TALLAHASSEE
INTERNATIONAL AIRPORT

Master Plan Update

FINAL REPORT

Michael Baker
INTERNATIONAL

Table of Contents

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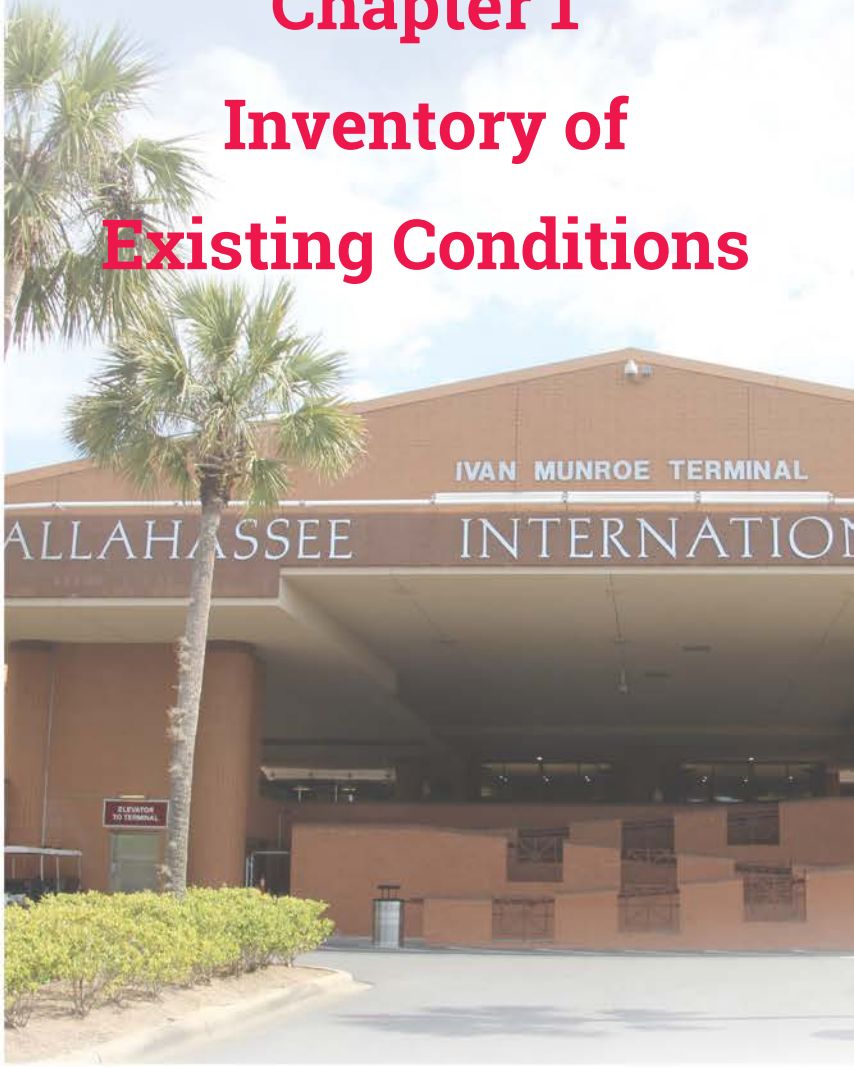
INTERNATIONAL AIRPORT

Table of Contents

List of Tables

List of Figures

Chapter 1
Inventory of Existing Conditions



Master Plan Update

TALLAHASSEE
INTERNATIONAL AIRPORT

1.0 Inventory of Existing Conditions

1.1 Master Plan Overview

The City of Tallahassee contracted with Michael Baker International in 2015 to develop a Master Plan Update for the Tallahassee International Airport (TLH). Since the previous Master Plan Update was completed 2006, several changes in Federal Aviation Administration (FAA) design standards and policies occurred and it was necessary to reassess the airport's immediate and long-term compliance, maintenance, and development needs. The FAA periodically requires airports to conduct updated planning efforts and to maintain an updated Airport Layout Plan (ALP) Drawing Set that depicts the airport's proposed development program and boundaries. The FAA requires airport sponsors to agree to assurances or obligations to be eligible to receive federal grants from the Airport Improvement Program (AIP), one of which is to keep an up to date ALP Drawing Set at all times. The intent of this Master Plan Update is to provide the detailed justifications, methodologies, and reasoning for the proposed developments shown within the ALP Drawing Set. The airport was recently renamed as an 'international facility' to highlight its far reaching impacts that extend outside of the Tallahassee area. At the beginning of 2016, the City was actively pursuing making the airport property into a Foreign Trade Zone (FTZ) to provide a site where new facilities, jobs, and businesses could be fostered without being subject to high import/export fees. Those actions highlight the path moving forward for the airport and this Master Plan Update—to be able to capitalize on opportunities that will make TLH into a broader facility for air travel, business development, and trade. This Master Plan Update also emphasizes the need for sustainable developments that are in-line with Tallahassee's sustainability plan (GreenPrint) and environmentally- and financially-conscious strategies from the FAA and Florida Department of Transportation (FDOT) Aviation and Spaceports Office. As part of the City's commitment to sustainability and customer service, three Tesla charging stations were recently installed at TLH to improve technology and enhance amenities at the airport,

As stressed throughout this Master Plan Update, TLH has a lot of potential for continued growth. It is located in the Capital City of Florida that is home to large institutions like Florida State University (FSU) and a thriving technology sector. The airport is owned and managed by the City of Tallahassee and the airport operating budget (the Aviation Fund) is fully-covered by fees charged to users of TLH. The Aviation Fund does not require contributions from the City's General Fund and excess revenues are used to fund capital improvements and to offer incentives to airlines.

The primary objective of this Master Plan Update was to produce a 20-year development program that would maintain a safe, efficient, economical, and environmentally-acceptable aviation facility while also identifying recommendations for improving customer service and technology. The key elements of the planning process are shown in **Figure 1-1**. It is important to point out that a

Technical Advisory Committee (TAC) was formed to provide input throughout the planning process and public participation was also encouraged. The TAC served an integral role in the planning effort and consisted of representatives from government agencies, airport users, airport businesses, and the public. Several meetings were held throughout the study to present information to the TAC, and was furthermore presented and discussed in an open forum at community workshop/public meetings, Airport Advisory Committee meetings, and Tallahassee Commission Meetings. The goal was to keep all stakeholders informed about all study issues and recommendations.

1.2 Key Issues

Specific issues that were evaluated as part of the planning process are delineated below, and specific tasks were incorporated into the study in an effort to address these considerations. This is not intended to be an exhaustive listing of items that require consideration within this Master Plan Update, but identifies major concerns or issues that should be addressed in support of the City of Tallahassee's long-term goals for TLH. Some specific goals and objectives to be considered include:

- Assess the operational efficiency, effectiveness, and safety of the airport.
- Evaluate the airport facility layout for conformance with FAA guidance and regulations.
- Evaluate and incorporate the aviation needs of the both the community and users.
- Assess the needs of current tenants and requirements necessary to attract new tenants and/or to expand their facilities.
- Assist the airport in supporting aviation demand within the region.
- Identify existing and alternative funding sources for airport development.
- Identify areas of environmental concern and provide mitigation options for future development.
- Evaluate long-term development options for commercial passenger, cargo, general aviation and airport support facilities.
- Identify vertical obstructions and investigate the associated impacts and/or mitigation options.
- Collect additional survey data as necessary to meet FAA AC 150/5300-18B for Airport Layout Plans.

The airport master plan also provides sustainable guidance for future airport development that will satisfy aviation demand in a cost-effective, feasible manner while addressing aviation, environmental, and socioeconomic issues of the community. In support of this goal, the planning team conducted assessments of air quality, greenhouse gas emissions, natural resource consumption, and energy usage so that sustainability goals, initiatives, and improvements could be identified for daily activities and infrastructure improvement projects that occur throughout the 20-year planning period.

Another key expectation of the master plan was to interface with and consider the recommendations of several important and separate initiatives that were conducted

simultaneously during the study. Each initiative referenced below had an impact on future facility needs and were carefully considered as future development alternatives were formulated.

- Air Service Development Campaign
- Establishment of a Foreign Trade Zone
- Establishment of Solar Farm Facilities
- Establishment of a Federal Inspection Services Facility
- Passenger Terminal Modernization Program
- Capital Circle Improvements

1.3 Inventory Background

The initial step in the planning process requires producing an inventory of existing conditions for the airport. This is necessary for understanding the framework for how the airport functions and to provide a foundation for evaluating the airport's existing and future facility requirements and development recommendations. The information collected as part of the inventory effort included the following:

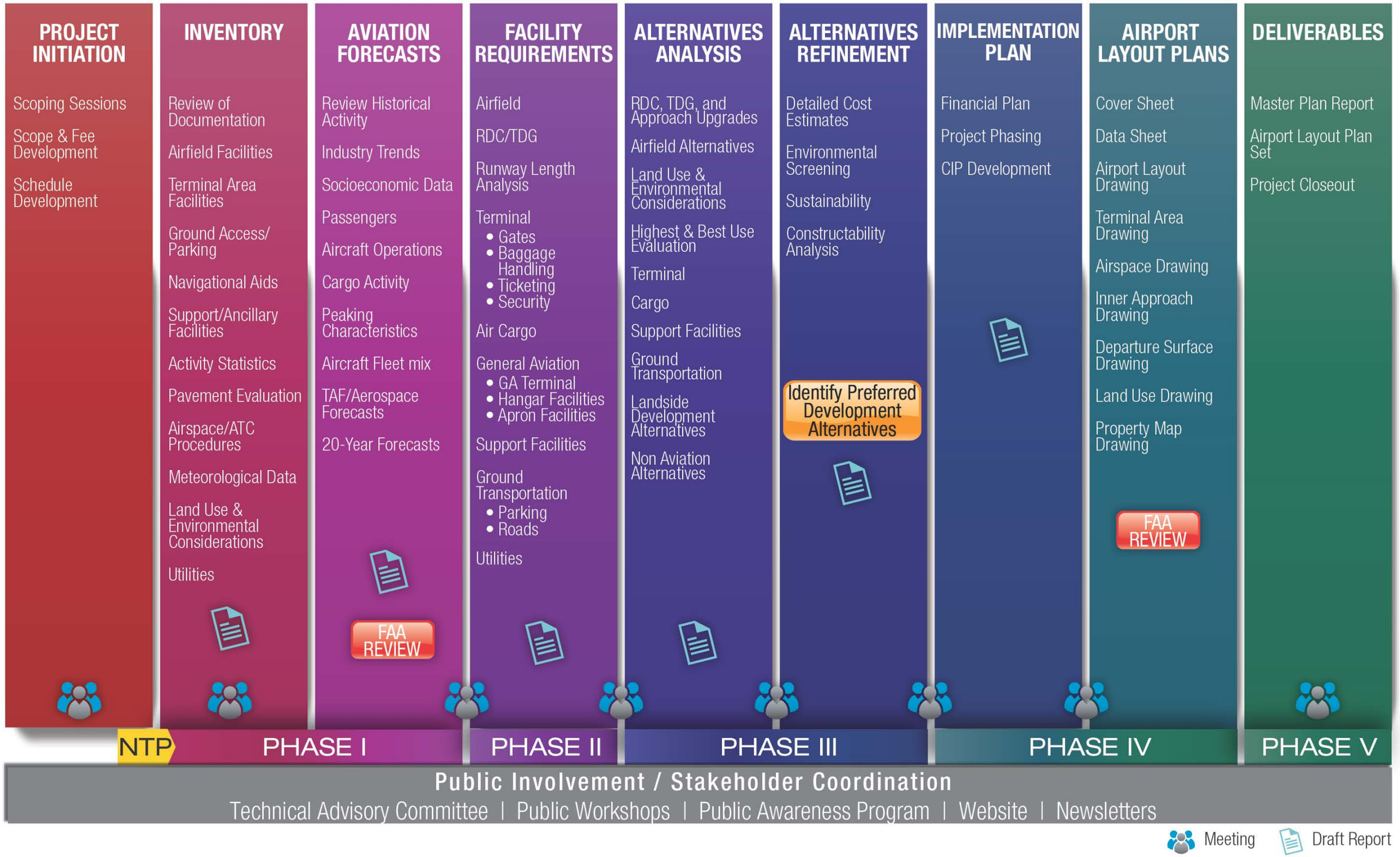
- Existing physical facilities such as runway, taxiways, aircraft parking aprons, navigational aids, the passenger terminal area, and information about other areas for general aviation, corporate, and aviation support activities.
- The airport's overall role in Northwest Florida including development history, location, and access relationship to other transportation modes.
- Previous studies that contain information related to the development and eventual implementation of projects at TLH.

In order to obtain an accurate depiction of the existing conditions of TLH and its surrounding community, it was necessary to obtain information from sources such as:

- Interviews with airport personnel
- Interviews with TLH users and tenants
- Correspondence with local, state, and federal agencies
- Updated aerial photography and mapping for the airport
- Available sources of updated facility information for the airfield, approaches, and activity
- Reference materials such as FAA publications, activity databases, and planning guidelines
- Review of airport and FAA statistical reports

The remaining sections of this chapter document the inventory of existing conditions for TLH.

Figure 1-1
Master Planning Process



1.4 Airport History

The airport was initially developed in 1928 as the first municipal airport in the City of Tallahassee and was located approximately where the James Messer Sports Complex is located today. It originally had a single turf runway and was named Dale Mabry Field after a famous World War I aviator and Florida native. In 1938, at the emergence of World War II, the United States Army established a fighter pilot training school on site, constructing three runways and significantly expanding the facility. In 1961, Dale Mabry Field was abandoned and Tallahassee Municipal Airport was established in its current location. Recently, Tallahassee Regional Airport was renamed Tallahassee International Airport to emphasize its far reaching contributions.

As shown in the picture on the right from 1983 (courtesy of the Tallahassee-Leon County Geographic Information Systems Department), the passenger terminal building used to be located on the North Apron. TLH has undergone several major airfield improvements including the construction of Runway 9-27 in the early 1980s, which now handles most of the commercial activity. Runway 9-27 was recently reconstructed to address design standard deficiencies for line-of-sight issues. This was due to a hump in the middle of the runway preventing line-of-sight for aircraft from one end of the runway to the other. Reconstruction of the runway to rehabilitate the pavement and remove the hump was completed in 2015, which mitigated the safety risks, reduced delays for aircraft, and brought the runway to full compliance with FAA design standards. To increase the flexibility of the airfield, Runway 18-36 was recently extended from 6,076 feet to 7,000 feet. Several improvements have also been conducted for cargo and general aviation facilities as well. It is worth noting that many of the recommendations from the previous Master Plan Update have been implemented at TLH, which is another factor that prompted this new planning effort.

In addition to the airfield improvements, several landside improvements have been implemented at TLH. These improvements include a Terminal Modernization Project. This project includes multiple improvements to short- and long-term passenger demands and also to meet modern spacing requirements. The Terminal Modernization Project will enhance the customer experience for travelers by providing convenience and efficiency. The project will include reconfiguring TLH's lobby up to the Transportation Safety Administration (TSA) checkpoint, a new baggage claim system, ticket counters for airlines and rental car agencies, safety screening machines, a new TSA screening room, and other aesthetic upgrades.

1.5 Airport Location and Ground Access

Tallahassee International Airport is located in Florida's Panhandle and is approximately a six mile drive from Downtown Tallahassee and Interstate 10 (I-10), which runs between Santa Monica, California and Jacksonville, Florida. Capital Circle SW is the airport's northern border and is the road where all landside facilities are located along. It is currently a two-lane rural road, but FDOT is in the process of expanding the road into a six-lane urban roadway with bike lanes and sidewalks to provide improved access to and from TLH in accordance with Blueprint 2020. Springhill Road is the primary travel route between TLH and Downtown Tallahassee. It is a two-lane road near the airport until it intersects with West Orange Avenue and then it becomes a four-lane road everywhere north into the Downtown area. **Figure 1-2** illustrates the general location and vicinity of TLH in relation to the State of Florida. The airport property encompasses approximately 2,485 acres of property and is located in Leon County.

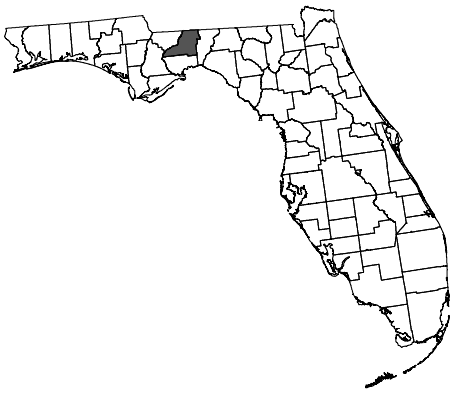
The City of Tallahassee is the largest city in Northwest Florida. The City is home to most state agency headquarters and employees as well as public facilities such as hospitals, FSU, Florida A&M University, and Tallahassee Community College (TCC).

1.6 Airport Management Structure

As the airport owner/sponsor, it is the City of Tallahassee's responsibility to determine the ultimate recommendations and long-term development objectives for TLH. Therefore, the City Commission has the ultimate approval authority for the airport. The airport is run by the Director of Aviation who serves at the pleasure of the City Manager. There are six divisions within the Aviation Department and approximately 50 employees. The following divisions fall under the Aviation Department:

- Executive Division
- Commercial Development Division
- Finance and Administration Division
- Facilities and Maintenance Division
- Operations, Security, and Information Technology Division
- Planning, Development, and Environmental/Technical Services Division

Each division plays an integral role at TLH and helps the Aviation Department support their five strategic cornerstones of "building a high performance organization, expanding for the future, preserving the airport's financial health, building stronger relationships in the community, and enhancing and delivering best-in-class customer service". There is also an Airport Advisory Committee consisting of 18 members that serve in an advisory capacity to the City and Aviation Department. The role of the group is to address issues related to TLH and promote economic development opportunities.



