administration regulations outlined in Title 23 CFR § 774.17 as guidance to the extent relevant to aviation projects; however, these regulations are not binding for the FAA[35]. According to Title 23 CFR § 774.17, a use of a Section 4(f) property occurs

- When land is permanently incorporated into a transportation facility.
- When there is a temporary occupancy of land that is adverse in terms of the statute's preservation purpose as determined by the criteria in § 774.13(d).
- When there is a constructive use of a Section 4(f) property as determined by the criteria in § 774.15.

The following properties are located within the land-use and noise-study area and could potentially be afforded protection under Section 4(f); however, a determination of significance would be required in order for a property to be considered protected under Section 4(f). These include public parks and recreation areas, as well as potentially significant historic resources as noted in Section 2.11.8, Cultural Resources.

- Richard Moya Park (Travis County)
- Timber Creek Park (Travis County)
- Del Valle Adult Softball Complex (COA)
- Onion Creek Greenway (Travis County)
- Hornsby Bend Bird Observatory (Austin Water Utility, COA)
- Stoney Ridge Neighborhood Park (COA)
- Old Moore's Crossing Neighborhood Park (COA)
- Moore's Crossing Historic District (significant historic resource)
- Moore's Crossing Bridge (significant historic resource)
- Wallace-Burleson-Moore Farmstead (significant historic resource)

Section 6(f) of the Land and Water Conservation Fund (LWCF) is administered by the National Park Service (NPS) and requires that areas for which development was funded through the LWCF

[35] FAA. 2015b. FAA Order 1050.1F Desk Reference. Subject: Environmental Impacts: Policies and Procedures. July 16, 2015. https://www.faa.gov/about/office_org/headquarters_offices/apl/environ_policy_guidance/policy/faa_nepa_order/desk_ref/media/desk-ref.pdf. Accessed June 22, 2017.

program remain in public outdoor recreation use, unless NPS approves substitution property of reasonably equivalent usefulness and location and of at least equal fair market value.[36]

There is one Section 6(f) resource within the study area: Richard Moya Park, located immediately south of the ABIA property.[37] According to the 1994 Final Environmental Impact Statement (FEIS) for the Proposed New Austin Airport at Bergstrom, approximately 76 acres of the park were within the 65 DNL contour, with approximately seven acres within the 70+ DNL contour. In 1994, the FEIS projected that noise levels for ABIA would be less than the noise levels when Bergstrom Air Force Base was operational.[38]

Further consideration of potential Section 4(f) and Section 6(f) properties and the legal protection afforded to them is included in the evaluation of the potential impacts of the development alternatives in Chapter 8, *Implementation Plan*.

2.11.4 Socioeconomic and Community Data

This section presents a general overview of demographics, socioeconomic conditions, and community resources within the community study area, which was developed based on the 0.5-mile buffer from the 65-dB noise contour line identified by the COA as AO-3, in addition to adjacent residential subdivisions and neighborhoods (see **Exhibit 2.11-2**). Demographic data was collected within all U.S. Census block groups, wholly or partially located within the community study area (see **Exhibit 2.11-3**).

Applicable statutes and regulations related to socioeconomic and community resources include:

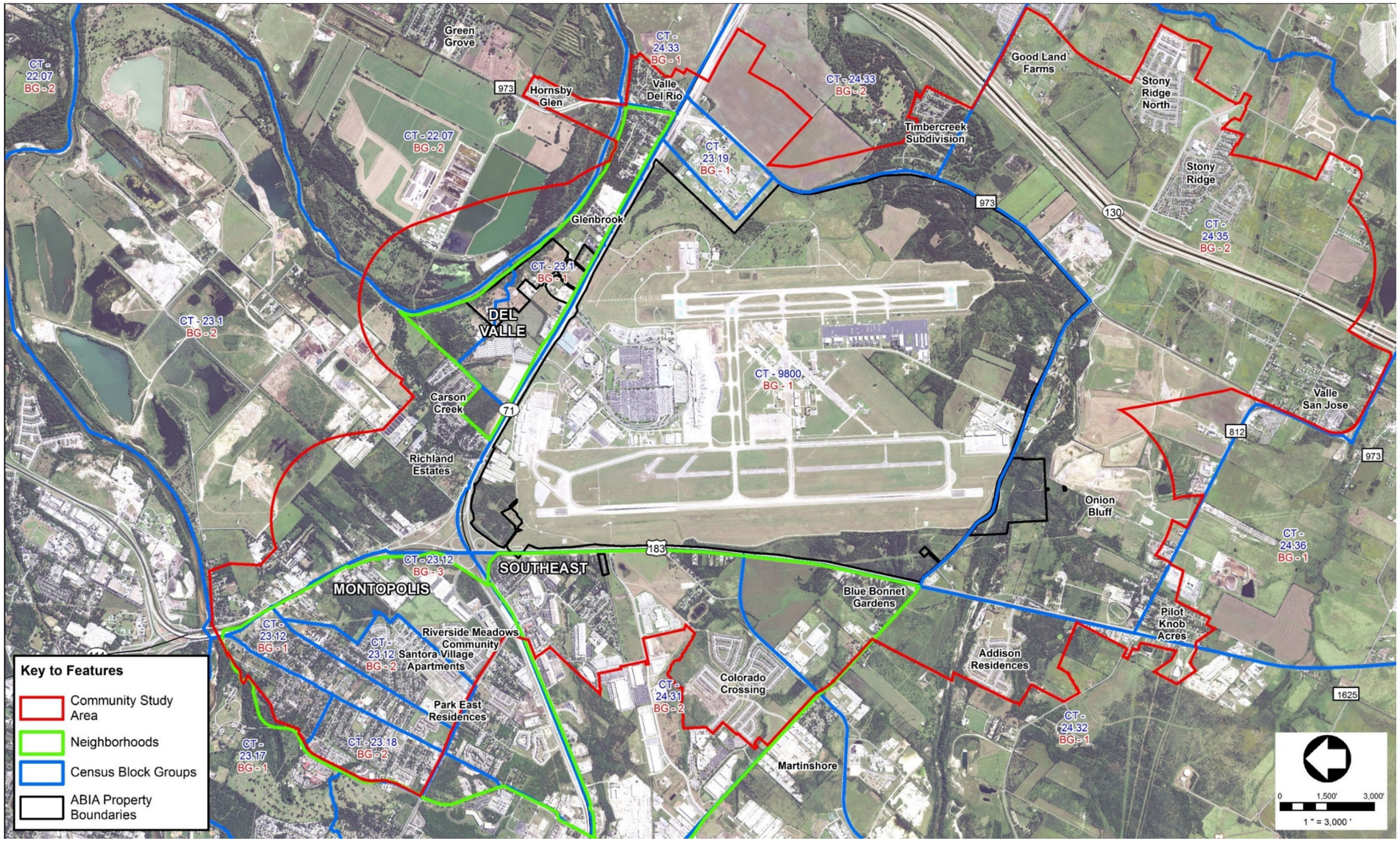
- Uniform Relocation and Assistance and Real Property Acquisition Policies Act of 1970, 42 U.S.C. § 61 et seq.
- Title VI of the Civil Rights Act of 1964, as amended, 42 U.S.C. §§ 2000d
- Executive Order 12898, Federal Actions to Address Environmental Justice Populations in Minority Populations and Low-Income Populations, 59 FR 7629, and related requirements, including DOT Order 5610.2(a), 1997 CEQ Guidance on Environmental Justice, etc.

[36] 36 CFR § 59.1

[37] NPS. 2017. Section 6(f) Grants by County. U.S. Department of the Interior. http://waso-lwcf.ncrc.nps.gov/public/index.cfm. Accessed March 10, 2017.

[38] FAA. 1994. Final Environmental Impact Statement for the Proposed New Austin Airport at Bergstrom, City of Austin, Travis County, Texas.

Exhibit 2.11-2: Community Study Area



Source: Texas Historical Commission, 2017; Aerial Photography NAIP, 2016

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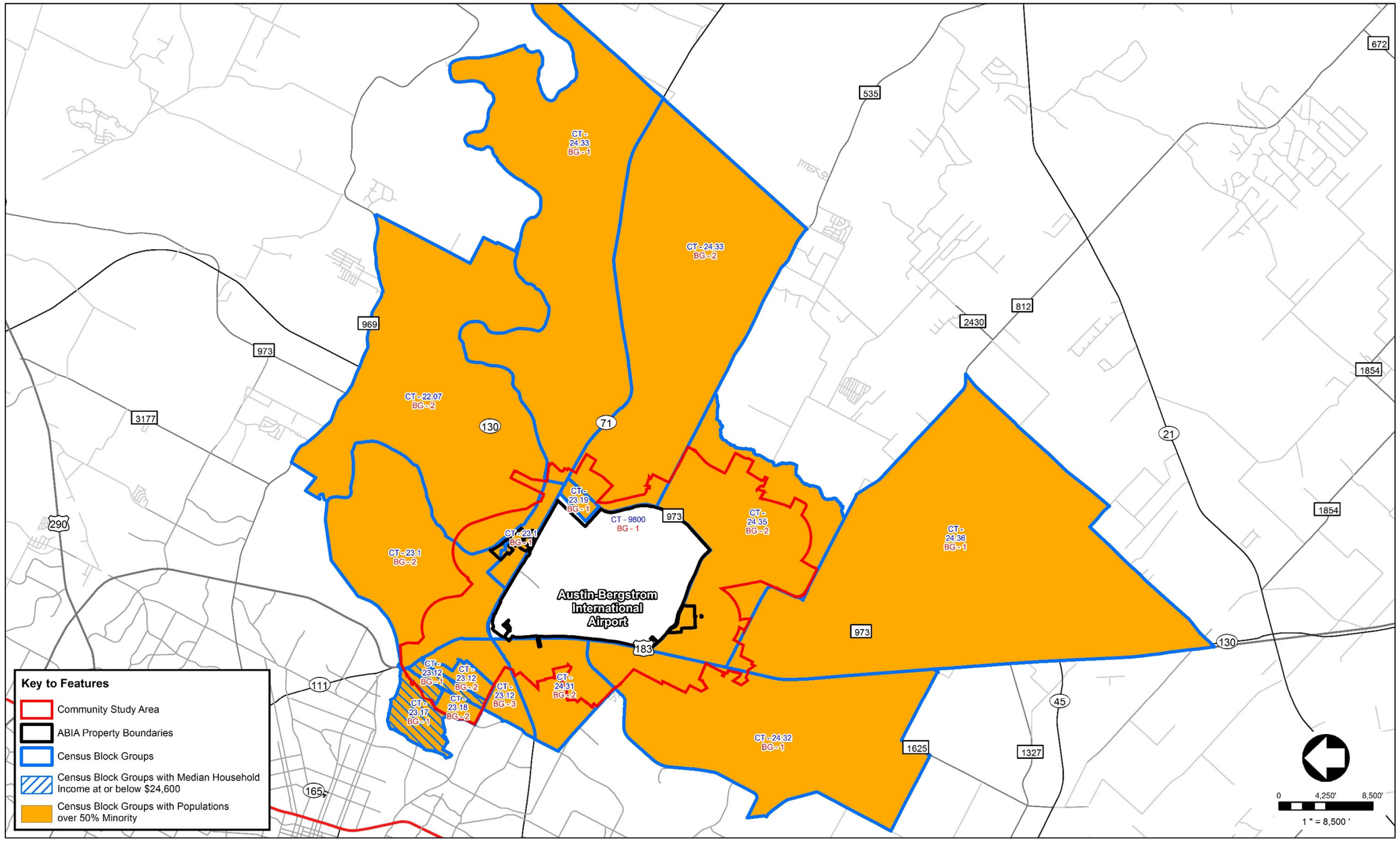
Exhibit 2.11-3: EJ Pops Within the Community Study Area



Source: US Census Bureau, 2015

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2.11.4.1 Population and Employment

Of the 16 block groups within or partially within the study area, Block Group (BG) 1 in Census Tract (CT) 23.19 is entirely comprised of ABIA and therefore has a population of zero. BG 1 CT 9800 is occupied by the Travis County Correctional Complex located northeast of the ABIA property and also has a reported population of zero. Based on the USCB 2015 American Community Survey (ACS) five-year estimates, the total population of the community study area is 46,314, compared to 41,470 persons in 2010, representing a 10% population increase in a five-year period. Thirteen out of the 15 populated block groups in the study area experienced population growth between 2010 and 2015. Comparatively, the City of Austin population increased by 16.1% between 2010 and 2015, while the population of Travis County increased by 4.9% during the same period (see **Table 2.11-5**).