N

Not to Scale

Leon County, Florida

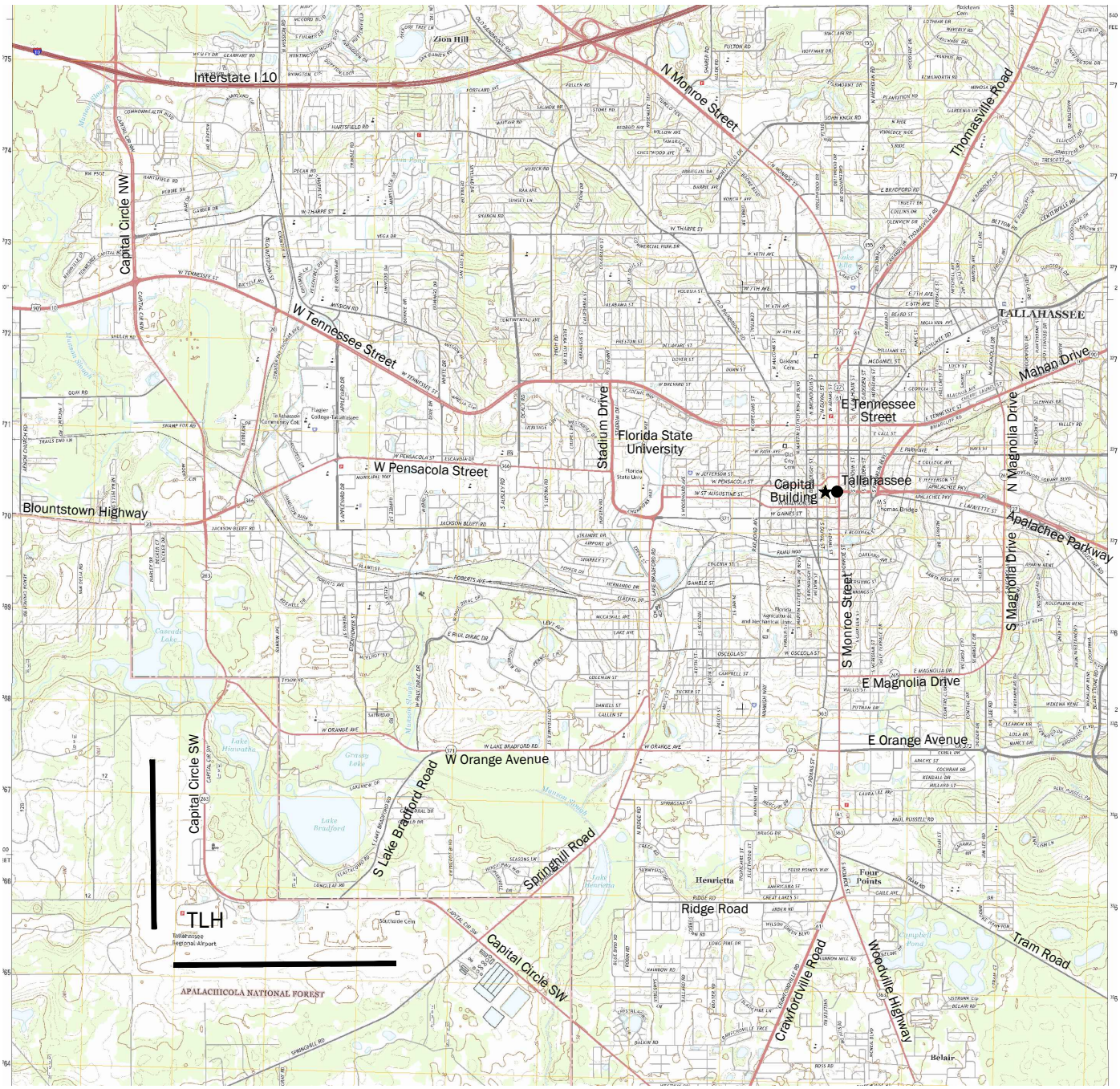


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Figure 1-2 Location / Vicinity Map

1.7 Previous Studies

During the course of this Master Plan Update, existing plans and studies were reviewed and evaluated in order to obtain relevant background information. These included but were not limited to previous planning studies, design drawings, the previous ALP Drawing Set, and relevant FAA and state role assessments. The following section provides an overview of the various studies that were reviewed as part of this effort.

1.7.1 2006 Master Plan Update

Below is a listing of major recommendations from the 2006 Master Plan Update for TLH. The recommendations included a mix of projects such as airfield modifications, terminal building upgrades, apron improvements, additional cargo facilities, and other landside and general aviation projects, many of which have been implemented at TLH. Some of the recommendations are also explored in this Master Plan Update for their continued need today and additional recommendations are identified in later sections of this study.

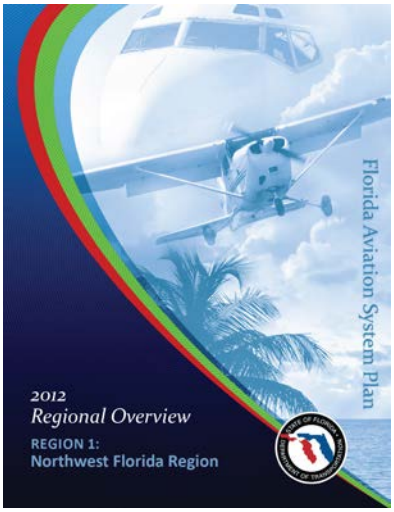
- Reconstruct Runway 9-27 to meet line-of-sight requirements ***(completed)***
- Extend Runway 18-36 to 7,000 feet ***(completed)***
- High speed exit taxiways along Runway 9-27 ***(unlikely to pursue moving forward due to changes in FAA criteria)***
- Taxiway configuration and sizing deficiencies ***(to be analyzed further)***
- Development of the general aviation aprons ***(ongoing)***
- Precision approaches to the Runways 9 and 18 ***(may reserve for the potential at TLH)***
- Installation of Local Area Augmentation System (LAAS) approaches ***(to be analyzed further)***
- Ten new helipads and a helicopter facility ***(to be analyzed further)***
- Relocation of the FedEx facility to the area east of the passenger terminal building ***(completed)***
- Extending the ticket lobby, baggage claim lobby, and the concourse layout ***(ongoing)***
- Terminal apron expansion ***(to be analyzed further)***
- Widening of Capital Circle SW ***(ongoing)***
- Developing a multimodal transportation center ***(to be analyzed further)***
- Developing a hotel on airport property ***(to be analyzed further)***

Other recently-completed projects not mentioned above include aesthetic, security, and concessions improvements within the passenger terminal building, apron rehabilitation, the preparation of various studies (terminal enhancement, safety management system, pavement management system, marketing and promotional study, FTZ Feasibility Study, etc.), and this Master Plan Update. Through 2021, there are plans to conduct a variety of additional improvements at TLH including further passenger terminal projects, reconstruction of the South Apron, airfield maintenance projects, implementation of the FTZ, Terminal Apron improvements, airfield lighting and signage improvements, security fence and gate rehabilitations, the construction of a consolidated rental car facility, further upgrades to the Airport Traffic Control

Tower (ATCT), new hangar development, utility upgrades, rehabilitation of the ARFF station, parking improvements, overlay of Runway 18-36, rehabilitation of the perimeter roads, modernization of computer systems, and study updates. This aggressive development plan over the next several years will require funds from the FAA, FDOT, the City's Aviation Fund, and other private sources, but will not require the use of local taxpayer dollars to pay for the aviation-related projects.

1.7.2 Continuing Florida Aviation System Planning Process (CFASPP)

The Continuing Florida Aviation System Planning Process (CFASPP) is FDOT's strategic plan for developing the state's 129 public-use airports. The CFASPP provides documentation of airports and related facilities needed to meet current and projected statewide aviation demands. The CFASPP is used to continually monitor Florida's aviation environment and determine the development requirements to best meet projected aviation demands. The CFASPP classifies the public-use airports in the state as follows:



- Commercial Service
- General Aviation Reliever
- General Aviation
- Heliport
- Seaplane Base

According to the CFASPP role classifications, TLH is a Commercial Service Airport that provides an existing and future role for tourism, business development, air cargo, and all facets of general aviation. The only role the CFASPP does not identify for TLH is for current and future international air service opportunities, which occur at larger airports in Florida like Miami International Airport (MIA), Orlando International Airport (MCO), and Tampa International Airport (TPA). A large amount of the passenger traffic at TLH is generated by state employee travel, student travel from the local universities, and athlete transport between FSU and competing athletic teams.

1.7.3 Federal Aviation Regulations (FAR) Part 139 Certification

The FAA provides certification of airports for commercial operations under Federal Aviation Regulations (FAR) Part 139, Certification of Airports. Airports with scheduled and unscheduled air carrier services with at least 30 seats and scheduled air carrier service with 10 to 30 seats must hold a FAR Part 139 Airport Operating Certificate (AOC) and comply with FAR Part 139 safety, facility, security, and recordkeeping requirements for the respective class. The FAR Part 139 certification categorizes airports into four classes, based on the type of air carrier operations at the facility. **Table 1-1** describes the FAR Part 139 categories based on the type of air carrier operations served. TLH obtained its FAR Part 139 Certification in May 1973 and undergoes an annual inspection by the FAA to keep the certification current. The airport currently has as a Class I AOC and is open to all sizes of air carrier operations (both scheduled and unscheduled).

Table 1-1 FAR Part 139 Categories	
Class	**Description**
Class I	Airports serving all types of scheduled operations of air carrier aircraft designed for at least 31 passenger needs.
Class II	Airports that serve scheduled operations of small air carrier aircraft and unscheduled operations of large air carrier aircraft.
Class III	Airports that serve only scheduled operations of small air carrier aircraft.
Class IV	Airports are those airports that serve only unscheduled operations of large air carrier aircraft.
Source: FAR Part 139, Certification of Airports.	

1.7.4 FAA National Plan of Integrated Airport Systems (NPIAS)

The FAA's National Plan of Integrated Airport Systems (NPIAS) is a five-year planning report submitted every two years to Congress which identifies development needs for certain airports throughout the country. The NPIAS identifies nearly 3,400 existing and proposed airports that are significant to national air transportation and establishes priority grouping for funding initiatives for those airports included in the system. The airport service level illustrates the type of public-use the airport provides to the community. In addition, the service level reflects the funding categories established by Congress to assist in airport development. **Table 1-2** presents the NPIAS categories and descriptions.

The 2015-2019 NPIAS report includes 100 airports in the State of Florida. The report classifies TLH as Non-hub Primary Commercial Service Airport, which is defined as a "commercial service airport that enplanes less than 0.05% of all commercial passenger enplanements but has more than 10,000 annual enplanements." There are 19 commercial service airports in Florida including four large hubs, three medium hubs, seven small hubs, and five non-hubs. The four other non-hub airports include Daytona Beach International Airport (DAB), Gainesville Regional Airport (GNV), Melbourne International Airport (MLB), and Punta Gorda Airport (PGD). The determination of the hub size is based on passenger enplanement activity as a certain percentage of nationwide enplanement activity. There are 29 large hubs in the country and they account for one percent or more of nationwide enplanements. Small hubs are those airports that enplane 0.05% to 0.25% of nationwide enplanements while medium hubs are in the 0.25% to 1% range. The potential for TLH to change from a non-hub to a small hub is explored later in this Master Plan Update, particularly considering that enplanement levels at TLH are near the levels of some small hub airports in Florida. **Figure 1-3** illustrates the NPIAS airports that are located in Northern Florida.

Table 1-2 FAA NPIAS Service Level	
Category	**Criteria**
Commercial Service – Primary	Public use commercial airports enplaning more than 10,000 passengers annually.
Commercial Service – Non-primary	Public use commercial airports enplaning between 2,500 and 10,000 passengers annually.
General Aviation – Reliever	General aviation airport having the function of relieving congestion at a commercial service airport and providing general aviation access to its community. Must have at least 100 based aircraft or 25,000 annual itinerant operations.
General Aviation	All other NPIAS airports.
Source: FAA Order 5090.3C, Field Formulation of the National Plan of Integrated Airport Systems.	

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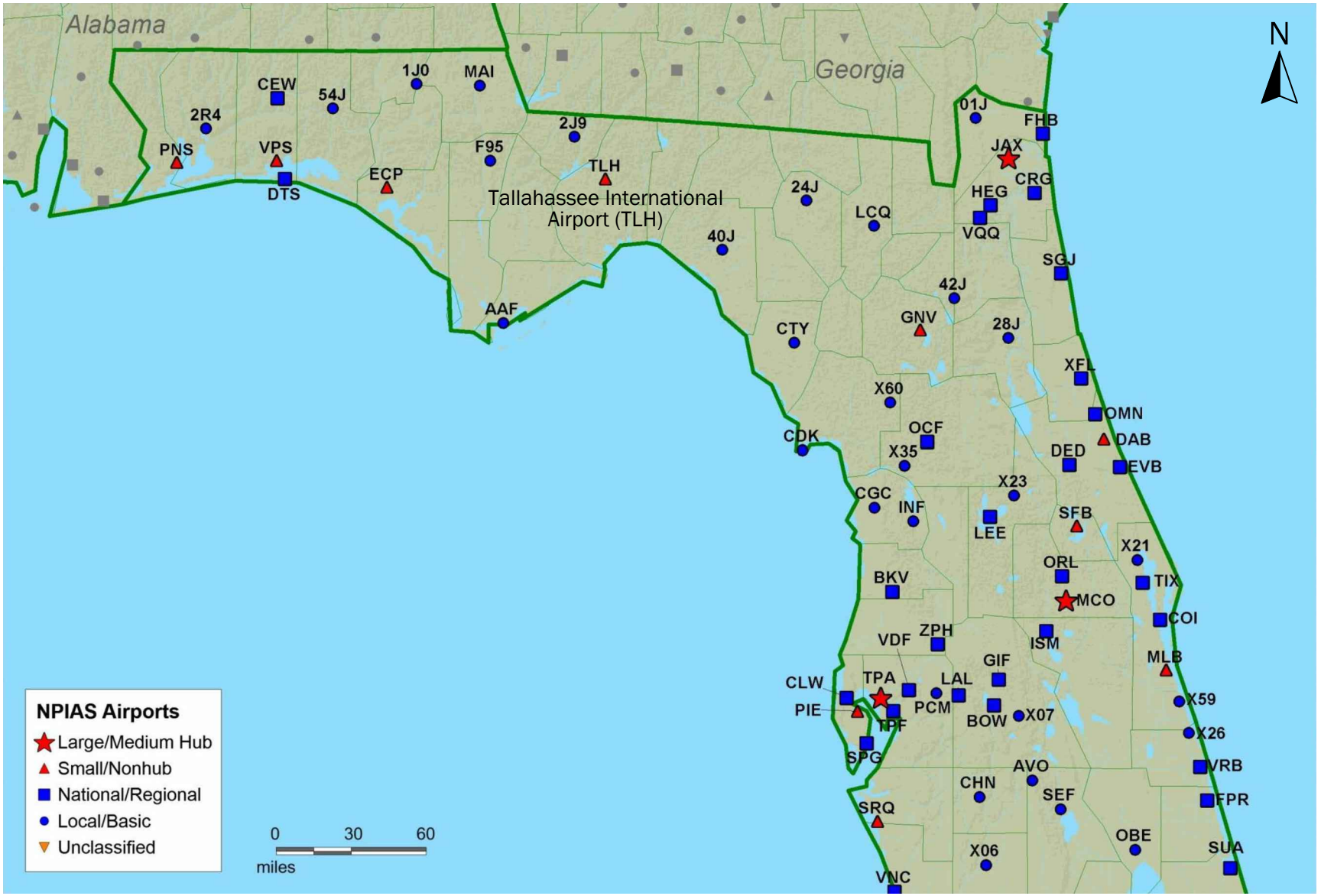
Alabama
Georgia
N
Tallahassee International Airport (TLH)
CEW
54J
1J0
MAI
2R4
PNS
VPS
DTS
ECP
F95
2J9
TLH
24J
LCQ
40J
AAF
CTY
GNV
01J
FHB
JAX
CRG
HEG
VQQ
SGJ
42J
28J
XFL
X60
OMN
DAB
OCF
CDK
X35
DED
EVB
X23
CGC
INF
LEE
SFB
X21
ORL
BKV
TIX
MCO
COI
VDF
ZPH
ISM
GIF
MLB
CLW
TPA
LAL
PIE
PCM
BOW
X07
X59
TPF
X26
SPG
AVO
VRB
CHN
SEF
FPR
SRQ
OBE
X06
SUA
VNC
NPIAS Airports
Large/Medium Hub
Small/Nonhub
National/Regional
Local/Basic
Unclassified
0
30
60
miles

1.8 Climate

Weather conditions are important to the planning and development of an airport. Temperature is a critical factor in determining runway length requirements, while wind direction and speed are used to determine adequate runway orientation. Also, navigational aid and lighting needs are determined by the percentage of time that visibility is impaired due to cloud coverage or other conditions.

1.8.1 Temperature Data

Tallahassee experiences a subtropical summer similar to the rest of Florida and has the mild moist climate characteristics of the Gulf States. TLH lies within the central portion of the Florida Panhandle at an elevation of approximately 83 feet Above Mean Sea Level (AMSL). The proximity to the Gulf of Mexico makes for a humid subtropical climate. The area experiences long summers, short mild winters, and drier springs and autumns. During the summer months, the average daily high temperature is above 90 degrees Fahrenheit while the average daily high temperature during the winter months is greater than 60 degrees Fahrenheit. **Table 1-3** lists historical climate data for Tallahassee that were obtained from the climate normals data that was evaluated over the period from 1981 to 2010 by the National Climatic Data Center (NCDC). The high month for precipitation tends to be in June with an average of 7.73 inches and the low month is April with 3.06 inches.

Table 1-3
Historical Climate Normals (1981-2010)

Month	Average Precipitation (Inches)	Average Daily High Temp (°F)	Average Daily Low Temp (°F)
January	4.34 In	63.5°	39.0°
February	4.85 In	67.5°	41.9°
March	5.94 In	73.8°	47.1°
April	3.06 In	79.9°	52.3°
May	3.47 In	87.0°	61.6°
June	7.73 In	91.0°	69.5°
July	7.17 In	92.1°	72.0°
August	7.35 In	91.5°	72.1°
September	4.69 In	88.4°	68.1°
October	3.23 In	81.4°	57.3°
November	3.50 In	73.0°	47.5°
December	3.90 In	65.3°	41.1°

Source: NOAA climate normals generated from the average of TLH ASOS records from 1981 to 2010.

1.8.2 Wind Data

Historical wind conditions were evaluated to determine the percentage of time that the runways at TLH provide sufficient crosswind coverage. The FAA recommends that runways achieve 95% crosswind coverage for the types of aircraft that regularly operate on them. If 95% crosswind coverage cannot be obtained by the runway configuration, additional runways may be needed. As shown in **Table 1-4**, both runways individually and together provide sufficient wind coverage at TLH. The historical wind observations were obtained from the Automated Surface Observing System (ASOS) at TLH for the period from 2005 through 2015. The ASOS is located in-between connector Taxiways B7 and B8.

Table 1-4
Historical Wind Coverage Analysis (2005-2015)

Runway	All Weather Coverage % (Knots)				Visual Flight Rule (VFR) Coverage % (Knots)				Instrument Flight Rule (IFR) Coverage % (Knots)			
	10.5	13	16	20	10.5	13	16	20	10.5	13	16	20
9-27	98.94	97.90	99.63	99.95	95.67	97.47	99.24	99.85	95.98	97.98	99.70	99.97
18-36	96.09	97.88	99.48	99.88	96.11	97.63	98.99	99.64	96.05	97.91	99.56	99.92
Combined	99.60	99.92	99.99	100	99.32	99.80	99.97	100	99.65	99.95	100	100
	Ceiling = All Visibility = All 121,273 Observations				Ceiling ≥ 1,000' Visibility ≥ 3 Miles 97,300 Observations				Ceiling < 1,000' and ≥ 200' Visibility < 3 Miles and ≥ ½-Mile 18,278 Observations			
Source: Station 722140 at Tallahassee International Airport, FL (2005-2015).												

In addition to the ASOS facility providing weather data, TLH is also equipped with lighted wind cones near Runways 9, 18, 27, and 36, all of which provide visual representation of the direction and intensity of the wind for pilots. The facility east of Runway 18 is also located within a segmented circle. TLH is also served by a Low Level Wind Shear Alert System (LLWAS). The system monitors wind speed and direction, generating warnings when wind shear or microburst conditions are detected. Current wind speed, direction data, and warnings are provided to controllers in the Terminal Radar Approach Control (TRACON) that provide approach and departure clearances and controllers in the ATCT that provide ground clearances at TLH.

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1.9 Socioeconomic Data

In addition to understanding the existing physical conditions of the airport environment, a variety of socioeconomic data was collected to understand the dynamics of growth within the geographic area served by the airport. This information provides essential background information in determining aviation service level requirements and plays an important role in aviation forecasting efforts. Tallahassee's Metropolitan Statistical Area (MSA) includes four counties; Gadsden, Jefferson, Leon, and Wakulla. Leon County is home to the Capital City and consists of approximately 449,278 acres of land.

The following sections discuss historical and forecast socioeconomic trends for the City of Tallahassee, Leon County, the State of Florida, and the country. It is intended to provide an understanding of how the local area measures up against the state and country and to determine what types of aviation facilities and services should the local population be able to afford. The City of Tallahassee is not like many parts of Florida that are major tourist destinations, but it does have factors like the strong state employee workforce and large universities that tend to drive much of the activity at TLH. However, because much of the population is composed of non-permanent students and politicians, there is a desire to improve air service to provide better connectivity to multiple markets, which would also be desirable for the year-round citizens. Enhanced connectivity between TLH and desired markets is recommended because that is key for the airport to provide enhanced customer service appeal for the local population and visitors.

1.9.1 Population

This section summarizes the historical and forecast population as shown in **Table 1-5**. In 2015, the population of Leon County was estimated at 288,619 and the City's population was estimated at 189,003. Therefore, the local area supports approximately 1.46% of Florida's total population. Much of the local population growth may be attributed to the growth that is occurring at FSU and new businesses that have relocated to the area. Between 2015 and 2020, it is projected that the population of Tallahassee will grow by more than 10,000 individuals which is just more than a growth rate of one percent per year. While slower than the anticipated growth rate for the state, the population of Tallahassee is projected to grow at a faster rate than the nation, which is illustrative of the potential need to provide added air service opportunities at TLH. **Table 1-6** illustrates the enrollment statistics for FSU for the past five years and the over 41,000 students that attend the university on an annual basis (mostly at the main campus in Tallahassee). As FSU continues to grow, such as with the $100 million donation to create the Jim Moran School of Entrepreneurship, so too should the population of the City.

Table 1-5
Socioeconomic Comparison (Local, State, & National)

Variable	Tallahassee	Leon County	Florida	US
Population				
2000	157,348	239,450	15,982,389	281,422, 025
2010	181,253	275,487	18,801,310	308,745,538
2015	189,003	288,619	19,830,700	319,507,044
2020	199,287	304,418	21,166,004	332,559,851
AAGR 2000-2010	1.42%	1.41%	1.64%	0.93%
AAGR 2010-2015	0.84%	0.94%	1.07%	0.69%
AAGR 2015-2020	1.07%	1.07%	1.31%	0.80%
Median Age				
2000	26.6	29.6	38.7	35.5
2010	26.2	29.6	40.7	37.1
2015	26.1	29.9	41.4	37.5
2020	27.4	31.0	42.2	38.1
AAGR 2000-2010	-0.15%	0.00%	0.51%	0.44%
AAGR 2010-2015	-0.08%	0.20%	0.34%	0.21%
AAGR 2015-2020	0.98%	0.73%	0.38%	0.32%
Average Household Income				
2000	$45,204	$51,087	$53,531	$56,675
2010	$54,996	$62,754	$67,707	$73,387
2015	$59,402	$67,679	$68,349	$76,502
2020	$68,205	$77,010	$78,438	$87,705
AAGR 2000-2010	1.98%	2.08%	2.38%	2.62%
AAGR 2010-2015	1.55%	1.52%	0.19%	0.83%
AAGR 2015-2020	2.80%	2.62%	2.79%	2.77%
Median Household Income				
2000	$31,512	$37,728	$38,924	$42,257
2010	$34,645	$41,331	$46,143	$51,362
2015	$39,056	$47,789	$46,872	$53,423
2020	$45,669	$55,917	$54,995	$62,096
AAGR 2000-2010	0.95%	0.92%	1.72%	1.97%
AAGR 2010-2015	2.43%	2.95%	0.31%	0.79%
AAGR 2015-2020	3.18%	3.19%	3.25%	3.05%
Per Capita Income				
2000	$18,903	$20,593	$21,228	$21,242
2010	$23,800	$26,044	$27,039	$28,088
2015	$25,668	$28,071	$27,264	$29,272
2020	$29,462	$32,016	$31,361	$33,657
AAGR 2000-2010	2.33%	2.38%	2.45%	2.83%
AAGR 2010-2015	1.52%	1.51%	0.17%	0.83%
AAGR 2015-2020	2.80%	2.66%	2.84%	2.83%

Source: Alteryx, Inc.
AAGR – Average Annual Growth Rate

Table 1-6 FSU Student Enrollment (2011-2015)					
Level	**Fall 2011**	**Fall 2012**	**Fall 2013**	**Fall 2014**	**Fall 2015**
Undergraduate Enrollment					
Freshmen	5,634	5,242	5,817	5,470	5,594
Sophomore	6,532	6,427	6,520	6,713	6,907
Junior	8,944	9,096	8,897	8,984	8,796
Senior	10,741	11,178	11,042	11,454	11,162
Subtotal	**31,851**	**31,943**	**32,276**	**32,621**	**32,459**
Graduate Enrollment					
Masters	4,431	4,237	4.045	4,020	3,892
Specialists	131	102	114	99	123
Juris Doctorate	725	693	707	645	596
Doctorate	2,723	2,647	2,688	2,726	2,725
Medical	476	476	481	482	483
Subtotal	**8,486**	**8,155**	**8,015**	**7,972**	**7,819**
Unclassified					
Unclassified	1,373	1,203	1,166	1,180	1,195
Subtotal	**1,373**	**1,203**	**1,166**	**1,180**	**1,195**
Total					
Total	**41,710**	**41,301**	**41,457**	**41,773**	**41,473**
Source: Florida State University Student Enrollment Data.					

1.9.2 Economics

For reference purposes, **Table 1-5** also presents statistics for median age, average household income, median household income, and per capita income. It is interesting to note that the median age is much lower in Tallahassee than the other geographies, which is indicative of the large student population and also helps to explain some of the lower income factors for the area. However, the stability of the local workforce associated with the universities and the state government help to maintain and grow the local economy.

Unlike most regions in Florida that benefit from tourism, the Tallahassee MSA is primarily recognized for its contributions to the technology sector, public service and education, construction and professional organizations, and business services. Although the central focus of Tallahassee's economy is the public service industry, a variety of other industries influence the local economy. These include education, printing and publishing, food processing, and the lumber industry. Tallahassee is also regarded as a high technology center, with institutions such as Innovation Park and Smart Park that position Tallahassee on the cutting edge of technology.

According to the Economic Development Council of Tallahassee, Leon County's two top employers in 2015 were the State of Florida (22,612) and Florida State University (12,512). Other top employers in the area include Leon County Public Schools (4,550), Publix Super Markets (3,439), Tallahassee Memorial HealthCare (3,190), City of Tallahassee (2,736), Walmart Stores (2,117), Leon County (1,919), Florida A&M University (1,759), Tallahassee Community College (1,631), and Capital Regional Medical Center (1,151).

1.10 Airline Passenger Activity

Airline service at TLH is currently provided by American Airlines, Delta Air Lines, and Sliver Airways. American provides daily service between TLH and Charlotte/Douglas International Airport (CLT), Dallas/Fort Worth International Airport (DFW), and Miami International Airport (MIA). Delta provides daily service between TLH and Hartsfield-Jackson Atlanta International Airport (ATL) and Silver Airways flies to Tampa International Airport (TPA), Orlando International Airport (MCO), and Fort Lauderdale International Airport (FLL). All flights by Silver Airways are conducted using 34-passenger Saab 340 turboprops. The other routes are all flown using regional jets, with the exception of flights operated by Delta Air Lines (and not under a codeshare agreement with a regional carrier) to/from ATL. Delta uses various narrow-body jets on those flights including Boeing 717s and 737s and McDonnell Douglas MD-88s.

1.11 Airspace

The National Airspace System (NAS) is an integrated collection of controls, procedures, and policies put in place and regulated by the FAA to ensure safe and efficient air operations. The NAS is divided into airspace classes using aeronautical charts to designate the level of service and operating rules for a given area. Airspace within the United States is generally classified as either 'controlled' or 'uncontrolled.' As shown in **Figure 1-4**, TLH is surrounded by controlled Class C airspace. The controlled airspace extends from the surface to 4,100 feet AMSL within five nautical miles around the airport and from 1.400 feet AMSL to 4,100 feet in the five to ten nautical mile range around TLH. To fly within the controlled Class C airspace, pilots must receive clearance from Tallahassee Approach/Departure Control (when available) or the Jacksonville Air Route Traffic Control Center (ARTCC). There is some Special Use Airspace (SUA) associated with a St. Mark's National Wildlife Refuge where pilots need to be cognizant of the endangered whooping crane population and several Military Operations Areas (MOAs) where there are airspace restrictions associated with Tyndall Air Force Base. The primary aircraft operating within the MOAs is the F-15 Eagle air-to-air fighter jet. In addition to the MOAs, there is also an established Instrument Flight Rules (IFR) Military Training Route (MTR). MTRs are designated airspace that has been generally established for use by high performance military aircraft to train below 10,000 feet AMSL. There are VR (visual) and IR (instrument) designated MTRs. IR15 begins at Apalachee Bay directly south of the airport and continues on a northwesterly direction passing to the southwest of TLH. Aircraft operating in that area need to be aware of the established military routes.

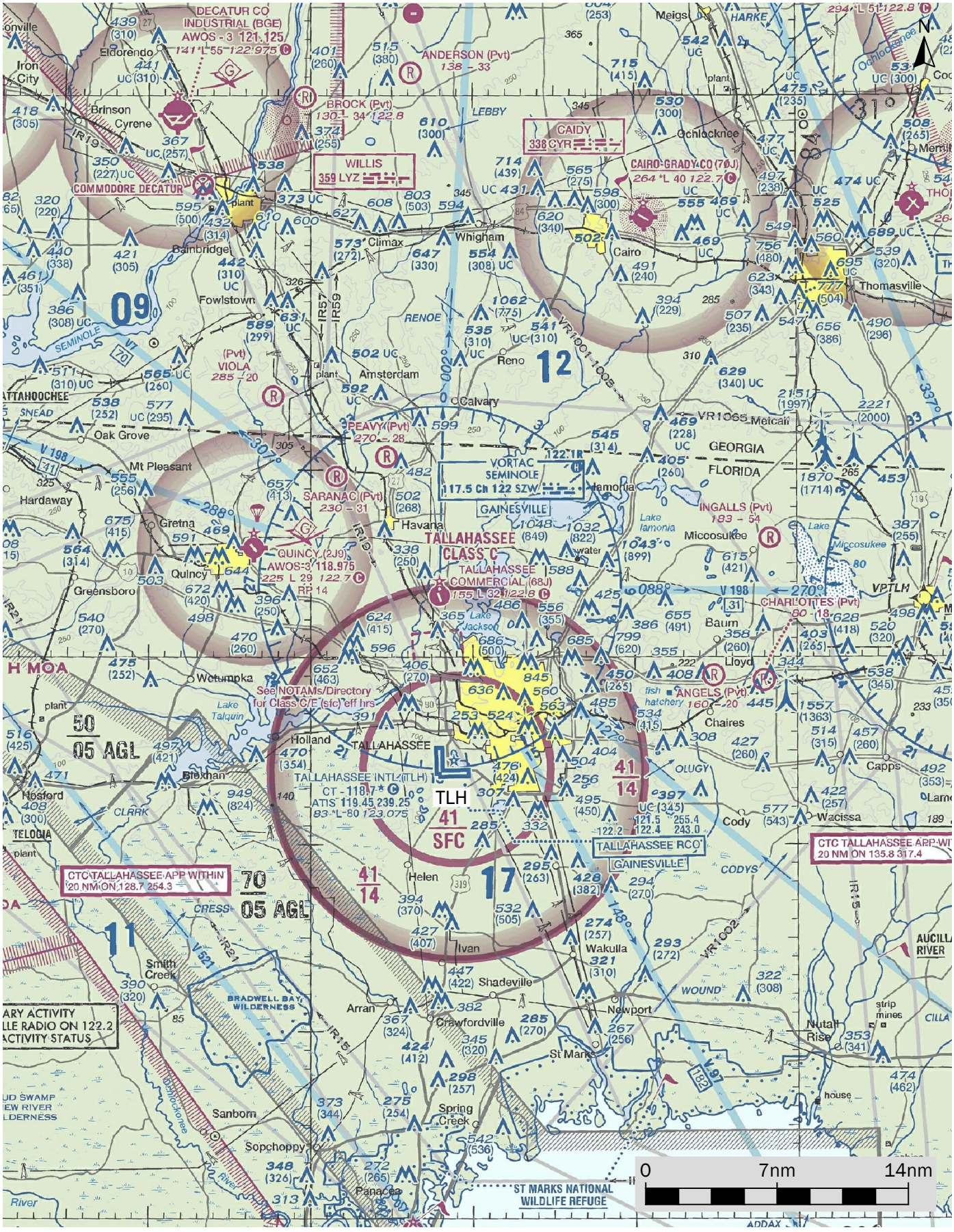
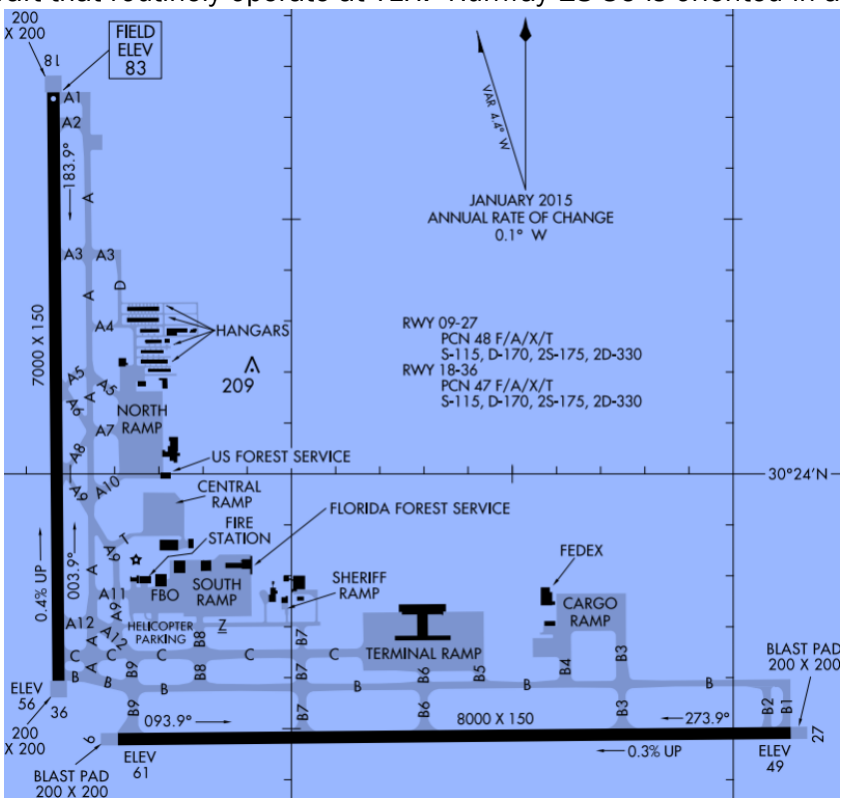


Figure 1-4 Sectional Aeronautical Chart

1.12 Airfield Overview

At TLH, the airfield consists of the two runways, taxiways, and their associated markings and lighting features. As illustrated in **Figure 1-5** and summarized in **Table 1-7**, Runway 9-27 is the primary runway at TLH and is oriented in an east-west configuration. The runway is 8,000 feet long, 150 feet wide, and has a grooved asphalt surface that is in good condition because its reconstruction was completed in 2015 to correct a line-of-sight issue associated with a hump that prevented pilots from being able to see aircraft at either runway end. The pavement strength of Runway 9-27 is rated at 115,000 pounds for aircraft with a single-wheel gear configuration, 170,000 pounds for aircraft with a dual-wheel gear configuration, and 330,000 pounds for aircraft with a double tandem wheel configuration. Therefore, Runway 9-27 is capable of supporting the commercial aircraft that routinely operate at TLH. Runway 18-36 is oriented in a north-south configuration, is 7,000 feet long and 150 feet wide, and has the same pavement strength ratings as Runway 9-27. Runway 18-36 is classified as the crosswind runway at TLH and is often used for general aviation operations; however, the runway was recently extended from 6,076 feet to its current length of 7,000 feet to better accommodate the crosswind demands of all airport users.