Table 2.11-5: Population Growth within the Community Study Area from 2010–2015

CENSUS TRACT	BLOCK GROUP	2010 POPULATION	2015 POPULATION	PERCENT CHANGE
22.07*	2	5,533	6,568	18.7%
23.1*	1	758	918	21.1%
23.1*	2	2,484	2,537	2.1%
23.12*	1	1,806	1,647	-8.8%
23.12*	2	2,679	2,902	8.3%
23.12*	3	2,672	2,973	11.3%
23.17*	1	3,836	4,057	5.8%
23.18*	2	2,827	3,203	13.3%
23.19*	1	1,945	2,264	16.4%
24.31*	2	2,139	3,037	42.0%
24.32***	1	1,102	1,275	15.7%
24.33**	1	1,793	1,887	5.2%
24.33**	2	4,188	4,906	17.1%
24.35**	2	5,036	5,873	16.6%
24.36***	1	2,672	2,267	-15.2%
9800*	1	0	0	0.0%
City of Austin		**764,129**	**887,061**	**16.1%**
Travis County		**1,121,645**	**1,176,558**	**4.9%**

Notes: *Located entirely within the City of Austin and entirely within Travis County.
**Located partially within the City of Austin and entirely within Travis County.
***Located outside of the City of Austin but entirely within Travis County

Source: USCB. 2015. ACS 5-year Estimates – Table B01003: Total Population. Table B19013: Median Household Income in the Past 12 Months, United States Census Bureau. 2010. SF1 Data – Table P1: Total Population. Redistricting Data – Table P2: Hispanic or Latino and Not Hispanic or Latino by Race.

The BLS lists the Austin economy as among the fastest growing metropolitan areas in the U.S. There has been a 2.8% increase in non-farm jobs from May 2016 to May 2017.[39] The following is a list of the top five major employment industries in Austin metropolitan statistical area (MSA):

- Government at 17.8%;
- Professional and business services at 16.9%;
- Education and healthcare at 11.6%;
- Leisure and hospitality at 12.2%
- Retail at 10.4%[40]

According to the Austin Chamber of Commerce, major employers (those with 6,000 employees and over) in the Austin area include Apple, Austin Independent School District (AISD), Dell Technologies, Samsung Austin Semiconductor, Seton Healthcare, the State of Texas, and the University of Texas at Austin, among others[41].

The BLS reports the Austin-area unemployment rate as 2.9% and the Austin-Round Rock MSA unemployment rate as 3.2%, both of which are lower than the national unemployment rate of 4.7% as of April 2017.[42]

2.11.4.2 Minority and Low-income Populations

The community study area is located almost entirely within Austin City Council District 2, with small portions of the study area extending into District 3. Both of these districts are predominately Hispanic, at 69% in District 2 and 61% in District 3. Out of the 10 City Council Districts in Austin, Districts 2 and 3 have the fourth and second highest rates of poverty, respectively.[43]

For the purposes of this overview, minority and low-income populations are defined in accordance with the 1994 Executive Order (EO) 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. EO 12898 requires all federal agencies to consider whether their programs, policies, and activities would have disproportionately high and adverse human health or environmental effects on minority and low-income populations.[44]

DOT Order 5610.2(a) defines minority as a person who is:

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39 U.S. Bureau of Labor Statistics (USBLS). 2017b. Over-the-year change in total nonfarm employment for metropolitan areas, not seasonally adjusted. https://www.bls.gov/web/metro/metro_oty_change.htm. Accessed June 19, 2017.

40 Austin Chamber of Commerce. 2017a. Economic Indicators. Austin Chamber of Commerce. https://www.austinchamber.com/upload/files/ed/ecoind/EconomicIndicators.pdf. Accessed June 12, 2017.

41 ACC. 2017b. Employment by Industry. Austin Chamber of Commerce. https://www.austinchamber.com/economic-development/austin-profile/workforce. Accessed June 12, 2017.

42 BLS. 2017a. Austin Area Economic Summary. https://www.bls.gov/regions/southwest/summary/blssummary_austin.pdf. Accessed June 19, 2017.

43 COA. 2017c. Demographic, Socioeconomic and Political Characteristics of Austin's Council Districts. PowerPoint presentation of Comparative Districts Analysis. Planning and Development Review Department. https://www.austintexas.gov/sites/default/files/files/10-ONE/Districts10_rev5.pdf. Accessed June 29, 2017.

44 59 FR 7629, Section 3-302.

- Black: a person having origins in any of the black racial groups of Africa
- Hispanic or Latino: a person of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race
- Asian American: a person having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent
- American Indian and Alaskan Native: a person having origins in any of the original people of North America and/or South America (including Central America) who maintains cultural identification through tribal affiliation or community recognition
- Native Hawaiian and Other Pacific Islander: people having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands

As shown in **Table 2.11-6** all populated block groups within the community study area have a minority population of at least 55%. In most cases, minority populations exceed 75% of the total block group population.

Table 2.11-6: Minority Populations within the Community Study Area

CENSUS TRACT	BLOCK GROUP	TOTAL POPULATION	WHITE POPULATION	MINORITY POPULATION	TOTAL % MINORITY POPULATION
22.07*	2	5,533	843	4,690	84.8%
23.1*	1	758	102	656	86.5%
23.1*	2	2,484	307	2,177	87.6%
23.12*	1	1,806	101	1,705	94.4%
23.12*	2	2,679	131	2,548	95.1%
23.12*	3	2,672	427	2,245	84.0%
23.17*	1	3,836	902	2,934	76.5%
23.18*	2	2,827	288	2,539	89.8%
23.19*	1	1,945	806	1,139	58.6%
24.31*	2	2,139	365	1,774	82.9%
24.32***	1	1,102	235	867	78.7%
24.33**	1	1,793	807	986	55.0%
24.33**	2	4,188	679	3,509	83.8%
24.35**	2	5,036	659	4,377	86.9%
24.36***	1	2,672	609	2,063	77.2%
9800*	1	-	-	-	0.0%
City of Austin		**1,024,266**	**517,644**	**506,622**	**49.5%**
Travis County		**790,390**	**385,271**	**405,119**	**51.3%**

Notes: *Located entirely within the City of Austin and entirely within Travis County.
**Located partially within the City of Austin and entirely within Travis County.
***Located outside of the City of Austin but entirely within Travis County

Source: USCB, 2010 Redistricting Data (Table P2: Hispanic or Latino and Not Hispanic or Latino by Race).

Per DOT Order 5610.2(a), low-income is defined as "any readily identifiable group of low-income persons who live in geographic proximity, and, if circumstances warrant, geographically dispersed/transient persons (such as migrant workers or Native Americans) who will be similarly affected by a proposed DOT program, policy or activity." This analysis considers persons living at or below the 2017 U.S. Department of Health and Human Services (DHHS) poverty guideline for a family of four ($24,600) to be low income.[45]

Table 2.11-6 indicates that two low-income block groups live in the community study area. This is based on a comparison of the median household income of project area block groups as reported in the 2010 ACS to the DHHS poverty guideline of $24,600 for 2017. BG 1 in CT 23.13 and BG 1 in CT 23.17 have median household incomes below the poverty guideline. Additionally, BG 2, CT 23.1. BG 2, CT 23.12, and BG 1, CT 24.32 are all above (within $7,000 of) the 2017 DHHS poverty guideline. No income data is available for BG 1 CT 23.19 or BG 1 CT 9800, as they are entirely occupied by the Travis County Correctional Complex and ABIA, respectively.

Comparatively, the median household income for the City of Austin is $57,689 (see **Table 2.11-7**). All but two of the populated block groups, BG 2, CT 22.01 and BG 2, CT 24.35, have median household incomes lower than that of the City of Austin. All of the block groups within the study area have median household incomes lower than both the reported Austin-Round Rock MSA of $63,437 and/or the reported Travis Country of $61,451.

Based on the data provided, all the populated block groups within the community study area are considered Environmental Justice (EJ) populations. Any future federal action that would affect these populations would be required to consider whether impacts related to a specific project would be considered disproportionately high and adverse.

[45] U.S. Department of Health and Human Services. 2017. HHS Poverty Guidelines for 2017. Effective January 26, 2017. https://aspe.hhs.gov/poverty-guidelines. Accessed June 17, 2017.

Table 2.11-7: Median Household Income in the Community Study Area

CENSUS TRACT	BLOCK GROUP	MEDIAN HOUSEHOLD INCOME
22.07*	2	$58,707
23.1*	1	$45,313
23.1*	2	$31,346
23.12*	1	$21,107
23.12*	2	$26,089
23.12*	3	$30,536
23.17*	1	$24,090
23.18*	2	$10,799
23.19*	1	-
24.31*	2	$44,375
24.32***	1	$29,118
24.33**	1	$38,750
24.33**	2	$56,353
24.35**	2	$58,327
24.36***	1	$41,012
9800*	1	-
City of Austin		**$57,689**
Austin-Round Rock MSA		**$63,437**
Travis County		**$61,451**

Notes: *Located entirely within the City of Austin and entirely within Travis County.
** Located partially within the City of Austin and entirely within Travis County.
*** Located outside of the City of Austin but entirely within Travis County
Source: USCB, 2015 ACS 5-year estimates (Table B19013: Median Household Income in the Past 12 Months).

2.11.5 Community Resources

Table 2.11-8 lists the residential subdivisions within the community study area, which range from multi-family complexes to lower-density, single-family homes. In addition to these developments, there are three major neighborhoods within the study area: Montopolis, Southeast, and Del Valle.

The Montopolis neighborhood to the northwest of ABIA is characterized as largely residential. Single-family homes comprise most of the land offset from major roadways, except for a few multi-family complexes. There are several mobile home parks along the US 183 and East Riverside Drive. Civitan Park and a few retail establishments border US 183.

The Del Valle neighborhood is located north of the ABIA property, between ABIA and the Colorado River. About half of the neighborhood is comprised of vacant lots. There are at least two mobile home parks, small retail establishments, and a few businesses within the occupied lots. Businesses include a storage facility, a car rental agency, hotel, and a parking lot for those headed to ABIA. Del Valle has its own Independent School District (ISD), which serves the areas north of

SH 45 and on either side of SH 130, encompassing 174 square miles. The students within Del Valle ISD are largely minority and low income. Approximately 85% of the student body is Hispanic, over 37% of students are considered to have Limited English Proficiency (LEP), and nearly 87% of students are considered to be economically disadvantaged.[46]

Table 2.11-8: Residential Subdivisions in the Community Study Area

NAME	DESCRIPTION
Santora Village Apartments	Multi-family residential
Park East Residences	Mixture of single- and multi-family residential, in construction
Riverside Meadows Community	Single-family residential
Richland Estates	Single-family residential
Carson Creek	Single-family residential
Hornsby Glen	Single-family residential
Valle Del Rio	Single-family residential
Timbercreek Subdivision	Scattered single-family residences, divided into lots for future development
Good Land Farms	Single-family residential
Stony Ridge North	Single-family residential
Stony Ridge	Single-family residential
Valle San Jose	Single-family residential
Pilot Knob Acres	Single-family residential
Addison Residences	Single-family residential
Blue Bonnet Gardens	Single-family residential
Colorado Crossing	Single-family residential

Source: Travis Central Appraisal District 2017, Google Maps and Google Earth aerial photography 2017.

West of ABIA, about half of the Southeast neighborhood is included within the community study area. The area contains one large Colorado Crossing subdivision of single-family homes, at least four mobile home parks, several office buildings, a few industrial facilities, and the Central Texas Veterans Clinic.

In addition to the residential subdivisions listed above, a number of important community facilities are located within the community study area. These include schools, health care services, places of worship, and other resources that serve the surrounding community. These resources are discussed further in Chapter 5, *Alternatives Analysis/Evaluation and Environmental Conditions,* as they relate to the potential impacts of the proposed airport development alternatives.

[46] Del Valle ISD. 2017. Quick Facts. https://drive.google.com/file/d/0B-27PmJ1aayETTZUTG12eEttb0E/view. Accessed June 28, 2017.

2.11.6 Ecological Resources

Ecological resources—including vegetation and wildlife, threatened and endangered species, and water resources—were inventoried within the ABIA property boundary (referred to as the ecological study area) and are shown on **Exhibit 2.11-4**. Various statutes and regulations related to biological resources guided the development of this inventory. The primary sources of guidance included:

- Endangered Species Act, 16 U.S.C. §§1531–1544
- Fish and Wildlife Coordination Act, 16 U.S.C. §§ 661–667d
- Migratory Bird Treaty Act, 16 U.S.C. § 703 et seq.
- EO 13112, Invasive Species, 64 FR 6183
- Clean Water Act, 33 U.S.C. §§ 1251–1387
- EO 11990, Protection of Wetlands, 42 FR 26961
- EO 11988, Floodplain Management, 42 FR 26951
- COA Environmental Criteria Manual and Land Development Code requirements

2.11.6.1 Vegetation and Wildlife

The ecological study area occurs along the western boundary of the Texas Blackland Prairies vegetation region as originally described by Gould[47] and Hatch[48] and later modified by the U.S. Environmental Protection Agency (EPA)[49] and Griffith.[50] The physiognomy, height and canopy coverage, and floristic composition, and number of plant species on the ABIA property is typical of this ecological region. Vegetation occurs within four principal plant communities:

- Riparian woodland and forest
- Upland woodland
- Upland parkland/savannah
- Maintained and periodically mowed grasses and forbs

The upland parkland/savannah vegetation community is comprised of old fields, an old golf course, previous pastureland, and previous cropland no longer used for these purposes. These areas are gradually being invaded by woody species, resulting in a mosaic of mixed grasses

47 Gould, F.W. 1975. Texas plants – a checklist and ecological summary. MP 585. Texas Agricultural Experiment Station, College Station, Texas.

48 Hatch, S.L., K.N. Gandhi, and L.E. Brower. 1990. Checklist of the vascular plants of Texas, Texas Agricultural Experiment Station, Texas A&M University. College Station, Texas.

49 EPA. 2003. Level III ecoregions of the continental United States (revision of Omernik, 1987): Corvalis, Oregon, U.S. Environmental Protection Agency-National Health and Environmental Effects Research Laboratory, Map M-1, various scales. http://www.epa.gov/wed/pages/ecoregions/level_iii.htm. Accessed October 17, 2012.

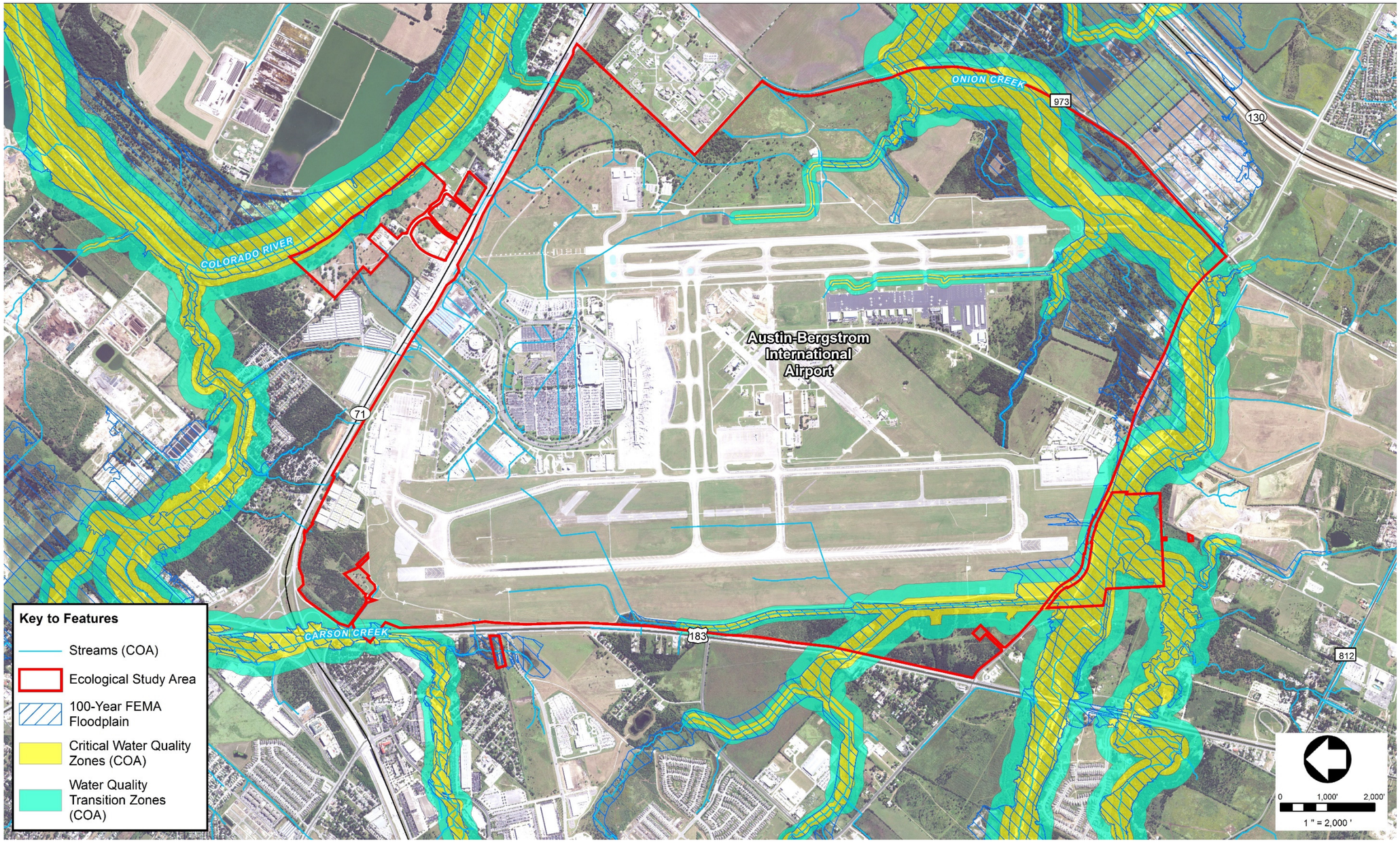
50 Griffith, G.E., Bryce, S.A., Omernik, J.M., Comstock, J.A., Rogers, A.C., Harrison, B., Hatch, S.L., and Bezanson, D. 2004. Ecoregions of Texas (color poster with map, descriptive text, and photographs); Reston, Virginia, U.S. Geological Survey (map scale 1:2,500,000). http://www.epa.gov/wed/pages/ecoregions/tx_eco.htm. Accessed June 12, 2017.

interspersed with trees, vines, and shrubs of varying age classes. Representative plant species occurring within these vegetation communities are listed in **Appendix 2.1.**

Wildlife habitat conditions vary from poor within the highly developed areas surrounding the airport terminals, parking areas, building infrastructure, and taxiways to excellent within the Onion Creek riparian corridor and several adjoining tributaries where mature to old-growth forest conditions exist. Habitat suitability components involving a diversity of mature and/or old age class trees and shrubs within the Onion Creek riparian corridor constitutes the highest quality wildlife habitat within the ABIA property. A number of pecan, sycamore, and American elm trees exhibit growth characteristics to qualify as protected COA heritage trees. Wetlands and open water areas with fringe wetlands also occur within the Onion Creek floodplain, greatly increasing habitat diversity and resultant habitat quality. Upland woodlands and the mixed parkland/savannah vegetation types situated generally between the existing airport infrastructure and the riparian corridors constitute moderate quality habitat, while the mowed grasses and forbs constitute the lowest quality habitat by supporting the least number of wildlife species among the four vegetation communities on the ABIA property. Attraction of wildlife to vegetation on the ABIA property and subsequent incursion into aircraft operational areas is lessened through high enclosure fencing, placement of earth berms at the bottom of fencing to discourage animal digging, employment and regular use of noise devices, placement of metal bars and grills on drainage culverts, regular patrolling of the property by wildlife control specialists, and selective hunting where problems cannot be controlled by other methods.[51, 52] Activities are planned and guided through the development and implementation of a wildlife management and control plan.

[51] ABIA. 2013. *Wildlife Management Plan*. Approved September 18, 2013.
[52] COA Aviation Department. 2017. ABIA Quarterly Noise Report – 4th Quarter 2016. Prepared on March 13, 2017.

Exhibit 2.11-4: Ecological Study Area



Source: Aerial Photography NAIP, 2016; Streams: City of Austin, 2015; Water Quality Zones: City of Austin, 2006 (City Ordinance # 20120628-014)

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2.11.6.2 Threatened and Endangered Species

A summary of federally and state-listed endangered and threatened and endangered species, as well as candidate species, that could potentially occur in Travis County is included in Appendix 2.1**.** A description of these species' habitats with assessment of impacts that would potentially occur as a result of future development is also included. Desktop analysis and site evaluations conducted in August 2015 and on June 19, 2017, in addition to review of recent database information on the potential occurrence of listed species compiled by the Texas Parks and Wildlife Department (TPWD)[53] and U.S. Fish and Wildlife Service (USFWS),[54] indicate that no potential habitat for federally or state-listed species exists within the ecological study area.

2.11.6.3 Water Resources, including Wetlands

2.11.6.3.1 Groundwater

Water resources on the ABIA property include both groundwater and surface water. Groundwater within the ABIA property boundary area is mostly confined to a shallow alluvium and terrace complex that is not connected to any major aquifers. The presence of groundwater varies seasonally and topographically according to water table conditions as influenced by surface recharge received locally within the vicinity of ABIA. The terrace deposits are up to 60 feet in depth, with the water table typically occurring approximately 20 to 40 feet below the ground surface[55]. Exceptions include areas that have been excavated for gravel mining or airport construction where groundwater depth is much shallower, resulting in discharges at seeps and springs. Areas of terrace deposits and underlying claystone and/or sites of alluvium/claystone are most likely potential sites of discharge through seeps and springs.[56]

The pumping of groundwater on the ABIA property is very restricted, as this resource is not used for drinking water. All drinking water is provided by the COA Water Utilities Department through the city's water supply system. However, the quality of the groundwater has been monitored. According to a five-year monitoring report by HydroGeoLogic,[57] total dissolved solids (tds) ranged from 409 milligram / liter (mg/L) to 767mg/L. The report further indicates that general use of groundwater is limited by elevated nitrate concentrations, with some wells exhibiting 12-40 mg/L (above the U.S. EPA) Maximum Contaminant Level (MCL) of 10 mg/L defined by the EPA, and lists one well as high as 135mg/L. The elevated levels are attributed to seepage from septic tanks, runoff from barnyards, and application of fertilizers.

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53 Texas Parks and Wildlife Department. 2016. Annotated County Lists of Rare Species for Travis County. Revised May 16, 2016. http://tpwd.texas.gov/gis/rtest/. Accessed July 12, 2017.

54 USFWS. 2017. Species by County Report, Environmental Conservation Online System. https://ecos.fws.gov/ecp0/reports/species-by-current-range-county?fips=48453. Accessed July 12, 2017.

55 United States Air Force. 1990. Draft Environmental Impact Statement: Proposed Closure of Bergstrom Air Force Base, Texas. Programs and Environmental AFRCE-BMS/DEV, Norton Air Force Base, California.