Taxiways provide a network for aircraft to maneuver safely and efficiently around the airfield. Both runways are supported by a taxiway system consisting of full-length parallel taxiways and connector taxiways. Taxiway B is the full-length parallel taxiway for Runway 9-27 and is the primary taxiway serving the passenger Terminal Apron and the Cargo Apron. The connector taxiways associated with Taxiway B are identified as B1 through B9 and provide access from the runway and to/from the various facilities to the north of Runway 9-27. Taxiway A is the full-length parallel taxiway for Runway 18-36 and connectors A1 through A12 provide access to the facilities to the east of the runway. Taxiway C is a parallel taxiway to Taxiway B and runs from the Terminal Apron west to the Runway 36 end. There are other taxiways that provide access around the various general aviation facilities at TLH. The conditions of all airfield pavements is shown in **Figure 1-6**, which illustrates that most pavements are in fair to good condition, with the exception of most of Runway 18-36 and some of the pavement on the South Apron.

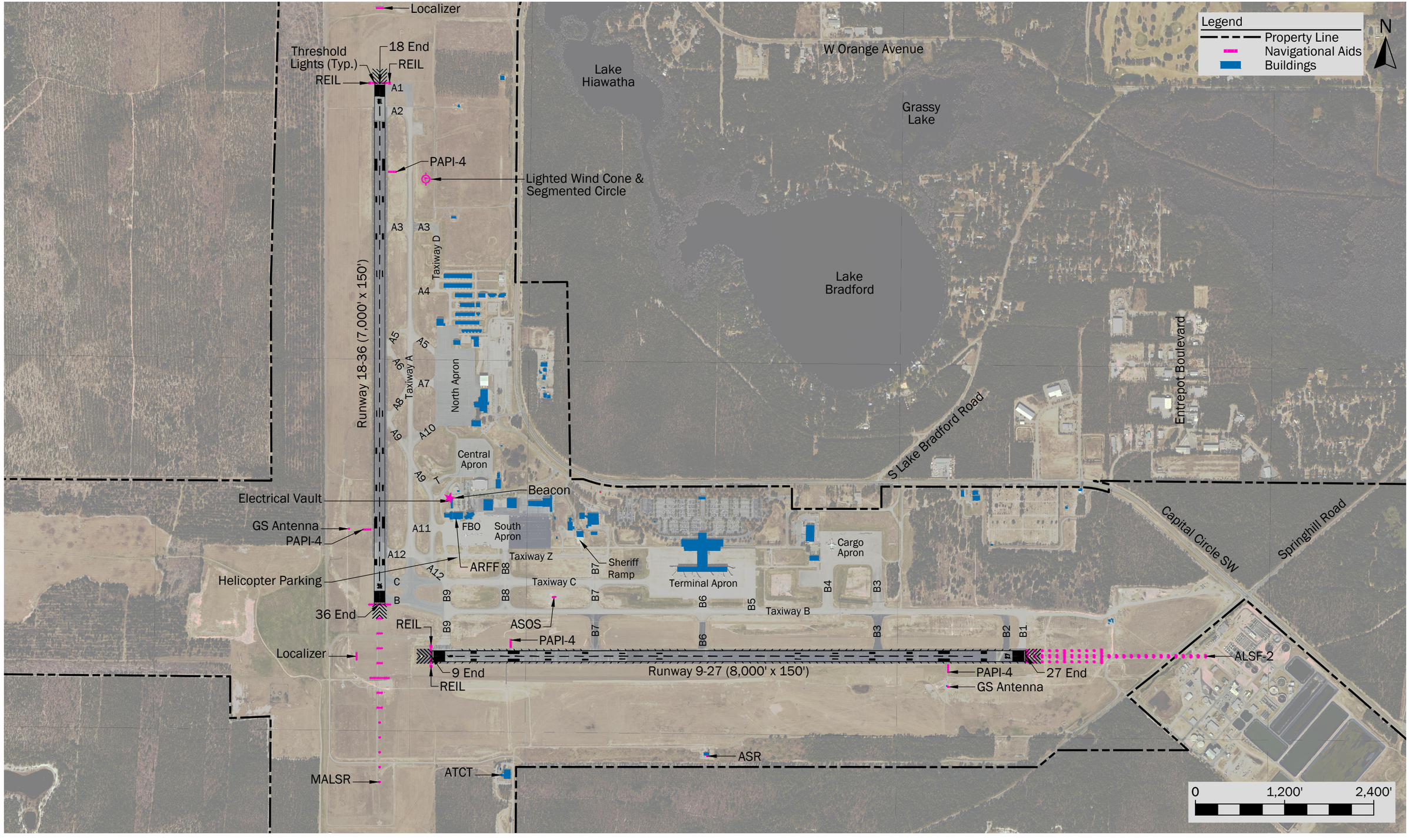


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Figure 1-5 Existing Airfield Facilities

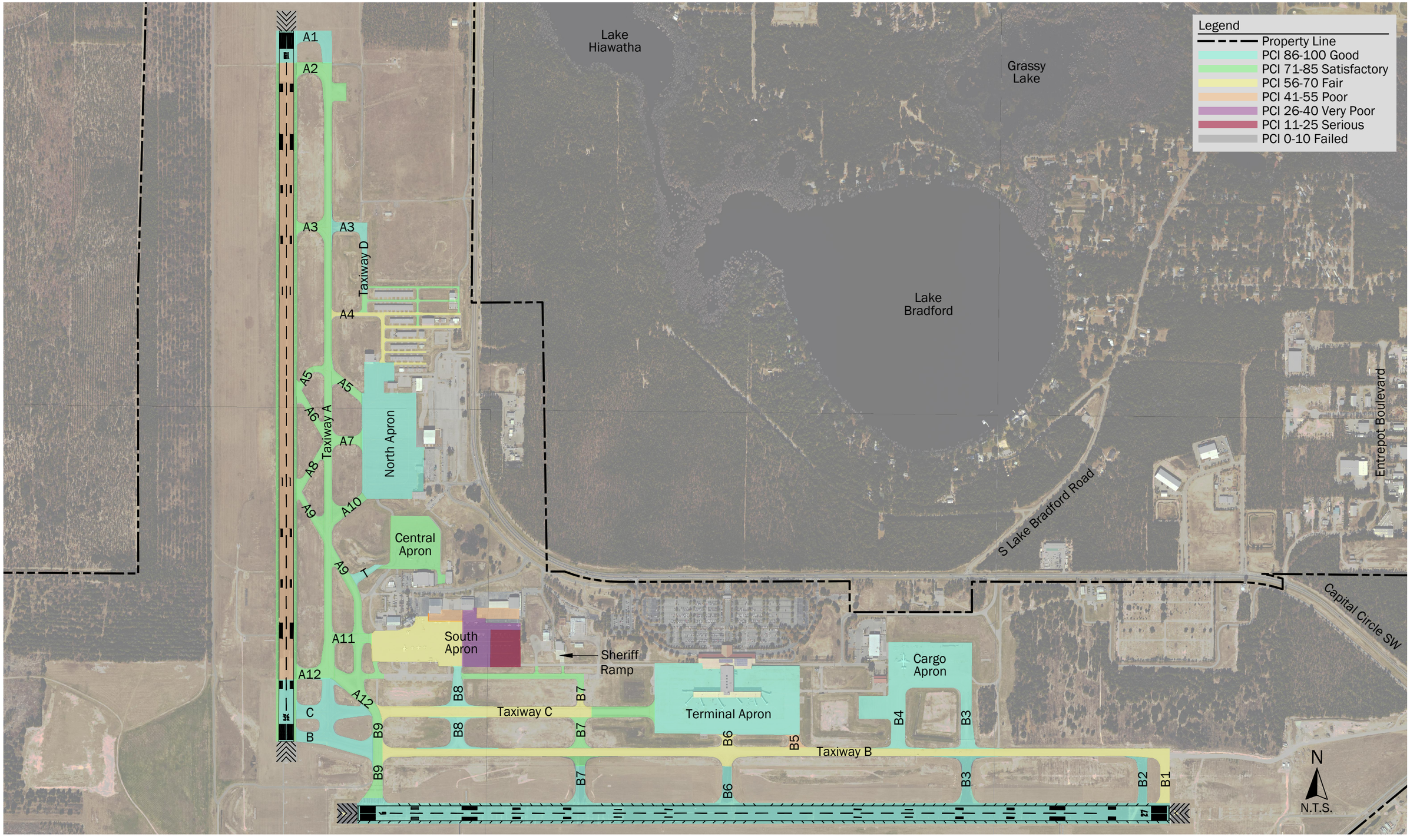

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Figure 1-6 Airfield Pavement Condition Index

Table 1-7 Airfield Overview		
Runway Characteristics	**09-27**	**18-36**
True Bearing	89.46 / 269.47	179.48 / 359.48
Runway Length	8,000 Feet	7,000 Feet
Runway Width	150 Feet	150 Feet
Runway Surface	Grooved Asphalt	Grooved Asphalt
Runway Load Bearing Strength (Pounds)		
Single Wheel	115,000	115,000
Dual Wheel	170,000	170,000
Dual Tandem Wheel	330,000	330,000
Runway Lighting	High Intensity (HIRL)	High Intensity (HIRL)
Runway Markings	Precision	Precision
Taxiway Lighting	Medium Intensity (MITL)	Medium Intensity (MITL)
Apron Lighting	Yes (Pole Mounted)	
Approach Aids		
Visual Glide Slope Indicators (VGSI)	PAPI-4	PAPI-4
Runway End Identifier Lights (REIL)	Yes (9 End)	Yes (18 End)
Approach Lighting	ALSF-2 (27 End)	MALSR (36 End)
Weather Reporting	ASOS	
Lighted Wind Cones and Segmented Circle	Yes	
Control Tower	Yes	

Source: 2016 FAA Digital Airport/Facility Directory.
HIRL – High Intensity Runway Lights MITL – Medium Intensity Taxiway Lights
PAPI-4 – 4-Light Precision Approach Path Indicator ALSF-2 – Approach Lighting System with Sequence Flashing Lights
MALSR – Medium Intensity Approach Lighting System ASOS – Automated Surface Observing System

1.13 Instrument Approaches and Navigational Aids

There are several instrument approaches available to the runway ends at TLH that range from precision Instrument Landing System (ILS) approaches that utilize ground-based equipment to provide horizontal and vertical course guidance to aircraft to other Global Positioning System (GPS) approaches that utilize satellite navigation. The most precise approaches at TLH are published for Runway 27 including a Category II (CAT II) ILS that can be flown by special aircrews when horizontal visibility minimums are as low as a Runway Visual Range (RVR) of 1,200 feet. Other approaches to Runway 27 include a CAT I ILS that is supported by a glide slope, localizer, and an Approach Lighting System with Sequence Flashing Lights (ALSF-2) that extends 2,400 feet beyond the runway end, as well as localizer-based and satellite-based procedures. The approaches to Runway 27 and the three other runway ends are supported by four-light Precision Approach Path Indicators (PAPI-4) that provides visual course guidance to pilots in the air to help them clear obstacles by staying on the appropriate approach path.

Runway 9 is supported by several GPS-based procedures including a Localizer Performance with Vertical Guidance (LPV) approach that provides satellite-based horizontal and vertical guidance to aircraft. The Runway 9 end has Runway End Identifier Lights (REILs) that help pilots navigate to the runway end during nighttime and poor visibility conditions. The horizontal approach visibility minimums for Runway 9 are higher than Runway 27 because the equipment is not as precise, but it is noted that the 2006 Master Plan Update recommended the installation of a CAT I ILS approach for Runway 27 to provide reduced minimums.

The capabilities for Runway 18-36 are similar to Runway 9-27 in that there is one runway end with a CAT I ILS approach (Runway 36 end) and other localizer-based and GPS-based procedures to the runway ends. Runway 36 has a Medium Intensity Approach Lighting System (MALSR) that supplements the ILS approach and extends 1,400 feet beyond the runway end and Runway 18 has REILs. As mentioned for Runway 27, the 2006 Master Plan Update also recommended the installation of a CAT I ILS approach for Runway 18. Both ends of Runway 18-36 have procedures that are based off the Seminole VHF Omni-directional Range (VORTAC) located just north of the Tallahassee Commercial Airport (68J). There are also approach procedures for Runway 18 that are designed for high-performance military aircraft.

Other navigational aids at TLH include the lighted wind cones that are located near Runways 9, 18, 27, and 36, the ASOS, and the rotating beacon that is located near the fuel farm. These features are important for identifying the wind and weather conditions at TLH while in the air and on the ground through visual and electronic means. Furthermore, the rotating beacon helps pilots identify the airport at night. Although there are several other approach and navigational aids at TLH, these are the key ones that require emphasis as part of this planning effort. Additional needs for approaches and navigational aids, such as the potential to provide improved approach capabilities, are discussed as part of the facility requirements analysis.

1.14 Airfield Lighting, Markings, and Signage

Runway lighting is essential for safe operations and for pilots to define the lateral limits of the pavement. Both Runways 9-27 and 18-36 are both equipped with High Intensity Runway Lights (HIRL) along the runway edges and Runway 9-27 also has centerline and touchdown zone lights to supplement the CAT II ILS approach. According to FAA AC 150/5340-30J, Design and Installation Details for Airport Visual Aids, "runway centerline and touchdown zone lighting systems are designed to facilitate landings, rollouts, and takeoffs. The touchdown zone lights are primarily a landing aid while the centerline lights are used for both takeoffs and landings." Those types of features particularly help pilots navigate to the runway while in-flight and on the runway during poor visibility conditions. At TLH, the lighting is consistent with what is required for the types of approaches available to each runway end. The taxiways at TLH are provided with Medium Intensity Taxiway Lights (MITL) along the edges which are the standard taxiway lighting system for airports with lighted runways. Other airfield lighting features include the lighting that is provided at each apron, which mostly include pole-mounted lights at the back side of each apron. On the Terminal Apron, the lights are also pole mounted but are located near each gate position.

The runways at TLH all have precision markings which meet or exceed the marking requirement for the approaches that are available to each runway end. Therefore, no adjustment to the runway markings should be needed except for routine maintenance. The information for airfield markings is documented in FAA AC 150/5340-1M, Standards for Airport Markings. Within that AC, there is a requirement for Part 139 Certificated Airports to have enhanced taxiway centerline markings that "provide supplemental visual cues to alert pilots of an upcoming runway holding position for minimizing the potential for runway incursions." All runway holding positions at TLH are marked with enhanced taxiway centerline markings and therefore comply with FAA requirements.

Additionally, FAA AC 150/5300-13A, Airport Design, recently changed the requirements for taxiway filet or turn geometry, which has the potential to affect some of the existing markings at TLH. Those revised standards are evaluated as part of the facility requirements analysis and with the new mapping that was obtained for this Master Plan Update.

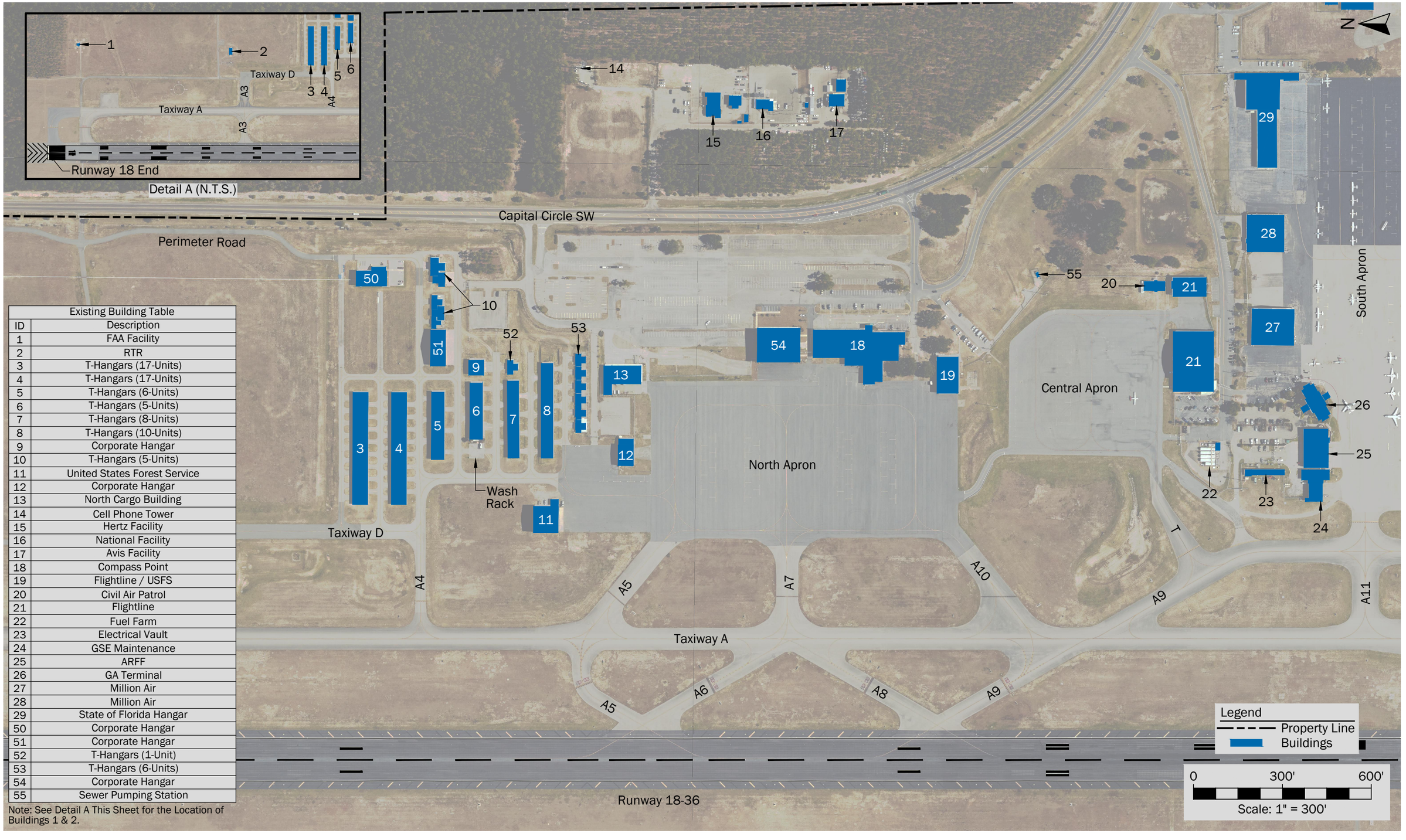
FAA AC 150/5340-18G, Standards for Airport Sign Systems, defines the requirements for airfield signage. The presence of an effective airfield signage system is necessary for the safe and efficient operation of the airport. The airport plans to conduct airfield signage improvements within the next five years. The airfield signage at TLH will be reviewed for its concurrency with FAA standards as part of the facility requirements analysis and recommended improvements will be identified for the electrical systems as well.