56 Masson, Marilyn A., James T. Jones, Michael Myers, and David O. Brown. 1994. Cultural Resources Survey for the New Austin Airport, Travis County, Texas. Hicks & Company Archeology Series 28. Austin, Texas. Report for Greiner, Inc.

57 HydroGeoLogic, Inc. 2011. Final second five-year review for former Bergstrom Air Force Base Austin, Texas. June 2011.

Surface water includes both natural streams and watercourses that drain the Onion Creek, Carson Creek, and Colorado River watersheds within the ABIA boundary. Also included are numerous manmade storm drainages and water detention structures on the ABIA property that control and manage runoff from airport runways, taxiways, and other infrastructure.

2.11.6.3.2 Surface Water

The quality of surface water within the Colorado River and its Onion Creek tributary are relatively good. Neither stream segment was listed on the 2014 State of Texas Clean Water Act Section 303(d) list of impaired streams.[58] The COA Watershed Protection Department's overall Environmental Integrity Index (EII) score for Onion Creek at the sampling location near its confluence with the Colorado River was 76 in 2014, placing it in the range of scores of 75.0 to 85.5 that are categorized as "very good." For Carson Creek, the EII overall score near its confluence with the Colorado River was 63 in 2014, placing it in the range of scores of 62.5 to 75.0 that are categorized as "good."

2.11.6.3.3 Waters of the U.S., Including Wetlands

According to the Clean Water Act, Waters of the U.S. (WOTUS) include rivers, streams, tributaries, interstate waters, and wetlands. Such areas are regulated and subject to permitting under the federal Clean Water Act by the EPA and the U.S. Army Corps of Engineers (USACE). Wetlands include areas where water either covers the soil or is present at or near the surface of the soil at a frequency and duration to support plants that would grow in saturated soil conditions. Hydrology largely determines how the soil develops and the types of plant and animal communities living in and on the soil, which can support both aquatic and terrestrial species. The prolonged presence of water creates conditions that favor the growth of specially adapted plants, or hydrophytes, and promotes the development of characteristic hydric wetland soils.

Preliminary field investigations were conducted by Hicks & Company biologists in June 2017 to evaluate potential wetlands and other WOTUS that may be considered subject to USACE permitting and/or that meet the criteria for COA Critical Environmental Features (CEFs) (see **Exhibit 2.11-5**). Sites documented in previous studies and assessments at ABIA were investigated in addition to new sites that may have recently developed. Maps of previously documented wetland sites were converted to digital files and downloaded to a hand-held GPS instrument with sub-meter accuracy, which was used to locate the sites for field evaluation. Latitude-longitude coordinates of new sites potentially meeting wetland criteria were recorded and uploaded into GIS digital map files for use during the alternative's assessment. Detailed wetland determinations of specific sites using the formal protocol established by the USACE and COA were not conducted during the preliminary field investigations. The data collected during this field effort are intended for use during evaluation of potential development alternatives for the ABIA

[58] Texas Commission on Environmental Quality. 2015. 2014 Texas integrated report for the Clean Water Act Sections 305(b) and 303(d). Available at: https://www.tceq.texas.gov/waterquality/assessment/14twqi/14basinlist. Accessed June 13, 2017.

Master Plan. Additional investigations will be required once specific development projects are identified (after the planning phase) in order to determine the full extent of potential impacts to wetlands and WOTUS and any associated permitting requirements. See **Appendix 2.2**.

A total of 42 sites have been investigated within the ABIA property boundaries based on the data reviewed and the results of the preliminary field investigations. Of this total, 32 sites were documented prior to the June 2017 field investigations. Nine additional sites were evaluated in June 2017, and one site was identified from data provided by ABIA and the COA web-based Property Profile (see Exhibit 2.11-5 for details). Of the original 32 sites previously documented, five sites no longer exist because of airport development (Sites 2, 3a, 3b, 4, and 6). Additionally, inconsistency of potential jurisdictional status between the original evaluations and 2017 field investigations occur at three sites (Sites 9b, 12, and 15), likely due to changes in environmental conditions. Seven potential wetlands, seeps, or springs documented during previous investigations were not observed during the 2017 investigations (Sites 19, 20, 21, 22, 23, 27, and 28). At least 12 of sites would require further field investigation to confirm USACE jurisdictional status (Sites 12, 16, 17, 18, 25, 29, 33, 34, 35, 37, 38, and 39). Additional investigations by Baer Engineering were documented following the June 2017 field work by Hicks & Company, the findings of which are included Appendix 2.2.

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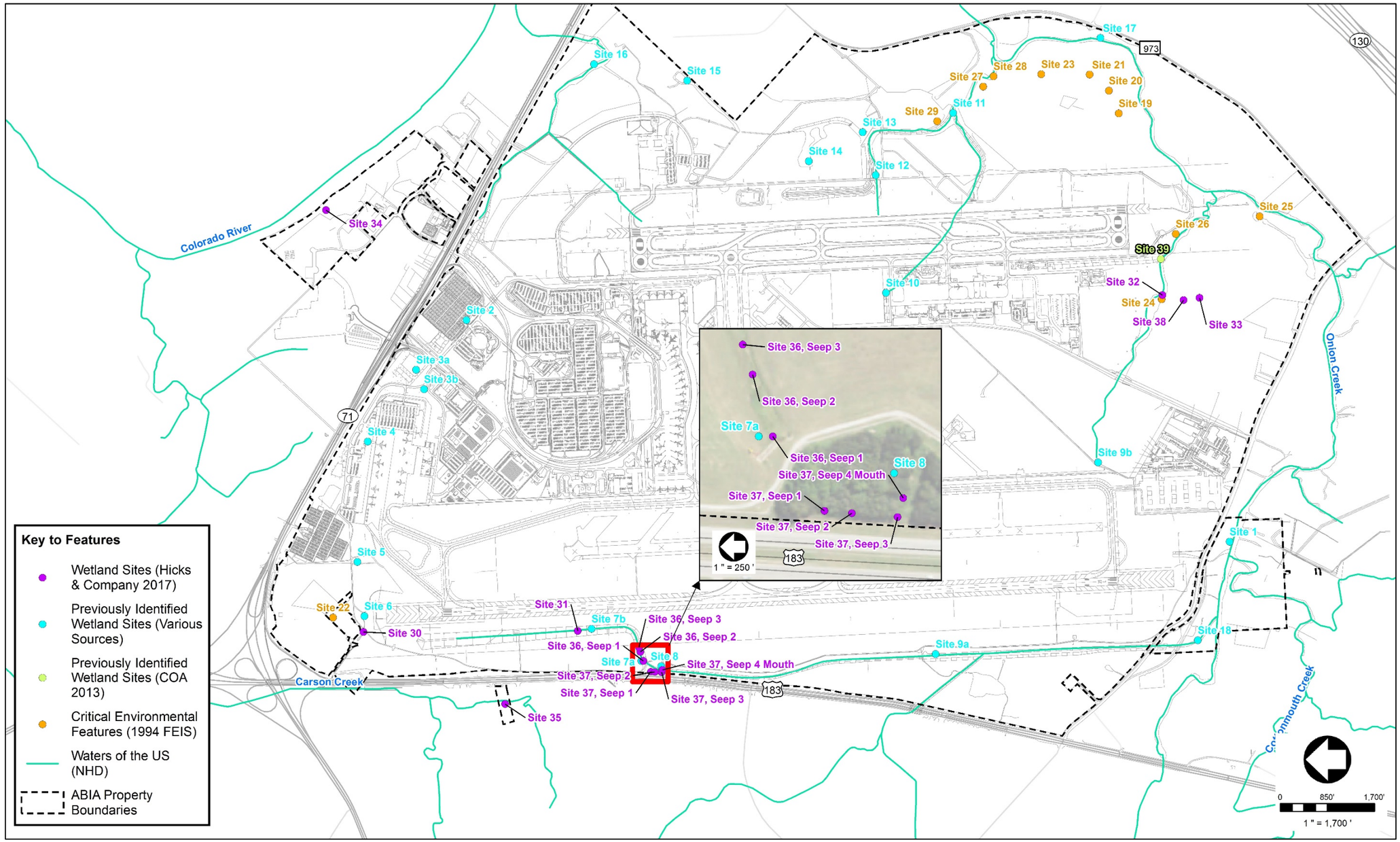
Exhibit 2.11-5: WOTUS and Wetlands



Source: See Memo Re: Potential Waters of the U.S. including wetlands for the ABIA Master Plan (Hicks & Company 2018).

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2.11.6.4 Critical Water Quality Zones and Critical Environmental Features

As a part of the COA's watershed protection measures, specific environmental features have been defined that fall under the COA's regulatory purview. These include a primary stream buffer designated as a Critical Water Quality Zone (CWQZ)[59] and a secondary stream buffer designated as a Water Quality Transition Zone (WQTZ) adjacent and parallel to the outer boundary of the CWQZ.[60] Definitions and buffer widths are described in the COA Environmental Criteria Manual §1.5.0. The COA has also defined CEF's that have established buffer setbacks of generally 150 feet unless otherwise specified.[61] Environmental features include bluffs, canyon rimrocks, springs and seeps, wetlands, and point recharge features for the Edwards Aquifer that include karst features and sinkholes that meet specified criteria.

In June 2012, a city ordinance (#20120628-014) was passed that approved a Master Development Plan (MDP) for ABIA and granted variances to existing and future COA LDC provisions. The ordinance also established a review and amendment process and repealed Ordinance 94-1117-L. Variances under the MDP Ordinance include:

- Part 6(A): allows no expiration date for the airport MDP provided periodic review is conducted
- Part 6(B): allows construction of specified facilities (e.g., new terminals, runways, taxiways and other associated infrastructure) without preserving the natural and traditional character of the land and waterways
- Part 6(C): limits capture of stormwater runoff to the first half inch for the constrained development area
- Part 6(D): allows specified development activities within the CWQZ within designated portions of the airport, provided specified limitations on impervious cover are met
- Part 6(F): limits impervious cover to not more than 30 percent within the WQTZ
- Part 6(G): allows cuts to exceed four feet but not more than 25 feet for all development under the MDP
- Part 6(H): allows fill to exceed four feet but not more than 15 feet of depth for all development under the MDP

Both the CWQZ and WQTZs are still applicable to the ABIA property, because the ABIA MDP Ordinance was approved prior to subsequent changes to the COA Watershed Ordinance. Consequently, variances stipulated by MDP Ordinance remain in effect, and future modifications or updates to the LDC are not applicable to ABIA.

[59] COA's Land Development Code LDC § 25-8-92
[60] COA's Land Development Code LDC § 25-8-93
[61] COA's Environmental Criteria Manual § 1.10

2.11.7 Air Quality & Climate

The statutes and requirements related to air quality and climate change in terms of aviation-related actions include:

- Clean Air Act, 42 U.S.C. § 7408
- EO 13514, Federal Leadership in Environmental Energy and Economic Performance, 74 FR § 52117
- EO 13653, Preparing the United States for the Impacts of Climate Change, 78 FR 66817
- Local and state regulations

Under the Clean Air Act (CAA) of 1990, the EPA has identified National Ambient Air Quality Standards (NAAQS) in 40 CFR Part 50 for six principal criteria pollutants to "provide public health protection, including protecting the health of 'sensitive' populations such as asthmatics, children, and the elderly.[62] These pollutants include ground-level ozone, lead, carbon monoxide, nitrogen dioxide, sulfur dioxide, and particulate matter.

Air quality regions that exceed the NAAQS are designated as "nonattainment areas" by the EPA and are required to conform to the Statewide Implementation Plan (SIP), which outlines measures for implementation, maintenance, and enforcement of the NAAQS within each state.[63] Federal aviation-related actions planned in a nonattainment or maintenance area must conform to the conditions of the applicable SIP, referred to as the General Conformity Rule.[64] ABIA is located in Travis County, which is part of the Austin-Round Rock area that is currently in attainment for all NAAQS.[65] Therefore, the General Conformity Rule does not apply to federal actions at ABIA.