1.15 Airport Traffic Control Tower (ATCT)

Tallahassee International Airport is served by an ATCT and TRACON facility that is located south of Runway 9 near Springhill Road and adjacent to the airport service road. The facility is attended daily from 6:00 a.m. until 11:00 p.m., is owned and operated by the FAA, and provides several services including approach and departure clearances, Automated Terminal Information Services (ATIS), and ground control. When the ATCT and TRACON are closed, there is no local ground control provided at TLH, but approach and departure control reverts to the Jacksonville ARTCC. A project was recently conducted to renovate the Heating. Ventilating, and Air Conditioning (HVAC) systems of the ATCT and TRACON facility and further upgrades are planned during the next five years. An Airport Surveillance Radar (ASR) is located near the center and to the south of Runway 9-27 and is used by controllers to view the position of aircraft in the local airspace.

1.16 Landside Overview

The landside facilities for TLH are illustrated in **Figures 1-7** through **1-10**. Four different graphics were developed to clearly identify the distinct landside areas and their associated facilities. **Figure 1-7** illustrates the North General Aviation Apron, **Figure 1-8** illustrates the South General Aviation Apron, **Figure 1-9** illustrates the Terminal Apron, and **Figure 1-10** illustrates the Cargo Apron. The building numbers were obtained from the previous ALP Drawing Set and recently-constructed buildings were assigned new building numbers that were a continuation of that previous effort.



Existing Building Table	
ID	Description
1	FAA Facility
2	RTR
3	T-Hangars (17-Units)
4	T-Hangars (17-Units)
5	T-Hangars (6-Units)
6	T-Hangars (5-Units)
7	T-Hangars (8-Units)
8	T-Hangars (10-Units)
9	Corporate Hangar
10	T-Hangars (5-Units)
11	United States Forest Service
12	Corporate Hangar
13	North Cargo Building
14	Cell Phone Tower
15	Hertz Facility
16	National Facility
17	Avis Facility
18	Compass Point
19	Flightline / USFS
20	Civil Air Patrol
21	Flightline
22	Fuel Farm
23	Electrical Vault
24	GSE Maintenance
25	ARFF
26	GA Terminal
27	Million Air
28	Million Air
29	State of Florida Hangar
50	Corporate Hangar
51	Corporate Hangar
52	T-Hangars (1-Unit)
53	T-Hangars (6-Units)
54	Corporate Hangar
55	Sewer Pumping Station

Note: See Detail A This Sheet for the Location of Buildings 1 & 2.

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Figure 1-7 Existing Landside Facilities (North General Aviation Apron)

Existing Building Table	
ID	Description
20	Civil Air Patrol
21	Flightline
22	Fuel Farm
23	Electrical Vault
24	GSE Maintenance
25	ARFF
26	GA Terminal
27	Million Air
28	Million Air
29	State of Florida Hangar
31	Corporate Hangar
32	Sheriff's Hangar
33	Lively
35	Low Level Windshear Alert System Tower
36	Parking Toll Booth
37	Terminal Building
46	Airport Surveillance Radar
47	FAA ATCT Complex
48	FAA Facility-MALSR Power Control Shack
49	Storage Barn

Note: See Detail A This Sheet for Buildings 46-49.

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Figure 1-8 Existing Landside Facilities (South General Aviation Apron)

Existing Building Table	
ID	Description
29	State of Florida Hangar
30	Temporary Storage Sheds
31	State of Florida Forestry Service
32	Sheriff's Hangar
33	Lively
35	Low Level Windshear Alert System Tower
36	Parking Toll Booth
37	Terminal Building
38	Cooling Towers
39	Air Cargo Facility
34	FedEx

Figure 1-9 Existing Landside Facilities (Terminal Apron)

Existing Building Table	
ID	Description
34	FedEx
38	Cooling Towers
39	Air Cargo Facility
41	Airport Maintenance Complex
42	National Weather Service
43	FAA Facility-ALSF-2 Power Supply

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Figure 1-10 Existing Landside Facilities (Cargo Apron)

1.16.1 North General Aviation Apron

The North General Aviation Apron (North Apron) is located east of Runway 18-36 and consists of a mix of hangars located along the North Apron, the old passenger terminal building ("compass point"), and a small cargo building. On the other side of Capital Circle SW, there are several facilities for rental car storage and service (i.e., ready and return lots). The hangars within the North General Aviation Apron include a mix of T-hangars (75 units), corporate hangars, and larger bulk storage and maintenance hangars. The hangars and facilities on the North Apron are accessible from Taxiway A and the various connectors. In order to improve situational awareness and to remove the potential for runway incursions at TLH, the FAA recommends removing direct connections between runways and aircraft parking aprons, which may need to be addressed on the North Apron.

1.16.2 Central Apron

Flightline Group provides aircraft sales, maintenance, avionics, aircraft storage, and other services and is located on the Central Apron which is between the North Apron and South Apron. The Central Apron is located to the east of Taxiway A and Runway 18-36 and is also home to the Civil Air Patrol facilities.

1.16.3 South General Aviation Apron

The South General Aviation Apron (South Apron) is also located to the east of Runway 18-36. This area includes the Fixed Base Operator (FBO) facilities of Million Air, other airport businesses, the Aircraft Rescue and Fire Fighting (ARFF) facility, the fuel farm, the electrical vault, and the Ground Support Equipment (GSE) maintenance facility. There are also several apron tie-downs and helicopter parking positions on and around the South Apron. Between the South Apron and the Terminal Apron, there are facilities that are occupied by the State of Florida housing the state's aviation fleet, Lively Technical Center, and the Leon County Sheriff's Department hangar. The facilities on the South Apron are accessible by travelling along Taxiways A, B, and C. The South Apron is used by many of the transient general aviation aircraft that are visiting TLH and utilizing the airport's FBO facilities and other maintenance services

1.16.4 Terminal Apron

The Terminal Apron contains the passenger terminal building that consists of 14 gates, eight of which contain Passenger Boarding Bridges (PBBs). A detailed overview of the terminal is presented later in this chapter. The passenger terminal building is accessible by aircraft from Taxiway B and by automobiles from Capital Circle SW. The direct connection from Runway 9-27 to the Terminal Apron is addressed later in this study to improve the situational awareness for pilots and to the help reduce the potential for runway incursions.

1.16.5 Cargo Apron

The Cargo Apron is located to the east of the Terminal Apron and contains the cargo facilities for the Delta, Dade GSE, DHL, FedEx, and USPS. The cargo facilities are accessible from Taxiway B, which also has a direct connection from Runway 9-27 that may need to be addressed as part of

this study. The majority of the cargo activity at TLH is conducted by FedEx on regularly-scheduled flights between TLH and FedEx's hub at Memphis International Airport (MEM) using Boeing 757-200 freighter jets; however, FedEx also conducts feeder routes through airports like MCO, Jacksonville International Airport (JAX), and Mobile Downtown Airport (BFM) using Cessna 208 Caravan turboprops. The Delta cargo activity generally consists of belly cargo on scheduled Delta flights. Additional information pertaining to the cargo operations at TLH is presented as part of the forecasting effort. The airport maintenance facility located to the northeast of the Cargo Apron and adjacent to the Southside Cemetery, which is purposely located in a remote area that would not have a lot of potential to be utilized for future aviation development.

1.17 Terminal Inventory

The terminal area at TLH consists of the facilities essential for commercial air service including the passenger terminal building, the commercial service apron, the public parking lots, employee parking, and the rental car ready/return lot. This section describes each of these areas and identifies constraints and opportunities that will be considered during the alternatives evaluation phase of this study. Other miscellaneous facilities located within or adjacent to the immediate terminal area include Lively Aviation School, the Sheriff's hangar, and air cargo facilities. **Figure 1-11** illustrates the key areas of the Terminal Area facilities.

1.17.1 Hourly Parking

The hourly or short-term parking is located north of terminal building directly across the terminal access road adjacent to the rental car ready/return lot. A short entry road from the access road is located "upstream" from the terminal building in the northwest corner of the lot. Vehicles exit via a drive leading through the center of the daily parking lot to the common toll-plaza. Defined pedestrian pathways by means of striped out spaces and crosswalks lead to the terminal. Currently there are 307 hourly parking spaces, including handicapped spaces.

1.17.2 Daily Parking

The daily or long-term parking lot is located within the terminal access loop road north of the terminal building. Defined pedestrian pathways by means of striped out spaces and cross walks lead to the terminal. The first entrance to this lot is located "upstream" from the terminal building prior to reaching the entrance to the short-term lot, a second entrance is provided "downstream" from the terminal. An exit drive leading to the toll-plaza bisects the daily parking lot. All traffic exiting the hourly and daily parking lots use this toll-plaza. There are three exit lanes at the plaza. The daily lot has a total of 1,330 parking spaces.

1.17.3 Cell Phone Parking

Cell phone parking lots reduce dwell times at the curbfront and provide a passenger convenience for meeter/greeters who do not wish to enter the passenger terminal building. At TLH a cell phone lot has been constructed near the terminal access road intersection with Capital Circle SW. The entry/exit drive to the lot makes it possible to return to the terminal via the terminal loop access road without leaving the airport road system. This lot has a total of 30 parking spaces.

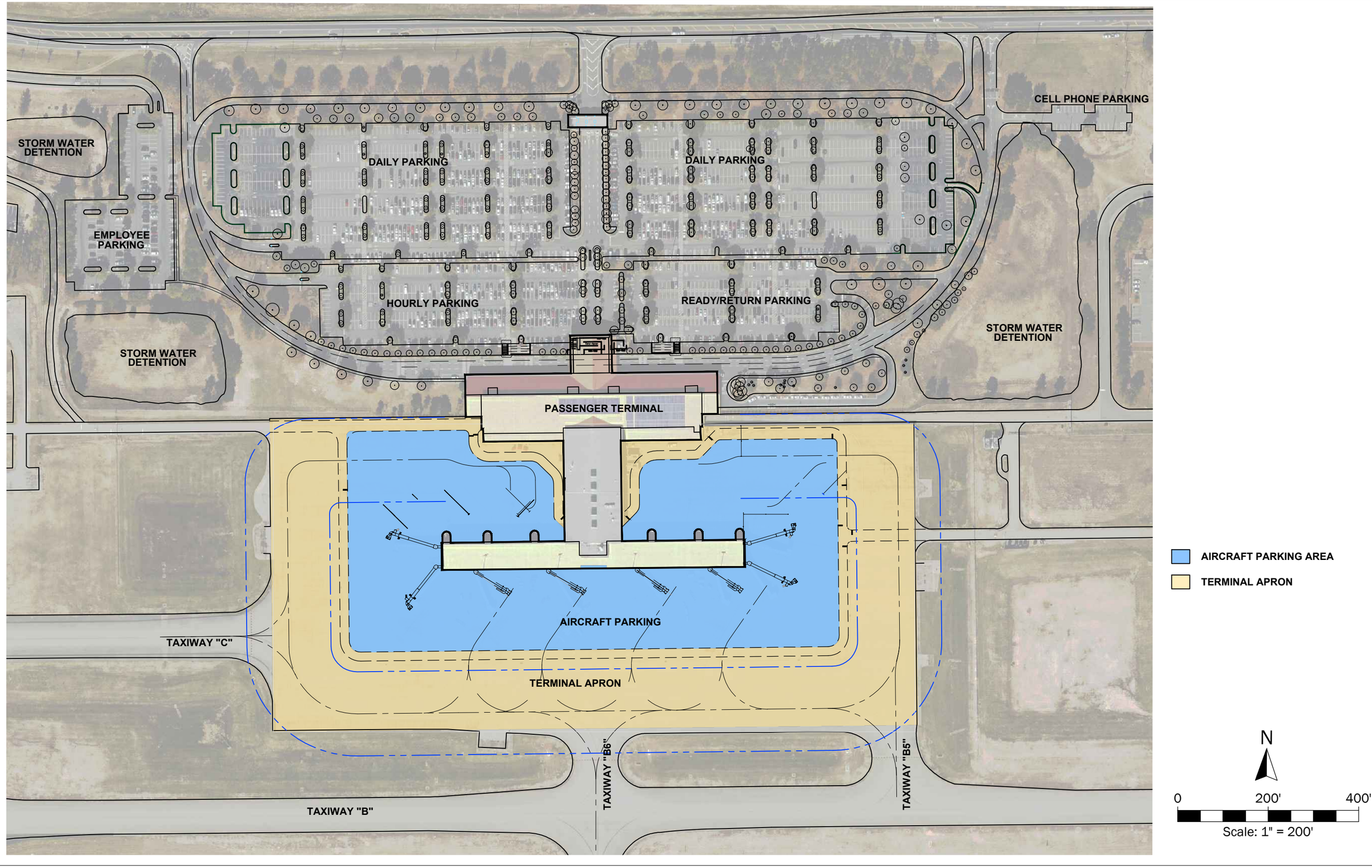


Figure 1-11 Terminal Area Facilities

1.17.4 Rental Car Ready and Return Parking

The rental car ready/return lot is located to the north of the terminal across the terminal area access road adjacent to the hourly and daily parking lots. The entry to the ready/return lot is located "downstream" from the terminal building. Traffic also exits the ready/return lot via a short exit drive, leading to the terminal access road. Defined pedestrian pathways by means of striped out spaces and cross walks lead to the terminal. Currently this lot has 244 ready/return spaces.

1.17.5 Employee Parking

A large surface lot northwest of the terminal building outside of the terminal access loop road provides employee parking. Employees are provided access in and out of this lot via an entrance road off of Capital Circle SW. An emergency/maintenance access direct from the airport access loop road has been constructed. Spaces for handicapped and motorcycle parking are included in the lot. Access to the terminal building is provided via a sidewalk from the southeast corner of the lot along the terminal access road to the ticketing area of the terminal. There are 210 employee parking spaces in this lot.

1.17.6 Existing Parking Lot Totals:

Table 1-8 summarizes the existing Terminal Area parking lot capacities:

Table 1-8
Existing Parking Lot Capacities

Parking Lot	Number of Spaces
Hourly Parking	307
Daily Parking	1,330
Cell Phone Parking	30
Rental Car Ready / Return	244
Employee Parking	210

Source: Michael Baker International, Inc., 2016.

1.17.7 Existing Commercial Service Apron

The commercial service apron at TLH is bordered by the passenger terminal building to the north, Taxiway B4 to the east, and Taxiway B to south. Taxiways B7, B8 and B9 to the west provide access to the FBO and other tenant operations. Taxiways B4 and B5 to the east provide access to air cargo operations. Commercial aircraft traffic flows between the apron and Runway 9-27 via the perpendicular Taxiways B1 through B9. The overall area of the commercial service apron is approximately 97,285 square yards, of which approximately 45,440 square yards is considered the effective aircraft parking area as indicated in **Figure 1-11**.

1.17.8 Terminal Building Layout

The existing passenger terminal facility (The Ivan Monroe Terminal) at TLH was opened in December 1989 to replace the original 1960s terminal structure. The three-story structure is now approximately 214,333 square feet in size including the covered areas under the main floor.

The majority of public activity at TLH occurs on the main level (second floor) of the terminal building (115,296 square feet) while administrative functions are located on the upper (third floor) and support functions on the lower (first floor) apron levels.

Major functions of the terminal, including ticketing, baggage claim, security screening, concessions, and passenger holding are all located on the main level. **Figure 1-12** illustrates the Main Level layout. Passengers enter the building from the curb road and parking lots from one of six vestibules located along the north face of the terminal. Two entry vestibules are located directly north of the ticket counters, two are located in the center of the building, and two are located directly to the north of baggage claim. After entering the building, the ticketing and baggage claim areas are visible. Signage reinforces direction to the major areas of the terminal. Once inside the terminal building, passengers either proceed to ticketing, or directly to the passenger screening area, depending on whether they must check baggage, obtain boarding passes, or coordinate with an airline representative.

The ticketing area is located at the far west end on the north (land) side of the terminal building. It includes the ticket lobby, ticket agent area, and airline ticket offices (ATO). Security regulations developed by the Transportation Security Administration (TSA) require that all checked baggage is screened prior to loading onto a commercial aircraft. Currently, there are three Explosive Detection Systems (EDS) fulfilling the screening requirements of TLH located in ticket lobby. Because they were placed in an already congested area, the baggage screening system at TLH significantly reduces the effective useable area of the ticket lobby. However as described in the Existing Terminal Building Construction section that follows, a current project should alleviate this problem by the fall of 2016.

The outgoing baggage make-up area for each airline is currently located on the lower level of the terminal building below the ATO. This will be changed as a part of the terminal renovations as well. Currently, Delta Airlines (and subsidiaries), American Airlines (and subsidiaries), and Silver Airways serve TLH in the spring of 2016.

After enplaning passengers have received the proper credentials at the ticket counters, the kiosks, or by early remote check-in, they proceed to a security screening area that includes two screening stations located in a north-south corridor that connects the ticketing and baggage claim areas to the secure concourse. Various concessions and miscellaneous functions including restrooms, stairways, etc., are located along this corridor on both sides. During peak periods the congestion at the security checkpoint queuing area obscures the view and access to the concessions and restrooms. The restrooms located along this corridor are the only public restrooms serving the un-secure side at the main level.

While the majority of concessions at TLH are located on the un-secure side of the terminal, passengers are afforded a modest selection of concessions in the secure passenger holding area. Traditionally, at airports the size of TLH, concessions were located on both sides of security. Often times a heavier percentage of concessions including restaurants and gift shops were located on the un-secure side. Since TSA regulations in effect since 9/11 have caused the security screening

process to be more time intensive and stressful to passengers, airports the size of TLH must consider the balance of secure versus un-secure concessions. Since the trend of passengers is to now clear security as soon as possible, and arrive at their assigned holding area, they are more likely to utilize concessions in the secure area.

Once clearing the security checkpoint, enplaning passengers enter the secure concourse located on the south (air) side of the terminal building. This area is comprised of the holding areas (gates), limited concessions, restrooms, miscellaneous support spaces including small electrical, mechanical, and storage closets, and the concourse circulation. Eight of the gates in the concourse area utilize boarding bridges to accommodate narrow body and regional jet aircraft. Although bridges were renovated in 2004 to better accommodate the fleet mix at that time, they are currently in need of renovation/replacement as they reach the end of their useful service life. A series of stairwells located on the north side of the concourse provides access to the apron level for authorized personnel, emergency egress, and additional ground boarding capabilities for smaller aircraft.

Arriving passengers enter the secure concourse from their respective aircraft and proceed past the security checkpoint on the deplaning side. If baggage was checked, it is retrieved at baggage claim located on the east end of the landside of the terminal. Two re-circulating sloped plate conveyor devices display baggage from inbound aircraft. Baggage is fed to the claim devices by inclined conveyors originating at the inbound baggage operations area located below baggage claim on the lower level. The baggage claim area also includes rental car agencies and baggage offices. Currently, seven rental car agencies serve TLH, including Avis, Alamo, Dollar, Enterprise, Hertz, National, and Thrifty. Each of the five available agency lease areas approximately the same square footage and service counter length. The rental car agencies are in a location that is convenient to passengers picking up luggage in baggage claim and are adjacent to the vestibules leading to the curbside area closest to the rental car ready/return lot.

Outgoing and incoming bag operations areas are located on the apron (lower) level of the terminal building (66,382 square feet), as well as the airport storage area, the delivery area, and airline operations space. **Figure 1-13** illustrates the Lower Level of the terminal building. The majority of the major mechanical spaces are also located on this level. Incoming bags are delivered by baggage tugs from the aircraft to the inbound operations area located directly under baggage claim on the main level. At this point it is transferred from the tug carts to conveyors that transport the baggage up to the main level baggage claim devices. Outbound baggage is transported in a similar manner from the ATO's on the main level down to the lower level. Currently, this baggage goes directly to the individual airline's outgoing baggage make-up area under the terminal, since the Checked Baggage Inspection System (CBIS) function is in the ticketing lobby. From here it is delivered to its respective aircraft by tugs and carts. However, in the current Terminal Phase One renovation project, the CBIS will move to the area under the terminal, with a single sloped plate device shared by all airlines for outbound make-up, and then to their respective tugs got loading on aircraft.

Deliveries to the terminal building arrive on the apron level through a covered gate entrance located on the east side of the building. A screening procedure allows certain deliveries to occur. From the gated entrance, delivery trucks proceed down a ramp to a below-grade loading dock area located under the central circulation corridor connecting the main terminal area to the concourse area. This area allows enough space to turn around and exit the dock area via the same ramp from which it was entered. Service elevators and stairs area located adjacent to the dock area to transport deliveries to the upper levels of the terminal building.

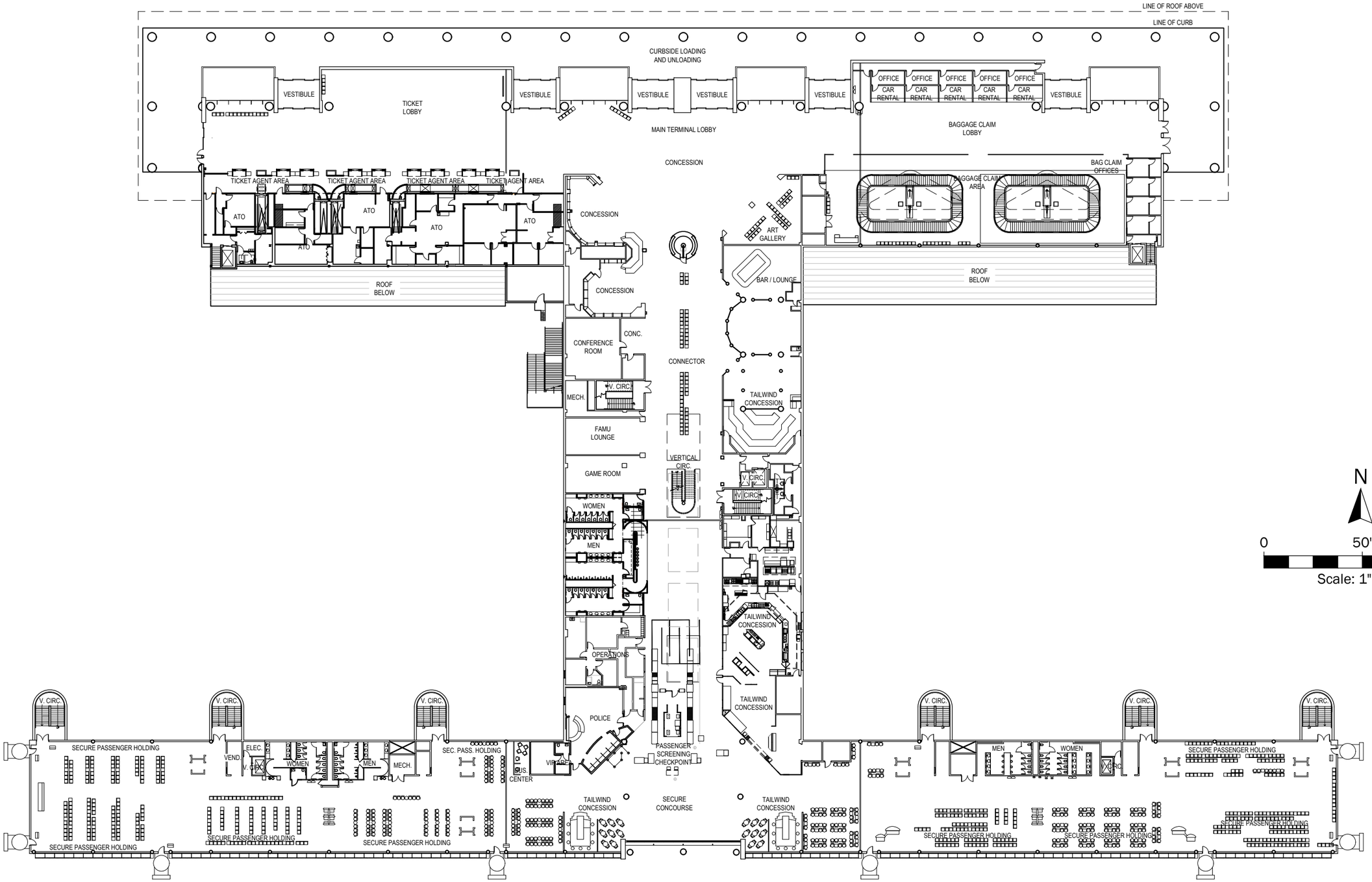
The upper level of the terminal (32,655 square feet) houses all of the airport administration, airport facilities, TSA offices, and conference areas within the terminal building. An observation area located on the upper level provides the public with a view of the commercial service apron and immediate terminal area. **Figure 1-14** illustrates the layout of the Upper Level of the Terminal Building.

This level can be accessed via a large centrally located stair on the un-secure side of the corridor which connects the ticketing and baggage claim areas to the secure passenger holding concourse. The location of this stair creates congestion and blocks the visibility and access to restrooms and concessions located on the main level below.

Large openings in the upper level floor allow light from skylights above to reach the main terminal floor. One of these openings was located above the passenger screening checkpoint and posed a potential security risk. Renovations in 2007 moved the screening area toward the airside and created controlled entry and exit lanes that could be closed off from the openings above.

Relocated SSCP (2007) with security-controlled entry points and exit lane

In addition to the main areas of the terminal building at TLH described above, there are many miscellaneous spaces including mechanical and electrical areas, restrooms, storage, circulation, and structural elements.


LINE OF ROOF ABOVE
LINE OF CURB
CURBSIDE LOADING AND UNLOADING
VESTIBULE
TICKET LOBBY
MAIN TERMINAL LOBBY
OFFICE
CAR RENTAL
BAGGAGE CLAIM LOBBY
BAG CLAIM OFFICES
BAGGAGE CLAIM AREA
TICKET AGENT AREA
ATO
CONCESSION
ART GALLERY
ROOF BELOW
BAR / LOUNGE
CONFERENCE ROOM
CONC.
CONNECTOR
V. CIRC.
MECH.
TAILWIND CONCESSION
FAMU LOUNGE
VERTICAL CIRC.
GAME ROOM
WOMEN
MEN
OPERATIONS
POLICE
PASSENGER SCREENING CHECKPOINT
SECURE PASSENGER HOLDING
VEND.
ELEC.
SEC. PASS. HOLDING
U.S. CENTER
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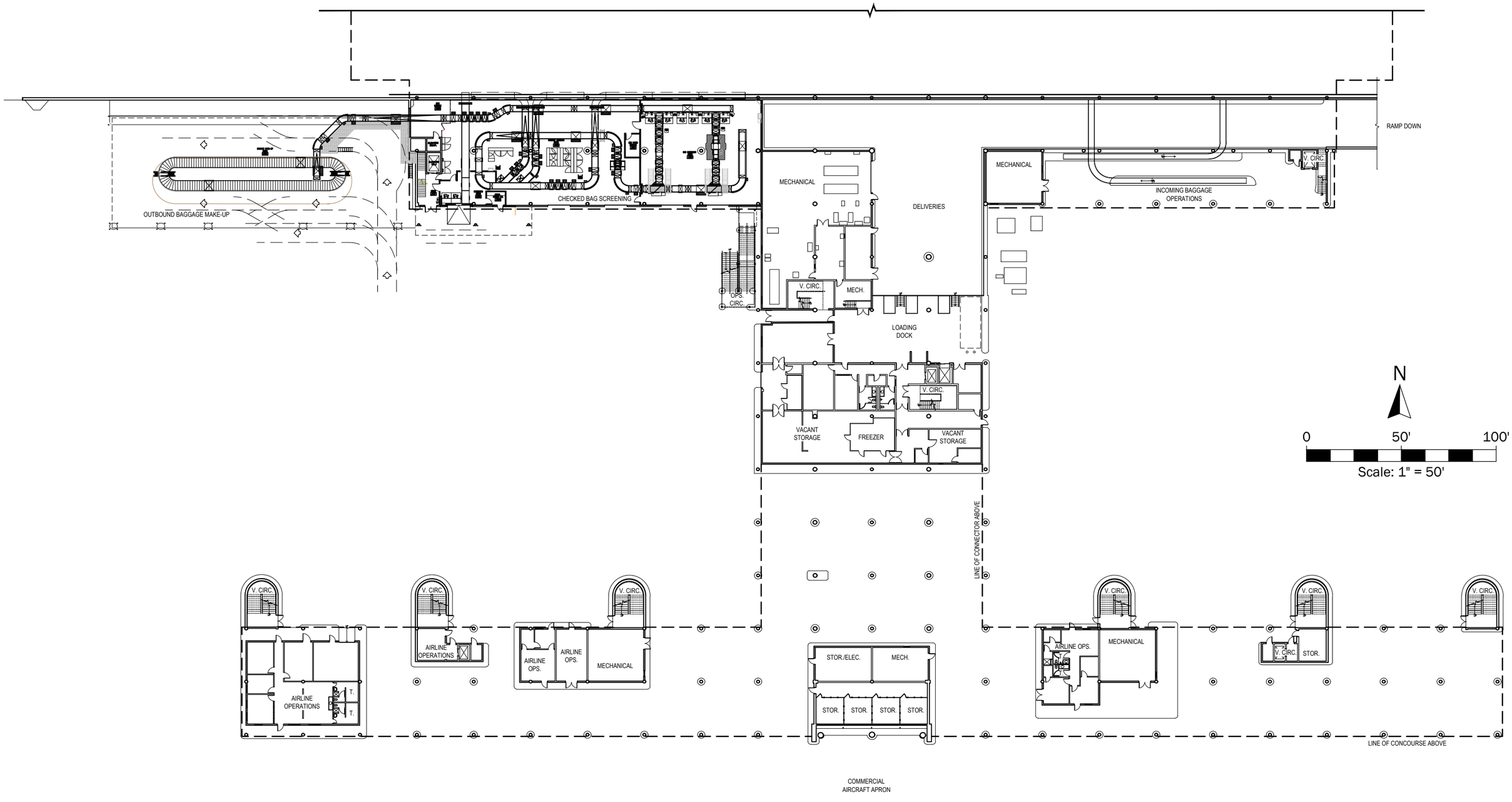
OUTBOUND BAGGAGE MAKE-UP
CHECKED BAG SCREENING
MECHANICAL
DELIVERIES
MECHANICAL
INCOMING BAGGAGE OPERATIONS
V. CIRC.
RAMP DOWN
V. CIRC.
MECH.
OPS. CIRC.
LOADING DOCK
V. CIRC.
VACANT STORAGE
FREEZER
VACANT STORAGE
LINE OF CONNECTOR ABOVE
V. CIRC.
AIRLINE OPERATIONS
T.
T.
V. CIRC.
AIRLINE OPS.
AIRLINE OPS.
MECHANICAL
V. CIRC.
STOR./ELEC.
MECH.
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STOR.
STOR.
STOR.
V. CIRC.
AIRLINE OPS.
MECHANICAL
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V. CIRC.
STOR.
V. CIRC.
LINE OF CONCOURSE ABOVE
COMMERCIAL AIRCRAFT APRON
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Scale: 1" = 50'


LINE OF ROOF BELOW
OPEN TO BELOW
ROOF BELOW
ROOF BELOW
ROOF BELOW
TRANSPORTATION SECURITY ADMINISTRATION
AIRPORT FACILITIES
OPS. CIRC.
OPEN TO BELOW
V. CIRC
V. CIRC
V. CIRC
WOMEN
MEN
TELEPHONE
OPEN TO BELOW
OPEN TO BELOW
OPEN TO BELOW
AIRPORT ADMINISTRATION
AIRPORT OPERATIONS
PUBLIC OBSERVATION AREA
ROOF BELOW
ROOF BELOW
COMMERCIAL AIRCRAFT APRON
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Scale: 1" = 50'

1.17.9 Existing Terminal Building Construction

The existing terminal building at TLH is framed primarily with a steel structural system on concrete piles and grade beams. The exterior walls are constructed of a combination of split ribbed concrete masonry units (CMU), brick, and an exterior insulated finish system on reinforced CMU walls on the lower level, and a steel frame on the two upper levels. Sloped roofs are framed with steel beams and concrete tiles, and flat roofs are constructed of a modified bitumen system. A monumental structural glazing system creates the glass façade on the north side of the main terminal building, and aluminum storefront systems comprise the remaining glazed areas.

Interior finishes include standard carpet, vinyl composition tile, ceramic tile, and exposed concrete (service areas) flooring. Ceilings are constructed of a linear metal suspended system in the ticketing and baggage claim areas and acoustical panel "lay-in" suspended ceiling throughout the majority of the terminal. Lighting throughout the terminal consists of a combination of concealed incandescent and lay-in fluorescent fixtures. The skylights on the roof provide natural lighting in the corridor connecting the ticketing and baggage claim functions to the secure concourse, and the upper level administrative area.

Reynolds, Smith, and Hills, Inc. (RS&H) completed a Terminal Conditions Summary in August, 2001. The intent of the Conditions Summary was to provide the airport with an assessment of the terminal buildings major components. Recommendations for correcting existing deficiencies and associated cost estimates were also provided as part of the report. Several of those projects and recommendations have been implemented each year as funds allowed. These improvements generally replaced antiquated systems, but did include improvements to the public restrooms, replacement and reconfiguration of baggage claim conveyors, relocation of airport operations, and infill of the airside atrium.

A more comprehensive renovation of the terminal in several phases is under design by RS&H and in construction. Phase One began construction in late 2015 and is projected to be competed in fall 2016. This initial phase includes terrazzo flooring in all public areas to the security screening checkpoint, new wall finishes, new airline ticket counters and new rental car counters. The EDS machines will be removed from the lobby and moved to the current first floor baggage make-up areas. A new exterior covered area with a sloped plate outbound name-up device will be shared by all airlines. The revised layout is reflected in the previous figures.

The Phase Two project is still in an early design stage. It will focus on improvements in the security checkpoint area, including reconfiguration of the screening lanes and improvements to finishes and building systems similar to Phase One. Phase Three will address the airside public spaces in a similar fashion.

Phase One Terminal Ticketing Lobby Renovations (Rendering courtesy RS&H)

1.17.10 Terminal Summary

Inventory information gathered and analyzed in this section provides a base for determining deficiencies with the existing terminal building and terminal area that will be discussed later in this report. The areas compiled in **Table 1-9** will be used later in this study to compare the existing capacity for each major component of the terminal building to the forecasted demand based on passenger activity forecasts over the next 20 years. Evaluations of the terminal area and terminal building facilities in this section help determine the most appropriate methods for providing future improvements to satisfy future demands. Conceptual alternatives for both the terminal building and the apron are to be explored in the Airport Alternatives chapter. Considerations in the development of terminal building concepts include deficiencies (square footage, conveyors, etc.), functionality of existing areas, and location of adjacent constraints, cost effectiveness, phasing, regulatory constraints, and many more issues.

A preliminary identification of deficiencies in the existing terminal building obvious prior to the completion of the facility requirements analysis, includes congestion in the ticketing lobby (overall depth, EDS functions, etc.), congestion in the connecting corridor north of the security screening area (location of security queuing, central stairs, etc.), lack of sufficient restroom facilities on the unsecure side, and the general location of concessions.

Several of these issues are being addressed in the current projects. Phase One terminal renovations will relocate the checked baggage screening out of the lobby and down to the apron level. Ticket counters and outbound conveyors will be replaced. Phase Two will include changes and improvements to the passenger screening area. To the extent these designs have been fully developed, they are reflected in this inventory narrative and the plans in the previous figures.

1.17.11 Existing Terminal Areas

Table 1-9 illustrates size of major areas of the existing terminal building.