Beyond considering the effects of federal projects related to the NAAQS, federal agencies are also required under EO 13514 to disclose the contribution of a project to greenhouse gases (GHGs), which include carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. In 2012, the FAA released a guidance memorandum on how to consider GHG and climate under NEPA.[66] While consideration of GHGs is required for

62 EPA. 2016a. NAAQS Table. https://www.epa.gov/criteria-air-pollutants/naaqs-table. Updated December 20, 2016. Accessed June 20, 2017.

63 EPA. 2016b. Basic Information about Air Quality SIPs. https://www.epa.gov/sips/basic-information-air-quality-sips#what-is-a-sip. Updated September 30, 2016. Accessed June 20, 2017.

64 FAA. 2015b. FAA Order 1050.1F Desk Reference. Subject: Environmental Impacts: Policies and Procedures. July 16, 2015. https://www.faa.gov/about/office_org/headquarters_offices/apl/environ_policy_guidance/policy/faa_nepa_order/desk_ref/media/desk-ref.pdf. Accessed June 22, 2017.

65 TCEQ. 2016. Austin-Round Rock: Current Attainment Status. https://www.tceq.texas.gov/airquality/sip/aus/aus-status. Accessed June 19, 2017.

66 FAA. 2012. FAA Order 1050.1E, Change 1, Guidance Memo #3. Subject: Considering Greenhouse Gases and Climate under the National Environmental Policy Act: Interim Guidance. January 12, 2012.

compliance with NEPA and the CEQ's implementing regulations, currently no federal standards exist for GHG emissions applicable to aviation.

In addition to complying with the requirements under NEPA and the CAA, ABIA has implemented a number of landside and airside initiatives aimed at reducing emissions from airport sources. To reduce auxiliary power unit (APU) emissions, each gate has been outfitted with preconditioned air units and ground power units. Both operate entirely off wind power, making the initiative carbon neutral. Other environmental measures include providing automatic ventilation control on the apron through use of a carbon monoxide sensor system, providing alternative fuels for use by ground service equipment, and working with Capital Metro to ensure accessibility at ABIA by mass transit.[67]

2.11.8 Cultural Resources

The information provided below is based on previously conducted surveys and documentation of cultural resources within the ABIA property boundaries, considered to be the cultural resources study area and shown on **Exhibit 2.11-6**. A brief history of the ABIA property is provided below, followed by a summary of historic sites considered to be eligible for or listed on the National Register of Historic Places (NRHP) as well as a summary of archeological sites.

While a number of statutes and regulations are in place to protect cultural resources, the following are considered the primary statutes and regulations regarding federal projects that have the potential to affect cultural resources in Texas:

- National Historic Preservation Act, 54 U.S.C §§ 300101 et seq.
- Native American Graves and Protection and Repatriation Act, 25 U.S.C. §§ 3001–3013
- Antiquities Code of Texas, Chapter 13, Title 26 of the Texas Administrative Code (TAC)
- U.S. Department of Transportation Act 49 U.S.C. § 303, Section 4(f)

https://www.faa.gov/air_traffic/environmental_issues/media/Memo-AEE-400_GuidncMem3_GHG_Climate_NEPA_Intrm_12JAN2012.pdf. Accessed June 10, 2017.

67 Austin Bergstrom International Airport. 1998. ABIA Environmental Initiatives Summary. https://www.austintexas.gov/sites/default/files/images/Airport/Environmental/env_initiative.pdf. Accessed June 19, 2017.

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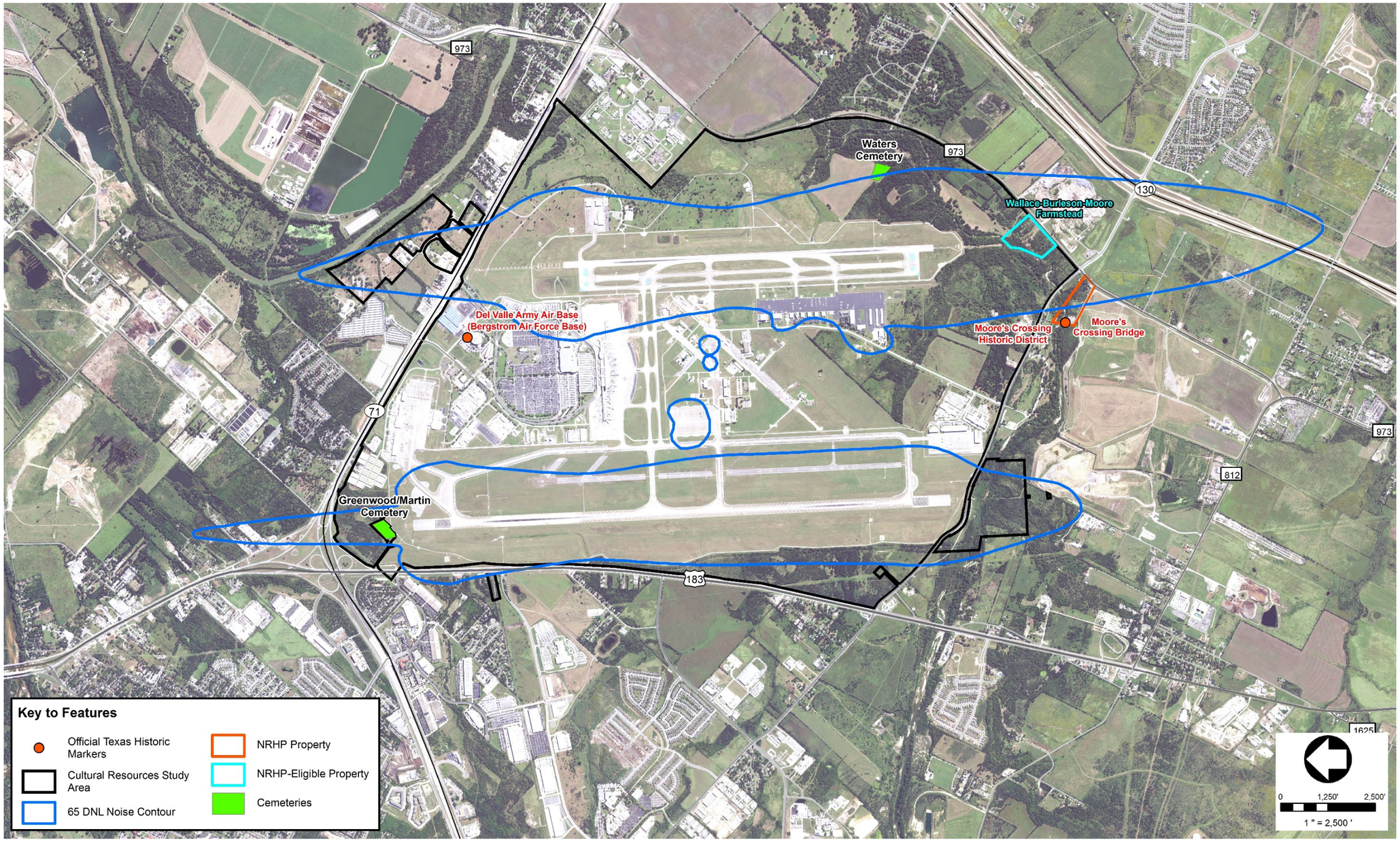
Exhibit 2.11-6: Cultural Resources Study Area



Source: Texas historical Commission, 2017; Aerial Photography: NAIP, 2016.

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2.11.8.1 Overview of ABIA History

In 1942, the military established the Del Valle Army Air Base on a portion of the land now occupied by ABIA. The base was renamed Bergstrom Army Air Field in 1943, and in 1966 it became Bergstrom Air Force Base. The COA had long recommended the location for the development of a new commercial airport and conducted several feasibility studies of the site over a number of years. In 1990, the Air Force recommended the closure of the base. It was formally recommended in 1991 by the Congressional Commission for closure in September 1993. In preparation for the disposal of Bergstrom Air Force Base by the military and acquisition of the property by the COA for a new commercial airport, numerous environmental documents were prepared to address environmental constraints, including cultural resources. These include a 1991 Cultural Resources Survey of Portions of the Bergstrom Air Force Base,[68] the 1993 FEIS for the Disposal and Reuse of the Bergstrom Air Force Base and the 1994 FEIS for the Proposed New Austin Airport at Bergstrom.

2.11.8.2 Previously Conducted Surveys and Documentation Efforts

Previous investigations within the cultural resources study area—conducted to identify both archeological sites as well as architectural (non-archeological standing structure) resources—were identified by reviewing the Texas Historical Commission Online Historic Sites Atlas[69] and Online Archeological Sites Atlas, previous environmental documents associated with ABIA, and the TxDOT online GIS layers for historic resources. Over 20 cultural resource surveys have been conducted within the proximity of the cultural resources study area, see **Appendix 2.3** for more detail. As a result of these survey efforts, the historic resources and archeological sites discussed in the following section were documented.

2.11.8.3 Previously Designated and Determined Eligible Historic Resources

The non-archeological historic resources identified in **Table 2.11-9** are those that have been listed in the NRHP, either as individual resources or as resources within an NRHP-listed historic district, or resources that have been officially determined eligible for listing in the NRHP by the State Historic Preservation Officer (SHPO). Additional resources within the cultural resources study area include historic-age cemeteries identified in the THC's Online Historic Sites Atlas as well as resources designated as State Antiquities Landmarks (SALs) or Recorded Texas Historic Landmarks (RTHLs) by the THC, see Exhibit 2.11-6.

[68] Bement, Leland C. Cultural Resources Survey of Portions of Bergstrom Air Force Base, Travis County, Texas. Technical Series 17. Texas Archeological Research Laboratory, University of Texas at Austin.

[69] Texas Historical Commission. 2017. Texas Historic Sites Atlas. https://atlas.thc.state.tx.us. Accessed June 21, 2017.

Table 2.11-9: Historic Resources Previously Designated and Determined NRHP Eligible

NAME	DESIGNATION	LOCATION	NOTES
Moore's Crossing Historic District	NRHP-listed historic district	Roughly bounded by FM 973, Moore's Bridge Road (Old Burleson Road), and Onion Creek	District includes 41TV430 (Moore's Crossing Bridge over Onion Creek), 41TV431 (low-water ford at Onion Creek),41TV1636 (former Moore & Berry Store/Michalk Grocery), 41TV1637 (Michalk House), and others for a total of 13 contributing resources within district boundary
Moore's Crossing Bridge (41TV430)	RTHL, OTHM	Bridge Road over Onion Creek (steel truss)	Marker is located in Richard Moya Park on Burleson Road
Wallace-Burleson-Moore Farmstead (41TV1635)	Determined NRHP eligible by SHPO	West side of FM 973 north of Burleson Road intersection	Site includes nine contributing resources (two appear to have been demolished)
Cemeteries and Markers			
Waters Cemetery (41TV413)	No designation	Off FM 973 on west side of Onion Creek adjacent to Pearce Lane intersection (on ABIA property)	Also known as Boggy Creek Cemetery and Smith Family Cemetery
Greenwood/Martin Cemetery (41TV1688)	No designation	E. Riverside Drive (on ABIA property)	
Del Valle Army Air Base (Bergstrom Air Force Base)	OTHM	Hotel Drive at Hilton Austin Airport (on ABIA property)	

Source: THC Online Historic Sites Atlas. Available at: https://atlas.thc.state.tx.us. Accessed June 21, 2017.

2.11.8.3.1 Moore's Crossing Historic District – NRHP Listed

The Moore's Crossing Historic District was listed in the NRHP in 1996 under Criterion A: Agriculture, Commerce, and Exploration/Settlement and Criterion C Community Planning and Development. The district contains 13 of the following contributing resources:

- 1880s truss bridge (Moore's Crossing Bridge) over Onion Creek (41TV430)
- Low-water ford (Moore's Crossing) at Onion Creek (41TV431)
- Former Moore & Berry Store/Michalk Grocery (41TV1636)
- Michalk House (41TV637)
- Cistern, privy, and circa 1915 house
- Ca. 1930 garage
- Ca. 1935 hen house, a circa 1935 barn

- Site of a former 1909 cotton gin, circa 1935 bridge over Onion Creek on FM 973[70] (Note: the FM 973 bridge appears to have recently been replaced).

2.11.8.3.2 41TV430 – Moore's Crossing Bridge – RTHL, OTHM

The truss bridge over Onion Creek is a contributing resource to the NRHP-listed Moore's Crossing Historic District. It is also a designated RTHL. An Official Texas Historical Marker (OTHM) commemorating the bridge is located in the adjacent Richard Moya Park. The bridge originally spanned the Colorado River at Congress Avenue in Austin. It was built in 1884 but was dismantled and put into storage in 1910. In 1915, a portion of the bridge was constructed over Onion Creek but was quickly destroyed by a flood. The remaining spans of the bridge were installed in 1922. The bridge was in service until 1994 when Burleson Road was rerouted. It is significant for its role in the transportation and development of the Moore's Crossing area and as a remaining example of a late 19th century truss bridge.[71]

2.11.8.3.3 41TV1635 – Wallace-Burleson-Moore Farmstead – NRHP Eligible

The Wallace-Burleson-Moore Farmstead is an agricultural complex on the west side of FM 973 north of the Burleson Road intersection that dates from the mid-19th through the mid-20th century. The site was determined NRHP eligible by the SHPO under Criterion A. The farmstead contains nine contributing resources including the Wallace-Burleson-Moore House (circa 1848), a log cabin (circa 1848), a barn/chicken coop, a well, a barn/blacksmith shop, a tenant house, a hog barn, and two additional circa 1935 barns (that no longer appear to be standing). The property is associated with the early community settlers of William S. Wallace, John Burleson, and Robert J. Moore, from whom the surrounding community of Moore's Crossing took its name. The circa 1848 house, although altered, is one of the oldest existing structures in the area.

2.11.8.3.4 Del Valle Army Air Base and Bergstrom Air Force Base OTHM

An OTHM commemorating the history of the Del Valle Army Air Base and Bergstrom Air Force Base is located in front of the current Hilton Hotel at ABIA. The marker summarizes the history of the base from its development in 1942 through its closure in 1992 and subsequent conversion to the ABIA in 1999.

[70] Myers, Terri, Diane Williams, Sara Kirtland. 1996b. Historic Context for Southeast Travis County and Cultural Resources Survey and Assessment for the New Austin Airport, Travis County, Texas. Hardy Heck Moore & Associates, Inc. May 1996.

[71] Myers, Terri, Diane Williams, Sara Kirtland. 1996a. Moore's Crossing Historic District. National Register of Historic Places Registration Form. Hardy Heck Moore & Associates, Inc. April 1996.

2.11.8.4 Previously Recorded Archeological Sites and Archeological Potential

2.11.8.4.1 Recorded Archeological Sites

According to background research conducted for the cultural resources study area, a total of 44 archeological sites, including both prehistoric and historic archeological sites, have been recorded within the vicinity of ABIA. Trinomials 41TV430 and 41TV1635–1637 are eligible or listed standing structures.

Of the remaining 40 previously recorded archeological sites, three are considered eligible for listing in the NRHP or as SAL's by the SHPO. In many cases, sites with potential for significance had undergone extensive levels of disturbance, from quarrying or land development, for example, to the extent that, by the time the sites were coordinated with the SHPO, they were determined ineligible for listing.

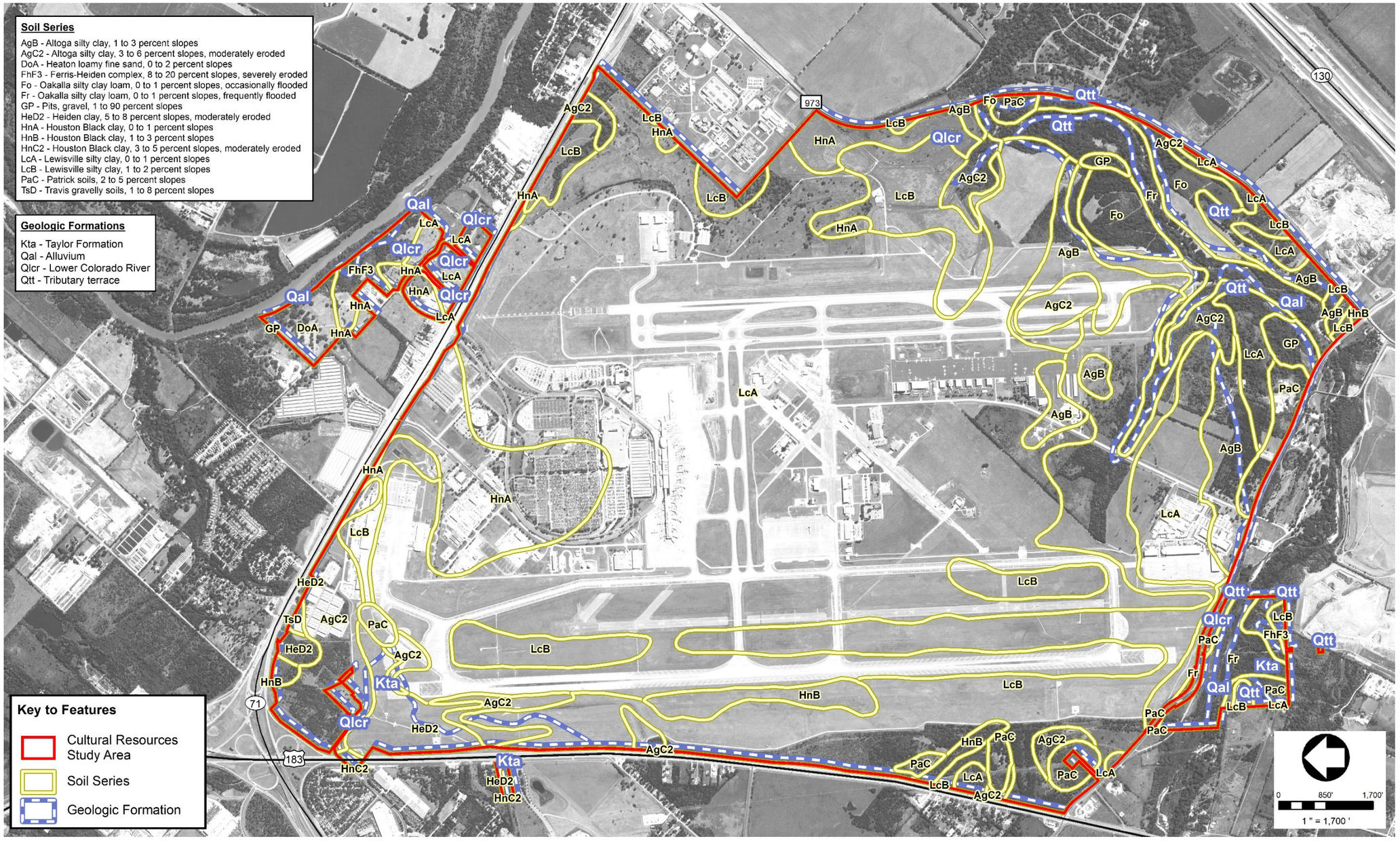
2.11.8.4.2 Archeological Potential

Holocene and Late Pleistocene Quaternary geologic formations are relatively recent deposits that coincide with the first major influx of humans in the Americas. As such, these formations have an increased likelihood of containing intact archeological deposits. Within the cultural resources study area, these formations are mapped as the Alluvium (Qal), Lower Colorado River (Qlcr), and Tributary terrace (Qtt) formations (see **Exhibit 2.11-7**). Cretaceous-age formations are older formations that predate this major influx and are less likely to contain intact archeological deposits. Where these formations are mapped, archeological deposits, when present, would most likely be in overlying sediment or on the surface itself. Within the study area, only one Cretaceous-age deposit is mapped: the Taylor formation (Kta).

Following Abbott,[72] the eleven-soil series (Altoga, Bergstrom, Ferris, Heaton, Heiden, Houston Black, Lewisville, Oakalla, Patrick, Pits and Gravel, and Travis) found in the cultural resources study area can be organized based on their potential to contain intact archeological deposits, see Exhibit 2.11-7. Each category is rated as either low, moderate, high, or very high for their depth of up to one meter below the surface and greater than one meter below the surface. Five of the soil series underlying the study area have low potential to contain archeological deposits at any depth. These are the Ferris, Heiden, Houston Black, Patrick, and Pits and Gravel series. The Altoga series has a low to moderate rating to a meter. Beyond this depth, this potential is reduced to low. The Heaton and Travis series have a moderate rating to a meter. Beyond this depth, this potential is reduced to low. The Bergstrom and Lewisville series have high potential at any depth. The Oakalla series has very high potential at any depth. These data are presented in **Table 2.11-10**.

[72] Abbott, James T. 2013. Rapid, Broad-Scale Modeling of Generalized Archeological Integrity Potential in Texas Using Extant GIS Data: A Proposed Methodology for Supervised Semi-automated Modeling Archeological Potential, and a Pilot Study of its Effectiveness. Environmental Affairs Division, Texas Department of Transportation, Austin.

Exhibit 2.11-7: Soils and Geology



Source: Aerial Photography: NAIP, 2016; Soils: NRCS, 2017; Geology: USGS. 2017

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Table 2.11-10: Archeological Potential within the Cultural Resources Study Area

SOIL SERIES	SHALLOW GEOARCHEOLOGICAL POTENTIAL (<1 METER)	DEEP GEOARCHEOLOGICAL POTENTIAL (>1 METER)
Altoga	low-moderate	low
Bergstrom	high	high
Ferris	low	low
Heaton	moderate	low
Heiden	low	low
Houston Black	low	low
Lewisville	high	high
Oakalla	very high	very high
Patrick	low	low
Pits and Gravel	low	low
Travis	moderate	low

Source: USDA. 2017b. Web Soil Survey. Natural Resource Conservation Service. Available at: https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm. Accessed June 12, 2017, Abbott, James T. 2013. Rapid, Broad-Scale Modeling of Generalized Archeological Integrity Potential in Texas Using Extant GIS Data: A Proposed Methodology for Supervised Semi-Automated Modeling Archeological Potential, and a Pilot Study of its Effectiveness. Environmental Affairs Division, Texas Department of Transportation, Austin.

Abbott's model is tied to the nature of soil deposition and heavily disturbed soils of even the highest geoarcheological potential may lack depositional integrity. Additionally, surficial or non-depositional archeological sites, such as burials, rock shelters, rock art sites, burned rock middens, and shell middens, may go unaccounted for when relying solely on geological and pedological factors to identify potentially eligible sites. Abbott's model only predicts the potential of soils to contain prehistoric archeological deposits; recent historic deposits are not reliably predicted by this model.