Table 1-9
Existing Terminal Areas

Terminal Component and Unit	Existing Area
Check-in Positions/ Kiosks (ea.)	18 / 6
Ticketing Length (lf)	178
Ticket Agent Area (sf)	1,740
Ticket Lobby (sf)	5,120
Airline Ticket Offices (sf)	6,650
Outbound Baggage Make-Up (sf)	9,288
Checked Baggage Screening (sf)	10,166
Claim Devices (ea)	2
Conveyor Frontage (lf)	310
Claim Lobby (sf)	6,710
Inbound Bag Operations (sf)	4,370
Rental Car Areas (sf)	1,964
Public Waiting (sf)	5,015
Prime Concessions (sf)	10,512
Miscellaneous. Lease (sf)	8,348
Security Screening and Queue (sf)	2,626
Passenger Holding (sf)	21,200
Passenger Holding Circulation (sf)	11,586
Gates (ea)	10
Airline Operations Area (sf)	3,468
Area Subtotal (sf)	**108,763**
Support Space (sf)	69,442
Delivery Area (sf)	15,870
Administrative Space (sf)	13,711
TSA Administrative Space (sf)	6,547
Total Area (sf)	**214,333**

Source: Michael Baker International, Inc., 2016.

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1.18 Support Facilities

According to FAA AC 150/5070-6B, Airport Mater Plans, support facilities "ensure the smooth and efficient airport operation, including the Aircraft Rescue and Fire Fighting (ARFF) stations, airport administrative areas, airport maintenance facilities, airline maintenance hangars, flight kitchens, aircraft fuel storage, heating and cooling systems, and FAA facilities. Although many support facilities have been documented throughout this chapter, **Table 1-10** summarizes the availability of these facilities at TLH.

Table 1-10
Summary of Support Facilities

Facility	Location	Notes
ARFF Station	South Apron	ARFF Index C (for aircraft at least 126 feet in length but less than 159 feet)
Airport Administration Areas	Second Floor of Passenger Terminal Building	Additional airport facilities are located around the airport
Airport Maintenance Facility	Northeast of the Cargo Apron along Capital Circle SW	For maintaining the airport property
GSE Maintenance Facility	South Apron	For Maintaining GSE Equipment
Aircraft Maintenance Hangar	Central Apron	Most aircraft maintenance services at TLH are provided by Flightline Group
Flight Kitchen	South Apron	The FBO (Million Air) can provide catering services
Fixed Base Operator (FBO)	South Apron	Million Air's services include Fuel and Ground Services, Hospitality Bar, Conference Room, Wireless Internet, Pool Table, Pilots Lounge, Private Bathroom and Shower, Sleep Room, Crew Car, and Rental Cars
Aircraft Fuel Storage	Between Central and South Aprons (Aboveground Tanks)	Jet A – 120,000 gallons (4 Tanks) 100LL – 25,000 gallons (1 Tank) Unleaded – 10,000 gallons (1 Tank)
Heating and Cooling Systems	Varies	Various heating and cooling systems are located throughout the property for individual facilities
FAA Facilities	South of Runway 9-27	Includes FAA ATCT and TRACON

Source: Michael Baker International, Inc., 2016.

1.19 Land Holdings

As part of this Master Plan Update, an Exhibit "A" Airport Property Inventory Map was developed in accordance with FAA Standard Operating Procedure (SOP) 3.00, SOP for FAA Review of Exhibit "A" Airport Property Inventory Maps. The detailed Exhibit "A" identifies all past, current, and proposed land holdings associated with the airport. The Exhibit "A" efforts include a title search, property map development, and a legal review and title opinion. The information provided will help the City determine the history of land holdings associated with TLH for as long as there are records associated with the property. Future property acquisition may be needed to bring the airport into compliance with FAA design standards and to improve the airport's compatibility with surrounding land uses.

1.20 Land Use Considerations

This section identifies baseline information related to existing land uses in the vicinity of TLH. The areas to the south and west of TLH are largely undeveloped. According to the 2015 Existing Land

Use Map for the Tallahassee Urban Area, the airport property is designated as a Transportation/Communications/Utilities land use. Most areas to the south and west of the airport are designated as an Open Space Resource Protection land use, with the exception of some single-family homes along Springhill Road. There are also some single-family homes around Lake Bradford to the north of Capital Circle SW, as well as warehouses, offices, and vacant lands. Overall, the airport is not constrained in its ability to continue to develop based on encroaching developments. The Future Land Use Map for the Tallahassee Urban Area illustrates similar land use controls around the airport to prevent the construction of developments that may prevent TLH from continuing to grow.

The Land Development Code for the City of Tallahassee also defines specific height restriction zoning around TLH to prevent the erection of structures that may be obstacles to the airport's airspace. The height restrictions are based on Part 77 Imaginary Surfaces that surround both runways at TLH. The Land Development Code also identifies an Airport Vicinity District which "is intended to be located in the vicinity of and particularly off the ends of the runways at TLH which are subject to Day-Night Average Sound Levels (DNL) that exceed the threshold identified by the FAA and the state as being compatible with certain land use types." The Airport Vicinity District identifies principal and accessory uses that may be considered acceptable with the noise levels and also for standards related to height, glare, and electronic interference. A Federal Aviation Regulations (FAR) Part 150 Noise Study was also completed for TLH in 1996 that identified operational and land use measures for mitigating incompatible noise exposure to sensitive developments in the vicinity of the airport including the utilization of both runways to balance exposure, the adoption of close-in departure procedures, reducing the number of older and noisier planes, adoption of overlay zoning, amendment of building codes to require sound reduction measures, property acquisition, and soundproofing existing structures. Therefore, the City has done a comprehensive job to protect the ability to grow TLH and to make the airport compatible with the surrounding environment.

1.21 Environmental Overview

An environmental overview is defined in FAA AC 150/5070-6B, Airport Master Plans, as an overview of environmentally sensitive features of an airport.[1] The environmental overview is a component of the inventory effort taking place at TLH during the Master Plan Update. The environmental information within this overview was compiled utilizing available resource materials and databases. This collection of data was based upon guidelines set forth in FAA Order 1050.1F, Environmental Impacts: Policies and Procedures, FAA Order 5050.4B, National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions, and FAA's Environmental Desk Reference for Airport Actions, which includes 14 impact categories that must be addressed in compliance with NEPA.

Potential environmental impact categories were considered based on the resource features present at the airport as a product of this Master Plan Update. In addition to known prior

[1] FAA AC 150/5070-6B, Airport Master Plans, http://www.faa.gov/documentLibrary/media/Advisory_Circular/150-5070-6B-Change-2-Consolidated.pdf, (May 19, 2016)

environmental planning documents and information from various types of available environmental resource maps of the airport area. Identification of features that had the potential of being applicable to future development plans at the airport were addressed in the following sections.

1.21.1 Biological Resources

Airport habitats were evaluated with consideration to suitability for federal and state protected species in accordance with the Florida Endangered and Threatened Species Act, Section 7 of the Endangered Species Act of 1973, as amended, and the Bald and Golden Eagle Protection Act of 1940. A list of state- and federally-protected species that may occur in the vicinity of TLH was developed based on review of the Florida Natural Areas Inventory (FNAI) species database for Leon County, which was last updated in January 2016[2]; FNAI element occurrence data, obtained in May of 2016; and the U.S. Fish and Wildlife Service list for Leon County, dated February 3, 2016.[3]

Table A-1 and A-2 located in **Appendix A** lists state- and federally-protected species of potential concern that have the potential to utilize habitats within and surrounding the airport.

1.21.2 Hazardous Material, Solid Waste, and Pollution Prevention

Identification of potential waste and hazardous material sites was accomplished through the utilization of the USEPA NEPAssist database,[4] and review of a 2015 Phase 1 Environmental Site Assessment report that was performed for another project on TLH property.[5] Only one location with an operating storage tank, the FAA Tallahassee ATCT, was identified on the Federal Facilities Listing (FF Tanks) database. The FAA Tallahassee ATCT is a listed facility that currently uses a 2,000-gallon diesel UST. Million Air Tallahassee is a Fixed Base Operator (FBO) that has seven ASTs ranging in size from 1000 to 30,000 gallons. In addition to the above-mentioned facility there are several tenants on the airport that are listed, according to the Resource Conservation and Recovery Act Information (RCRAInfo), as active and Conditionally Exempt Small Quantity Generators (CESQGs).[6]

1.21.3 Historic, Architectural, Archeological, and Cultural Resources

The National Register of Historic Places (NRHP) is an official list of the Nation's historic places worthy of preservation.[7] Based on review of the NRHP database, no NRHP-listed properties have

[2]FNAI, "FNAI Tracking List, Leon County," http://www.fnai.org/bioticssearch.cfm, January 2016 (February 3, 2016).
[3] USFWS, "Federal Threatened, Endangered, and Other Species of Concern Likely to Occur in Leon County, FL," https://ecos.fws.gov/ipac/project/HFX7L5LKFJHLJG52SLQHOFH33A/resources, December, 2013 (February 3, 2016).
[4] USEPA, NEPAssist, http://nepassisttool.epa.gov/nepassist/nepamap.aspx?wherestr=3300+Capital+Cir+SW%2C+Tallahassee%2C+FL+32310 (February 2, 2016).
[5] AECOM, *Phase I Environmental Site Assessment for the First Solar Tallahassee Airport Project Site*, November 2015
[6] USEPA, Categories of Hazardous Waste Generators http://www.epa.gov/hwgenerators/categories-hazardous-waste-generators (February 3, 2016).
[7] National Parks Service, "Natural Register of Historic Places," http://www.nps.gov/nr/research/data_downloads.htm, (February 4, 2016).

been documented on, or in the near vicinity of, airport property. The CRAS report identified the Springhill Railroad Tramline, which has previously been recommended by the State Historic Preservation Office (SHPO), as eligible for listing on the NRHP[8]. This railroad corridor lies parallel to, and just outside of, a segment of the southernmost portion of the airport's property and crosses the eastern end of the airport's property. However, previous surveyors have reported that the portions of the tramline corridor that run adjacent to the airport lack historic integrity due to past disturbance and alteration and are no longer contributing to the eligibility of the resource as a whole. After reviewing aerial photography, the portion of the corridor that passes through the eastern end of the airport's property appears to no longer hold historical contribution to the resource due to mowing and maintenance of the airfield.

1.22 Water Resources

1.22.1 Surface Waters and Groundwater

The airport property is situated above the Upper Floridian aquifer and is within the Ochlockonee and St. Marks watershed (United States Geological Survey [USGS] Hydrologic Unit Code [HUC] 031200010602). TLH itself is within a closed basin. No water bodies that are listed by the Florida Department of Environmental Protection as impaired waters receive drainage from the airport. TLH has a National Pollutant Discharge Elimination System Multi-Sector Generic permit, FLR05A776-003, and a Stormwater Pollution Prevention Plan which is implemented to prevent exposure of stormwater to pollutants.

1.22.2 Wetlands and Other Jurisdictional Waters of the United States

Land use and vegetative cover are most frequently detailed using the Florida Land Use, Cover and Forms Classification System (FLUCFCS). This land use classification system was originally developed by FDOT but has since been employed by multiple state and federal agencies in Florida.[9] Referring to the FLUCFCS data, (**Figure A-2** located in **Appendix A**), there are two areas on airport property that contain wetland land cover types. Lakes, cypress, intermittent ponds, and mixed wetland hardwoods land cover types are mapped within an area approximately 23.9 acres in size that lies north of the approach end of Runway 18. The easternmost portion of the airport property contains an area approximately 7.7 acres in size that consists of mixed wetland hardwoods, wetland coniferous forest, lake, and riverine land cover types.

1.22.3 Floodplains

Executive Order (EO) 11988, Floodplains, and the United States Department of Transportation Order 5650.2, Floodplain Management and Protection, requires that all airport development actions must avoid floodplain impacts wherever there is a practicable alternative. In addition, the design must also minimize the adverse impacts to the floodplain's natural and beneficial values and minimize the likelihood of flood-related risk to human life, health, and welfare.

[8] SEARCH, *Phase 1 Cutlural Resources Survey for Tallahassee International Airport*, March 2016
[9] FDOT, Florida Land Use, Cover and Forms Classification System, January 1999.

Review of the most updated FEMA Flood Insurance Rate Maps (FIRM), showed that the majority of the airport is located within Zone X which is defined by FEMA Zone classification as area determined to be outside the 500-year floodplain determined to be outside the 1% and 0.2% annual chance floodplains.[10]. There are small portions of the airport at both the very north and east ends of the airport property that fall within the Zone AE classification (**Figure A-3** located in **Appendix A**). Zone AE corresponds to the 100-year floodplains for which prior hydraulic studies have been completed and base flood elevations are available. The Zone AE floodplains located on airport property to the north and the east have defined base flood elevations of 38.2 and 38.26 feet, respectively.

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[10] FEMA, "Zone Classifications," http://www.floodmaps.com/zones.htm (February 4, 2016).

Chapter 2

Aviation Activity Forecasts

Master Plan Update

TALLAHASSEE
INTERNATIONAL AIRPORT

2.0 Aviation Activity Forecasts

2.1 Background

This aviation forecasting effort was conducted in 2016 as part of the Master Plan Update for the Tallahassee International Airport (TLH). The forecasts were developed based on the most recently-available information and are utilized in later sections of this study to determine short- and long-term facility requirements and to provide the preliminary justifications for recommended improvements. The forecasts are presented over a 20-year planning period that extends from 2015 through 2035. Although several forecasting efforts have been conducted over the course of the airport's history, this is the first comprehensive forecasting effort that has been conducted since the name of the airport was changed from 'Regional' to 'International.'

The last comprehensive forecasting effort was conducted as part of the 2006 Master Plan Update (with a planning period from 2003 to 2023). That was several years before several factors may have directly or indirectly resulted in declining activity levels at TLH including bankruptcies and mergers in the airline industry, rising fuel prices after Hurricane Katrina in 2005, the economic recession of the late 2000s, and some minor activity leakage after the new Northwest Florida Beaches International Airport (ECP) in Panama City, Florida opened in May 2010. Consequently, the previous Master Plan Update did not account for these largely unanticipated factors that may have influenced commercial and general aviation activity levels at TLH.

As discussed throughout this chapter, all sectors of aviation activity (airline, cargo, military, and general aviation) generally began to stabilize since 2011 at TLH. With recent upgrades to the airfield, ongoing enhancements to the passenger terminal building, and the City of Tallahassee's initiatives to improve customer service and technology, this forecasting effort had to consider what types of opportunities could be induced from those actions. It is also important to note that the City of Tallahassee intends to establish a Foreign Trade Zone (FTZ) at the airport which may also influence both aviation and non-aviation development and activity. Therefore, several ongoing and anticipated trends are identified in this chapter to evaluate the potential for future growth opportunities at TLH.

The following elements are addressed as part of this forecasting effort:

- Forecasting Limitations;
- Historical and Baseline Activity Analysis;
- Factors and Opportunities Affecting Activity Levels;
- Airline Forecasts;
- Air Cargo Forecasts;
- Military Operations Forecasts;
- General Aviation Operations and Based Aircraft Forecasts;
- Combined Operations Forecasts;
- Peaking Forecasts; and
- Forecast Summary.

2.2 Forecasting Limitations

Forecasting aviation activity is a complex process that considers a multitude of factors, both controllable and beyond an airport's control. Forecasts are not to be construed with predictions of the future, but rather an educated guess of future activity based on a variety of predictors, calculations, assumptions, and subjective judgment. The accuracy of the estimates decline as the planning term is extended, potentially as a result of unforeseen local or geo-political events, natural disasters, and/or climatological events.

The FAA's forecast approval process typically constitutes an approval for planning purposes only, which allows the airport sponsor to depict projects that are consistent with the long-term growth expectations on the Airport Layout Plan (ALP) Drawing Set. In most cases, prior to issuing a grant, the FAA will require updated information demonstrating that a proposed project is justified by activity at the time, or by activity that would directly result from the implementation of the proposed project. This policy helps to ensure that funding is directed towards critical projects throughout the U.S.

2.3 Historical and Baseline Activity Analysis

Because TLH serves all sectors of aviation activity, there are several historical activity trends that must be analyzed to determine what the likelihood may be for growth opportunities during the planning period. It is also necessary to identify the baseline values from where all forecasts begin from, which are the actual 2015 values for TLH as determined primarily from the following resources which are referenced throughout this chapter:

- FAA Air Traffic Activity Data System (ATADS) Database;
- FAA Traffic Flow Management System Counts (TFMSC) Database;
- FAA Terminal Area Forecast (TAF); and
- U.S. Department of Transportation (USDOT) Bureau of Transportation Statistics (BTS) Databases (T-100 Domestic Segment and Historical Load Factors).

The chapter was organized to present the airline forecasts first. The airline activity at TLH is composed of scheduled operations by American Airlines, Delta Air Lines, and Silver Airways, as well as unscheduled charter operations that are typically conducted to transport athletic teams for the local universities and visiting teams. For a Primary Commercial Service Airport such as TLH, the FAA distributes annual Airport Improvement Program (AIP) entitlement funding based on the number of passenger enplanements or the number of departing passengers.

The historical number of enplanements since 1990 at both TLH and ECP are shown in **Table 2-1** and **Figure 2-1** this data is provided for informational purposes to document historical growth trends at two commercial airports in Northwest Florida. The 1990 through 2014 enplanement values were obtained from the FAA's 2015 TAF and the 2015 values were extracted from the BTS T-100 Domestic Segment database. Much of the growth at TLH in the early 2000s was attributable to when AirTran was flying there from 2001 through 2004 and the Continental Airlines

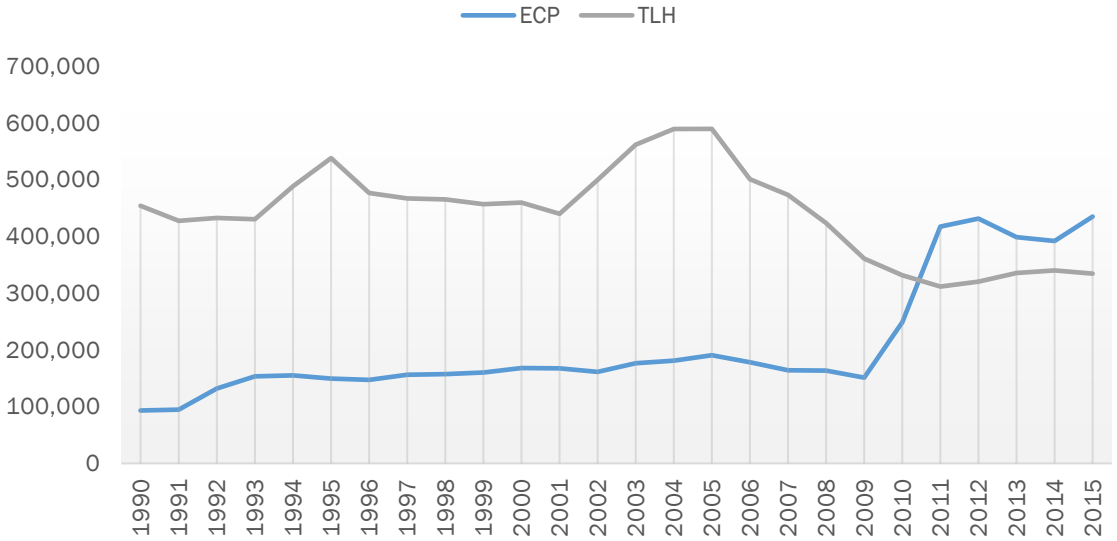
service between TLH and George Bush Intercontinental Airport in Houston, Texas that began in 2004 and ended in 2008. Following the departure of those services and after the new airport opened in Panama City in May 2010, TLH continued to experience fewer enplanements than ECP which is a popular beachside tourist destination with unique airline and passenger demands. As shown in **Figure 2-2**, after the new airport opened in Panama City in 2010, the number of enplanements at TLH remained relatively stable and a linear growth trend was observed between 2011 and 2015. This trend predicts future enplanement growth to occur at an Average Annual Growth Rate (AAGR) of 1.74% assuming that no induced demand would occur (e.g., new airline service). Those types of historical short-term trends can be the most telling, particularly when activity has remained relatively stable with minimal increases/decreases from year-to-year. Unfortunately, many of the other historical activity characteristics at TLH do not produce statistical correlations that are beneficial for this forecasting effort.