2.11.9 Hazardous Materials

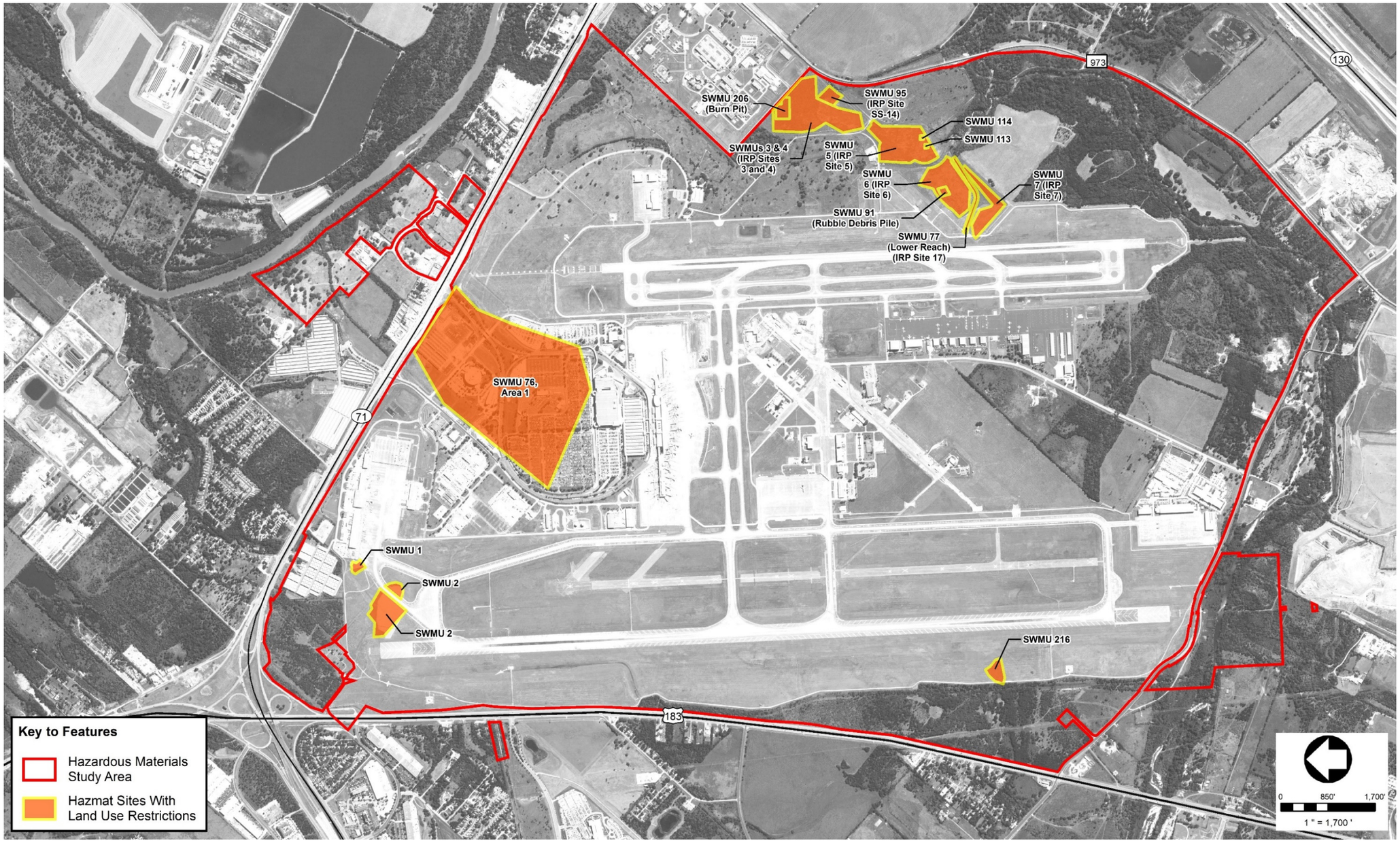
This section provides a general overview of the history of contamination and remedial actions taken at ABIA as well as the status of identified hazardous material sites on ABIA property, considered to be the hazardous materials study area and shown on **Exhibit 2.11-8**. Much of the information contained in this section was collected from the following:

- 1993 FEIS for ABIA[73]
- 1994 FEIS for ABIA[74]
- Focused Environmental Assessment on behalf of the COA Department of Aviation for General Aviation Development and Duct Bank[75]
- Most recent (second) Five-Year Review for Former Bergstrom Air Force Base Austin[76]
- Other studies in association with previous, ongoing, or planned environmental studies conducted at ABIA

No field investigations or site assessments were carried out to identify or characterize potential sources of hazardous materials, hazardous wastes, or environmental contamination.

[73] USAF. 1993. Final Environmental Impact Statement: Disposal and Reuse of Bergstrom Air Force Base, Texas. July 1993.
[74] Del Valle ISD. 2017. Quick Facts. https://drive.google.com/file/d/0B-27PmJ1aayETTZUTG12eEttb0E/view. Accessed June 28, 2017.
[75] COA. 2013. Focused Environmental Assessment: General Aviation Development and Duct Bank Relocation. June 2013.
[76] HydroGeoLogic, Inc. 2011. Final second five-year review for former Bergstrom Air Force Base Austin, Texas. June 2011.

Exhibit 2.11-8: Hazardous Materials Sites with Land Use Restrictions



Source: HydroGeologic, Inc., 2010; Aerial Photography; NAIP, 2016.

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2.11.9.1 History of Hazardous Materials at ABIA

There have been multiple hazardous material and contaminated site investigations at ABIA dating back to 1982. These investigations were carried out as part of the Installation Restoration Program (IRP), which was implemented in 1980 by the U.S. Department of Defense. They are in accordance with the provisions of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and are carried out under the Resource Conservation and Recovery Act (RCRA) program as required by the Texas Administrative Code Chapter 335, Subchapters A and S.

An environmental baseline survey (EBS) carried out as part of the IRP and completed in 1993 identified a total of 452 environmental action sites and 32 IRP sites that were investigated for closure under RCRA.[77] The sites identified and assessed during the above-mentioned investigations were predominantly:

- Landfills
- Spill sites
- Sewerage systems
- Fire training areas
- Vehicle maintenance areas
- Fuel hydrant system
- Contaminated ditches
- Oil-water separators (OWS)
- Hazardous waste storage areas
- Underground storage tanks (UST)

In order to close these sites under the RCRA, preapproval is required from both the Texas Commission on Environmental Quality (TCEQ) and the EPA. Site closure reports were submitted to the TCEQ and the EPA detailing the site closure and remediation steps taken, the existing conditions in terms of remediation measures, concentrations for the constituents of concern at the time of closure, and recommendations regarding whether or not further action was required post-closure. With the exception of one site, approval was granted for the closure of all sites with no requirement for post-closure remediation. Ongoing remedial activity is required at Solid Waste Management Unit (SWMU) 76, Area 1 (see **Table 2.11-11**). Deed recordation was completed prior to transfer of the various land parcels to COA; in certain instances, conditions of ownership relating to the management of these sites, deed restrictive covenants, were included in the deeds. Refer to Table 2.11-11 for an overview of the currently valid long-term post-closure requirements, all of which must be carried out by the U.S. Air Force (USAF).

Table 2.11-11: IRP Review Sites

[77] HydroGeoLogic, Inc. 2011. Final second five-year review for former Bergstrom Air Force Base Austin, Texas. June 2011.

IRP REVIEW SITES	POST CLOSURE REQUIREMENTS	LAND USE RESTRICTIONS & INDUSTRIAL CONTROLS
SWMUs 1 and 2	No further action required	– Prohibition of use of soil from within the boundaries – Exclusion of residential use from future land use options
Combined area: – **Landfills (SWMUs 3–7)** – **Asphalt storage area (SWMUs 113 and 114)** – **Former Ammunition Detonation Pit (SWMU 206)** – **Road oiling area (SWMU 95)** – **South fork drainage ditch (SWMU 77**	– Groundwater monitoring – Landfill cap inspections – Landfill cap maintenance	– Prohibition of surface or subsurface soil and well installation activities that may compromise the landfill caps – Prohibition of the extraction and use of onsite groundwater – Prohibition of residential land use, and ensuring that controlled access is maintained
SWMU 76 (Sanitary Sewer System), Area 1	– Hydraulic control of groundwater using a pump and treatment system and groundwater remediation using an air sparging (AS) / soil vapor extraction (SVE) system near the northern base boundary – Groundwater remediation using an AS/SVE system and residual source-area SVE wells with carbon treatment to remove volatile organic carbons (VOCs) from both recovered groundwater and air carried out within the plume source area	– Prohibition of surface or subsurface activities that may compromise – Prohibition of the extraction and use of onsite groundwater implemented
SWMU 216	No further action required	– Any surface or subsurface intrusive activity on the property is prohibited unless the owner prepares a Work Plan and a Health and Safety Plan. – Plans must be approved by the TCEQ prior to initiating any such activities within the property. – All uses of groundwater are prohibited.

Notes: These restrictions may however have been lifted, or may be lifted in the future, if the contaminant levels no longer present a risk and, therefore, the property no longer requires restriction. No evidence of this or approval from the TCEQ is currently available.

Source: Texas Natural Resource Conservation Commission. 2001. Letter RE: Bergstrom Air Force Base. RNRCC Solid Waste Registration No. 66002. EP ID final No. TX0572124188. Review of Final Amendment–Site Closure Report for SWMU 216. Alleged Solvent Disposal Site. Approval–Risk Reduction Standard No. 3. Laura Stankosky, Senior Project Manager, Base Closure Team to Charles Pringle, AFCEE Team Chief/BEC. July 26, 2001. For Transfer Deed for SWMU 16.

2.11.9.2 Remedial Actions, Land Use Restrictions, and Industrial Controls

Although not required for sites addressed under RCRA authority, 12 of the IRP sites were subjected to a five-year review process consistent with the CERCLA, with reviews having been conducted in 2005 and 2011. Eleven of these sites have been closed as described above, and one remains open with ongoing remedial actions being carried out, SWMU 76, Area 1. Further details on the status of these sites are included in Table 2.11-11. See Exhibit 2.11-8 for the locations of the various IRP review sites described.

All groundwater below the ABIA property has land-use restrictions and must be evaluated prior to removal or if contact is made during construction. These evaluations would be coordinated with the TCEQ.

2.11.9.3 Management of Hazardous Materials Sites with Land Use Restrictions

Exhibit 2.11-8 identifies locations at ABIA that possess hazardous material land-use restrictions that could impact future development in these areas. The remaining hazardous material sites have been closed with restrictions that should not impact future development.

It is important to note that although the long-term land-use restrictions may have implications for ABIA activities and planning, these post-closure requirements are the responsibility of the USAF. Post-closure requirements are therefore carried out by the USAF and the coordination of evaluations and investigations of proposed activities within areas with land-use restrictions must be carried out by the USAF.

2.11.9.4 Current Hazardous Material Sites at ABIA

Multiple bulk fuel and lubricant storage areas within the ABIA boundaries are used for the storage and handling of substantial quantities of hazardous substances. Associated with these are fueling and fuel transfer areas. These fueling and fuel transfer areas generally present a higher risk of hazardous substance emissions and therefore often require additional spill control measures, such as pollution control/holding ponds, and stormwater management measures. Standard applicable engineering controls and the use of best management practices (BMPs) to store and handle fuel and lubricants have been implemented by ABIA.

Hazardous substances such as paints, solvents, pesticides, and cleaning products are used for the ongoing operation and maintenance activities at ABIA. These substances are stored and used at various locations around the ABIA property and are managed in accordance with federal, state, and local regulations. In some areas, specifically near aprons, structural water-quality controls have been constructed. These controls consist of holding ponds designed to capture runoff containing de-icing fluids or hazardous materials, typically fuel spills.

Hazardous material handling is typically restricted to certain areas, such as the ramps or Remain Overnight Parking (RON) areas. Runoff from these areas is routed to the holding ponds. Sedimentation/filtration systems are used for standard treatment for all other runoff events.[78]

2.12 Sustainability Programs and Policies

For many years, the aviation industry as a whole, particularly airports, has seen the benefits of incorporating sustainability programs and policies into everyday operations and maintenance activities, design and construction projects, and airport planning efforts, including airport master plans. As with environmental issues, the FAA encourages identification and consideration of sustainability goals and practices during the ABIA master planning process.[79] These include but are not limited to promotion of City of Austin recycling and waste minimization, use of alternative energy sources, reduction of airport-related emissions, facilitation of community and economic development, and increased community engagement during the planning and development process.

The City of Austin has various goals and metrics by which it measures progress toward a more sustainable future. These include, but are not limited to, the following:

- Solid waste diversion and reduction
- Water conservation
- Stormwater pollution prevention
- Carbon footprint reduction
- Use of renewable energy
- Native landscaping
- LEED compliance

In 2007, Austin City Council passed a resolution that targeted greenhouse gas emissions that calls for all COA facilities, fleets, and operations to be carbon neutral by 2020, as well as for implementation of the most energy efficient building codes in the nation.[80] Additionally, in 2014, Austin City Council approved a resolution establishing the goal of reaching net zero community-wide greenhouse gas emissions by 2050. In the resolution, the council recognized that “reducing community-wide greenhouse gas emissions, especially those from the transportation sector, can have a positive impact on local air quality and result in a healthier community.”[81] The transition to

78 CDM, Axiom Engineers Inc., and Crespo Consulting Services Inc. 2001. Stormwater Drainage Master Plan Update. May 2001.
79 FAA. 2015a. Advisory Circular 150/5070-6B, Change 2. Subject: Change 2 to Airport Master Plans. January 27, 2015.
80 Austin City Council. 2007. Resolution Number 20070215-023.
81 Austin City Council. 2014. Resolution Number 20140410-024.

more sustainable transportation was advanced further in 2017, when a resolution supporting the development of a New Mobility Electric/Autonomous Vehicles and Services Plan was passed.[82]

In support of these and other climate-related goals, the *Austin Community Climate Plan* was developed by the COA Office of Sustainability's Climate Program and approved by Austin City Council in June 2015.[83] The plan identifies actions aimed at moving the entire Austin community toward climate neutrality and sets interim reduction targets for the future. A reporting cycle is proposed in the plan, which includes annual progress-reporting, regular plan-revision cycles, and a community-wide greenhouse gas inventory to be updated every three years. The plan also includes a City of Austin Climate Action Plan, which identifies specific actions that the COA should implement in the short-term future to begin reducing greenhouse gas emissions.

Airports Council International (ACI) – North America codified a sustainability approach known as EONS, containing four major pillars:

- Economic Viability
- Operational Efficiency
- Natural Resource Conservation
- Social Responsibility

The EONS framework adds an airport-oriented focus of operational efficiency to the common "triple bottom line" definition of sustainability, which focuses on economic viability, natural resource conservation, and social responsibility. These themes are visible in the sustainability reports and plans at ABIA, as well as of a number of airports across the industry. In 2012, the ACRP published *Report 80: Guidebook for Incorporating Sustainability into Traditional Airport Projects*, which is intended to "bridge the gap between efficient, real-world applications and the [aviation] industry."[84] ACRP Report 80 featured ABIA as one of its case study airports.

To date, ABIA has implemented a broad range of sustainability programs and policies designed to incorporate sustainability into daily airport operations and practices. As part of the current Master Plan effort, a framework for a future Sustainability Plan for ABIA has been developed in Chapter 7, *Sustainability Initiatives*. The following describes the current set of sustainability programs at ABIA.

82 Austin City Council. 2017. New Mobility Electric/Autonomous/Shared Vehicle Plan, Resolution Number AI-2017-463.

83 COA. 2015. Future Land Use Map Composite. Planning and Development Review Department. April 29, 2015. ftp://ftp.ci.austin.tx.us/GIS-Data/planning/maps/Future%20Land%20Use%20Map%20Composite.pdf. Accessed June 28, 2017

84 Airport Cooperative Research Program (ACRP) Report 80: Guidebook for Incorporating Sustainability into Traditional Airport Projects, 2012.

Currently, ABIA publishes an annual report on airport performance and sustainability that focuses on four key areas considered by ABIA to be the foundation of sustainability:

- Customer and community value
- Operational excellence
- Economic sustainability
- Environmental stewardship

These four core issues are similar to the four themes defined in the EONS approach, and also address the three categories of the triple bottom line.

According to the current Environmental Policy Statement published by ABIA, the COA Aviation Department (which owns and operates the airport) "will incorporate sustainable principles, climate resiliency best practices, and environmental stewardship into all aspects of its culture, planning, development, and operations at ABIA."[85] The COA Aviation Department states in its ABIA Environmental Policy Statement that in order to achieve its sustainability goals, resources will be focused on:

- Reducing resource consumption through innovative design and technology in the planning, development, and construction of airport facilities
- Engaging with tenants, business partners, and stakeholders on projects that promote energy efficiency and resource conservation and facilitate alignment with ABIA's sustainability and climate resiliency goals
- Incorporating sustainable principles into operations and maintenance through training, staff engagement, technology improvements, and management support
- Minimizing airport impacts by reducing energy, transportation fuel, water consumption, and waste, while also enhancing water reuse, recycling, on-site renewable energy, and waste diversion programs
- Continuing to integrate clean vehicles into the ABIA fleet and reducing ozone precursor chemicals and carbon emissions
- Purchasing renewable energy and carbon off-sets for sustainable sources;
- Identifying opportunities to derive business value from improved environmental performance and continual improvement in operations
- Maintaining a systematic program approach to support continued compliance with all applicable environmental regulations

[85] COA Aviation Department 2017. ABIA Environmental Policy Statement. https://www.austintexas.gov/sites/default/files/images/Airport/Environmental/ABIA_Sustainability_Policy.pdf. Accessed August 10, 2017.

Table 2.12-1 provides a brief overview of the current sustainability programs, policies, and initiatives in place at ABIA to support the City of Austin and FAA sustainability goals discussed above. These efforts serve as a baseline for developing various initiatives to be considered throughout the master planning process that would further serve to promote sustainability at ABIA.

Table 2.12-1: Current Sustainability Programs, Policies, and Initiatives

CATEGORY	PROGRAM, POLICY, OR INITIATIVE	DESCRIPTION
Air quality/emissions	ACI Airport Carbon Accreditation (ACA) Program	ABIA participates in an active carbon management program with reduction targets aimed at operational activities that contribute to most carbon emissions. ABIA is incorporating Levels 1 and 2 of the program into their daily activities and long-term strategy to reduce the airport's carbon footprint.[86]
	Global Reporting Initiative (GRI) Standards	ABIA used GRI Standards in the 2015, 2016, and 2017 Sustainability Reports. GRI Standards are a widely used method for evaluating critical impacts on the environment, society, and economy with the intent to embed sustainability into decision-making.[87]
	Electric Vehicle Charging Program	ABIA provides electric vehicle charging stations throughout the airport property.
	NextGen Airspace Modernization	NextGen improvements aimed at increasing efficiency, enhancing safety, reducing delays, and ultimately reducing aircraft exhaust emissions are currently being incorporated at ABIA.[88] Efforts include adjustments to existing satellite-based routes as part of Performance Based Navigation (PBN), which were put into place in 2015 and evaluated by the FAA for safety. Revisions to overlaying existing flight paths are expected to be put into place in 2017 and will increase safety, improve efficiency, reduce emissions, minimize delays, and reduce noise.[88]

86 ACI Airport Carbon Accreditation Program, 2017.
87 Global Reporting Initiative Standards, 2017.
88 FAA, 2017. What is NextGen? https://www.faa.gov/nextgen/what_is_nextgen/. Accessed August 10, 2017.

Table 2.12-1: Current Sustainability Programs, Policies, and Initiatives (continued 2 of 3)

CATEGORY	PROGRAM, POLICY, OR INITIATIVE	DESCRIPTION
Conservation/renewable resources	Reliance on wind power	Since 2011, the Barbara Jordan Terminal and other facilities have been powered by GreenChoice electricity, which is generated by wind power. Wind power is also used for aircraft A/C systems and electric support vehicles at the gate, making these operations carbon neutral.[89]
	Alternative-fuel vehicle program	ABIA uses alternative fuels (propane and compressed natural gas (CNG)) for its fleet of lawn mowers and forklifts. All private ground transportation providers are required to use alternative fuels.[89]
	Supplementing with solar power	Solar panels on ABIA property produce 192,500 kilowatt-hours per year.
Energy conservation	Energy efficiencies	Upgraded lighting fixtures reduce energy consumption, and large windows in the terminal buildings provide natural lighting.[85] Chilled water is stored during off-peak hours, which reduces peak demand power requirements for the community and energy provider.[85]
Water conservation	Native landscaping	ABIA is home to the largest native plant project in Austin. Native plants are more drought tolerant than conventional lawns and have fewer irrigation needs, reducing water use.
Sustainable Design	Leadership in Energy and Environmental Design (LEED) Certifications	LEED-certified buildings are recognized as resource efficient by the U.S. Green Building Council (USGBC).[90] ABIA policies incorporate LEED existing-building standards to existing facilities to the fullest extent possible. The taxi staging area and driver facility has been recognized as LEED Gold, while the East Infill and Rental Car Facility are both LEED Silver.
	Energy Star-Eligible facilities	Four buildings at ABIA meet the eligibility criteria for the EPA Energy Star label, which recognizes accomplishments in energy and water conservation and recognizes facilities that perform within the top 25% of their industry nationwide. Energy Star facilities at ABIA include the ARFF, the maintenance complex, the motor pool, and the planning and engineering building.[91]

89 COA Aviation Department, 2017. 2017 Aviation Sustainability Report. https://issuu.com/austin-bergstrom-international/docs/abia-sust-rpt-2017_nospread_final. Accessed August 10, 2017.

90 U.S. Green Building Council, 2017. LEED Certification. https://www.usgbc.org/help/what-leed. Accessed August 10, 2017.

91 COA Aviation Department, 2017. 2017 Aviation Sustainability Report. https://issuu.com/austin-bergstrom-international/docs/abia-sust-rpt-2017_nospread_final. Accessed August 10, 2017.

Table 2.12-1: Current Sustainability Programs, Policies, and Initiatives (continued 3 of 3)

CATEGORY	PROGRAM, POLICY, OR INITIATIVE	DESCRIPTION
	Hilton Austin Airport Hotel Green Seal	The Hilton Austin Airport Hotel is one of five Green Seal-certified hotels in the state and was awarded the Silver Level Achievement for Environmental Operational Commitment.[85] The hotel implements recycling and composting programs and uses non-toxic and biodegradable housekeeping products, among other sustainable practices.[92]
	EONS approach	ABIA implements the EONS approach (economic vitality, operational efficiency, natural resources, and social responsibility) for new facility development. Recent application of the EONS approach includes the CONRAC facility, where the flexibility of the infrastructure design will allow for transition to use as a parking facility in the future.
Waste reduction	Recycling and composting programs	The current terminal diversion rate is 50%, in part due to recycling programs, a newly implemented composting program, and a food donation program. Airport brush is composted and transferred to the local Dillo Dirt compost-processing facility.
Waste reduction/community outreach	Food-waste reduction	As of 2017, ABIA collects unsold food products from concessions and donates them to Keep Austin Fed, a local nonprofit. The program helps support local organizations and communities and prevents food waste from going into area landfills.[93]
Water conservation	Reclaimed-water system	ABIA uses graywater for terminal landside irrigation areas.
	Native landscaping	ABIA has the largest native plant project in Austin. Native plants used throughout ABIA grounds are better able to withstand drought and flood and require less water.[93]
Water quality	Stormwater pollution prevention best management practices and on-site water treatment	Stormwater management systems and controls for landside and airside include graded surfaces, pavements, collection and conveyance structures, water quality pond treatment systems, rain gardens, vegetation filters, detention basins, and discharge structures.[94]

92 Hilton 2017. Hilton Austin Airport Awarded National Green Seal, Silver Level Achievement for Environmental Operational Commitment. http://news.hilton.com/index.cfm/news/hilton-austin-airport-awarded-national-green-seal-silver-level-achievement-for-environmental-operational-commitment?tl=es. Accessed August 10, 2017.

93 COA Aviation Department, 2017. 2017 Aviation Sustainability Report. https://issuu.com/austin-bergstrom-international/docs/abia-sust-rpt-2017_nospread_final. Accessed August 10, 2017.

94 COA and Geomatrix Consultants, Inc. 2013. ABIA Strom Water Pollution Prevention Plan.

In addition to the initiatives outlined above, ABIA and its sustainability staff work closely with the COA to ensure that efforts at the airport align with and support the sustainability policies and initiatives in place at the City level. The COA monitors day-to-day municipal operations, including those at ABIA, and evaluates the sustainability performance of operations using a set of key performance indicators to determine whether targets set for specific issues (carbon emissions, green building, energy, zero waste, etc.) are being met. Currently, sustainability performance is measured and reported bi-annually. ABIA is responsible for meeting all COA-mandated requirements. The framework for a future Sustainability Plan at ABIA is included in Chapter 7, *Sustainability Initiatives,* and considers the importance of ABIA's role in meeting the COA's future sustainability targets.