Table 2-1
Historical Enplanement Comparison (1990-2015)

Year	ECP	TLH	% Difference (TLH vs. ECP)
1990	93,250 (Low)	454,178	387.05%
1991	94,653	427,243	351.38%
1992	131,900	432,253	227.71%
1993	153,541	430,091	180.11%
1994	154,833	488,381	215.42%
1995	149,635	537,663	259.32%
1996	147,456	476,515	223.16%
1997	155,948	466,741	199.29%
1998	157,509	465,454	195.51%
1999	160,242	456,776	185.05%
2000	168,244	459,514	173.12%
2001	167,423	440,015	162.82%
2002	161,136	499,836	210.20%
2003	176,620	561,777	218.07%
2004	181,083	588,969	225.25%
2005	190,815	589,418 (High)	208.90%
2006	178,059	500,932	181.33%
2007	164,078	472,964	188.26%
2008	163,287	423,587	159.41%
2009	151,227	360,976	138.70%
2010	248,663	331,766	33.42%
2011	417,172	311,579 (Low)	-25.31%
2012	431,547	320,343	-25.77%
2013	398,540	335,410	-15.84%
2014	391,670	340,114	-13.16%
2015 (Baseline)	434,869 (High)	334,263	-23.13%
AAGR 1990-2000	6.08%	0.12%	N/A
AAGR 2000-2010	3.98%	-3.20%	N/A
AAGR 2010-2015	11.83%	0.15%	N/A

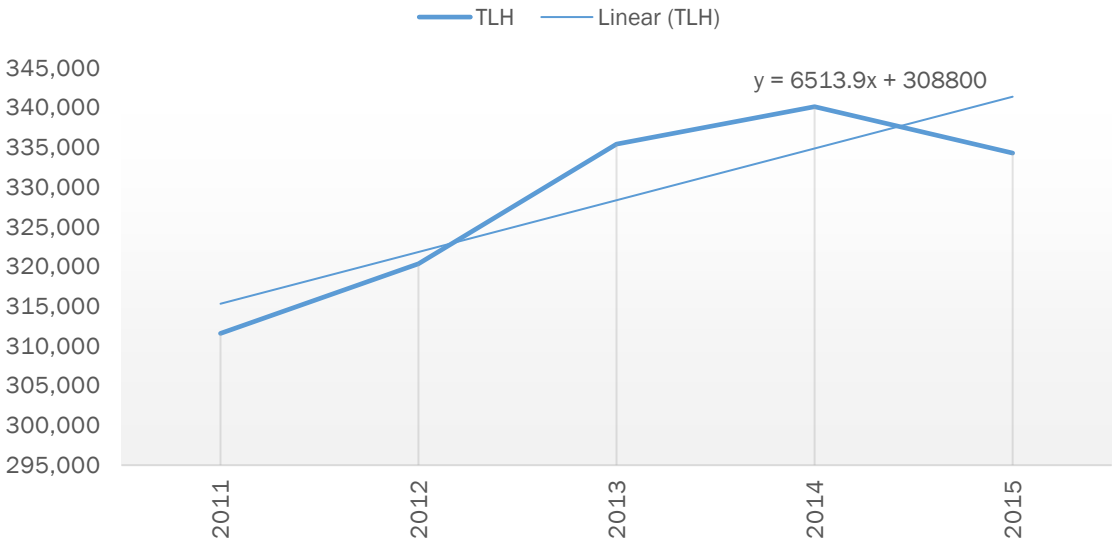
Sources: FAA 2015 TAF, BTS T-100 Domestic Segment database, and Michael Baker International, Inc., 2016.
AAGR – Average Annual Growth Rate

Figure 2-1
Historical Enplanement Comparison (1990-2015)



Sources: FAA 2015 TAF, BTS T-100 Domestic Segment database, and Michael Baker International, Inc., 2016.

Figure 2-2
Historical Enplanements at TLH (2011-2015)



Sources: FAA 2015 TAF, BTS T-100 Domestic Segment database, and Michael Baker International, Inc., 2016.

A summary of the historical operations for TLH is presented in **Table 2-2** and was obtained from the FAA's ATADS database for the period between 1990 and 2015. The ATADS data for TLH represents the official records from the on-site Airport Traffic Control Tower (ATCT). There are several different activity characteristics listed in the table that are broken down in further detail within this chapter, but this is the traditional way that activity is categorized by the FAA and Air Traffic Control (ATC) personnel. Below are the definitions of TAF variables from the FAA Terminal Area Forecast Summary for Fiscal Years 2015-2040.

- **Local Operations** are conducted by aircraft operating in the traffic pattern or within sight of the tower, or aircraft known to be departing or arriving from flight in local practice areas, or aircraft executing practice instrument approaches at the airport.
- **Itinerant Operations** are all aircraft operations other than local operations. Essentially, these represent takeoffs and landings of aircraft going from one airport to another.
- **Air Carrier Operations** represent either takeoffs or landings of commercial aircraft with seating capacity of more than 60 seats.
- **Commuter/Air Taxi** operations are one category. Commuter operations include takeoffs and landings by aircraft with 60 or fewer seats that transport regional passengers on scheduled commercial flights. Air taxi operations include takeoffs and landings by aircraft with 60 or fewer seats conducted on non-scheduled or for-hire flights.
- **Itinerant General Aviation and Local Civil Operations** represent all civil aviation aircraft takeoffs and landings not classified as commercial.
- **Military Operations** represent takeoffs and landings by military aircraft. Operations are either itinerant or local flights.

As can be seen in **Table 2-2**, total operations at TLH dropped from a record high of 155,792 in 1990 to a record low of 56,114 in 2014 (the record low occurred when Runway 9-27 was being reconstructed and was closed). Most of the declines were experienced in the local and itinerant general aviation sectors, which was common for many airports as various events occurred throughout the nation that negatively impacted the general aviation industry and the ability for people to pay for the associated equipment and services (as discussed in the next section of this chapter). Although the airport experienced declining activity levels since the early 1990s, the airline, air cargo, and general aviation sectors operate in very different capacities today and aviation facility requirements are also evaluated very differently. **Table 2-3** summarizes the baseline activity levels for this aviation forecasting effort. Additional historical and baseline activity factors are presented within individual sections of this chapter.

Table 2-2
Historical Operations (1990-2015)

Year	Itinerant (IT) Activity						Local (LOC) Activity				Total Operations
	Air Carrier	Air Taxi	GA	Military	IT Total	% Total	Civil	Military	LOC Total	% Total	
1990	18,337	23,179	61,052	4,590	107,158	68.78%	46,434	2,200	48,634	31.22%	155,792
1991	15,319	27,655	50,639	3,967	97,580	74.12%	31,718	2,358	34,076	25.88%	131,656
1992	15,214	27,265	47,300	4,108	93,887	75.88%	27,390	2,450	29,840	24.12%	123,727
1993	13,269	29,326	44,101	4,281	90,977	78.64%	21,846	2,868	24,714	21.36%	115,691
1994	14,496	33,158	41,319	3,634	92,607	78.65%	23,096	2,040	25,136	21.35%	117,743
1995	13,642	38,226	41,127	3,824	96,819	81.28%	20,580	1,718	22,298	18.72%	119,117
1996	6,690	41,315	39,722	4,588	92,315	81.85%	18,350	2,114	20,464	18.15%	112,779
1997	5,312	44,809	38,151	4,986	93,258	78.96%	21,530	3,324	24,854	21.04%	118,112
1998	5,138	38,828	39,807	5,225	88,998	79.49%	19,038	3,928	22,966	20.51%	111,964
1999	4,799	38,289	43,648	6,360	93,096	78.30%	18,996	6,810	25,806	21.70%	118,902
2000	4,298	38,409	43,443	7,192	93,342	77.14%	20,757	6,904	27,661	22.86%	121,003
2001	3,645	33,857	38,563	8,395	84,460	81.51%	13,577	5,588	19,165	18.49%	103,625
2002	6,895	30,674	38,700	12,257	88,526	81.61%	13,667	6,286	19,953	18.39%	108,479
2003	5,200	27,806	38,101	12,799	83,906	81.50%	14,202	4,838	19,040	18.50%	102,946
2004	5,618	28,270	38,817	11,001	83,706	83.32%	13,095	3,658	16,753	16.68%	100,459
2005	6,108	31,809	36,909	10,914	85,740	86.00%	11,113	2,849	13,962	14.00%	99,702
2006	4,849	29,620	38,077	12,743	85,289	83.40%	13,611	3,361	16,972	16.60%	102,261
2007	4,250	28,752	35,841	9,532	78,375	82.40%	13,724	3,014	16,738	17.60%	95,113
2008	4,712	26,239	32,774	8,929	72,654	81.24%	13,148	3,632	16,780	18.76%	89,434
2009	3,501	23,879	29,101	11,549	68,030	76.35%	15,466	5,611	21,077	23.65%	89,107
2010	4,513	19,752	26,621	12,627	63,513	79.59%	11,774	4,516	16,290	20.41%	79,803
2011	3,407	15,819	26,295	12,787	58,308	77.31%	13,373	3,742	17,115	22.69%	75,423
2012	3,072	16,062	23,318	9,878	52,330	82.02%	8,893	2,581	11,474	17.98%	63,804
2013	2,832	14,493	23,051	12,121	52,497	83.32%	7,296	3,215	10,511	16.68%	63,008
2014	4,601	11,081	22,196	9,744	47,622	84.87%	5,927	2,565	8,492	15.13%	56,114
2015 (Baseline)	5,339	10,123	22,197	10,151	47,810	82.54%	7,197	2,914	10,111	17.46%	57,921
AAGR 1990-2000	-13.50%	5.18%	-3.35%	4.59%	-1.37%	1.15%	-7.74%	12.12%	-5.49%	-3.07%	-2.50%
AAGR 2000-2010	0.49%	-6.43%	-4.78%	5.79%	-3.78%	0.31%	-5.51%	-4.16%	-5.16%	-1.13%	-4.08%
AAGR 2010-2015	3.42%	-12.51%	-3.57%	-4.27%	-5.52%	0.73%	-9.38%	-8.39%	-9.10%	-3.08%	-6.21%

Sources: FAA ATADS database and Michael Baker International, Inc., 2016.
AAGR – Average Annual Growth Rate

Table 2-3
Baseline 2015 Activity Levels

Baseline Airline Factors					
Item	**Operations**	**Seats**	**Average Seats (Seats ÷ Operations)**	**Passengers**	**Load Factor (Passengers ÷ Seats)**
Arrival/Passenger Deplanement Factors					
Scheduled Turboprop	1,142	38,896	34.06	24,586	63.21%
Scheduled Jet	5,464	419,462	76.77	307,874	73.40%
Unscheduled Jet	41	7,071	172.46	3,421	48.38%
Total Arrivals	**6,647**	**465,429**	**70.2**	**335,881**	**72.17%**
Departure/Passenger Enplanement Factors					
Scheduled Turboprop	1,150	39,134	34.03	23,966	61.24%
Scheduled Jet	5,472	419,838	76.72	307,107	73.15%
Unscheduled Jet	44	7,048	160.18	3,190	45.26%
Total Departures	**6,666**	**466,020**	**69.91**	**334,263**	**71.73%**
Total Airline Factors					
Total Operations	**13,313**	**931,449**	**69.97**	**670,144**	**71.95%**
Total Turboprops	**2,292**	**78,030**	**34.04**	**48,552**	**62.22%**
Total Jets	**11,021**	**853,419**	**77.44 (76.75 Scheduled)**	**621,592**	**72.84% (73.27% Scheduled)**
Sources: BTS T-100 Domestic Segment database and Michael Baker International, Inc., 2016.					

Baseline Air Cargo Factors		
Item	**Operations**	**Cargo Volume (Pounds)**
Inbound/Deplaned Cargo Factors		
Scheduled Turboprop	410	718,109
Scheduled Jet	262	7,601,097
Unscheduled Jet	2	132,103
Airline Belly Freight/Mail	N/A	232,522
Total Arrivals	**674**	**8,683,831 (Includes Belly Freight/Mail)**
Outbound/Enplaned Cargo Factors		
Scheduled Turboprop	432	741,149
Scheduled Jet	262	9,408,332
Unscheduled Jet	2	15,342
Airline Belly Freight/Mail	N/A	196,793
Total Arrivals	**696**	**10,361,616 (Includes Belly Freight/Mail)**
Total Air Cargo Factors		
Total Operations	**1,370**	**19,045,447 (Includes Belly Freight/Mail)**
Total Turboprops	**842**	**1,459,258**
Total Jets	**528**	**17,586,189 (Includes Belly Freight/Mail)**
Sources: BTS T-100 Domestic Segment database and Michael Baker International, Inc., 2016.		

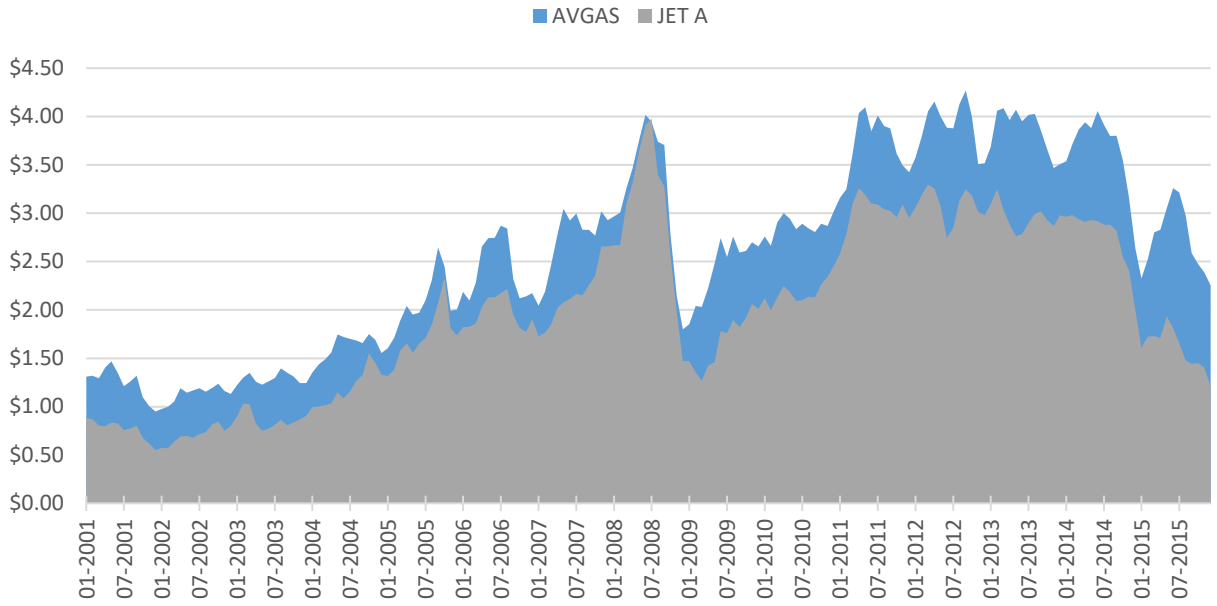
Baseline Military Factors	
Item	**Operations**
Itinerant Operations / % of Total	10,151
Local Operations / % of Total	2,914
Total Operations	**13,065**
Sources: FAA ATADS database and Michael Baker International, Inc., 2016.	

Baseline General Aviation Factors	
Item	**Operations or Based Aircraft**
Itinerant and Local Operations	
Itinerant Operations / % of Total	23,017 / 76.18%
Local Operations / % of Total	7,197 / 23.82%
Total Operations	**30,214**
Operations by Aircraft Type	
Single-Engine Piston (SEP)	17,133
Multi-Engine Piston (MEP)	2,560
Turboprop	3,346
Jet	5,161
Helicopter	2,014
Based Aircraft by Type	
Single-Engine Piston (SEP)	84
Multi-Engine Piston (MEP)	10
Turboprop	6
Jet	4
Helicopter	15
Total Based Aircraft	**119**
Sources: FAA ATADS database, FAA TFMSC database, and Michael Baker International, Inc., 2016.	

2.4 Factors and Opportunities Affecting Activity Levels

This section describes past and present trends that may influence operations and based aircraft levels at TLH. As part of any forecasting effort, the FAA recommends the identification of historical factors that represented turning points for the U.S. aviation industry such as the terrorist attacks on September 11, 2001, sharp fuel price increases after Hurricane Katrina damaged Gulf Coast refineries in August 2005 (refer to **Figure 2-3**), and the economic recession of the late 2000s. Although some of those events were impossible to predict, their resulting consequences had considerable impacts on aviation activity throughout the U.S. Local trends are also important because they provide airport-specific information that can be used to support the selection of preferred forecasts. Trends evaluated include economic conditions, load factor tends, airport-specific factors, and the FAA Next Generation Air Transportation System (NextGen).

Figure 2-3
U.S. Aviation Gasoline Wholesale/Resale by Refiners (2001-2015)

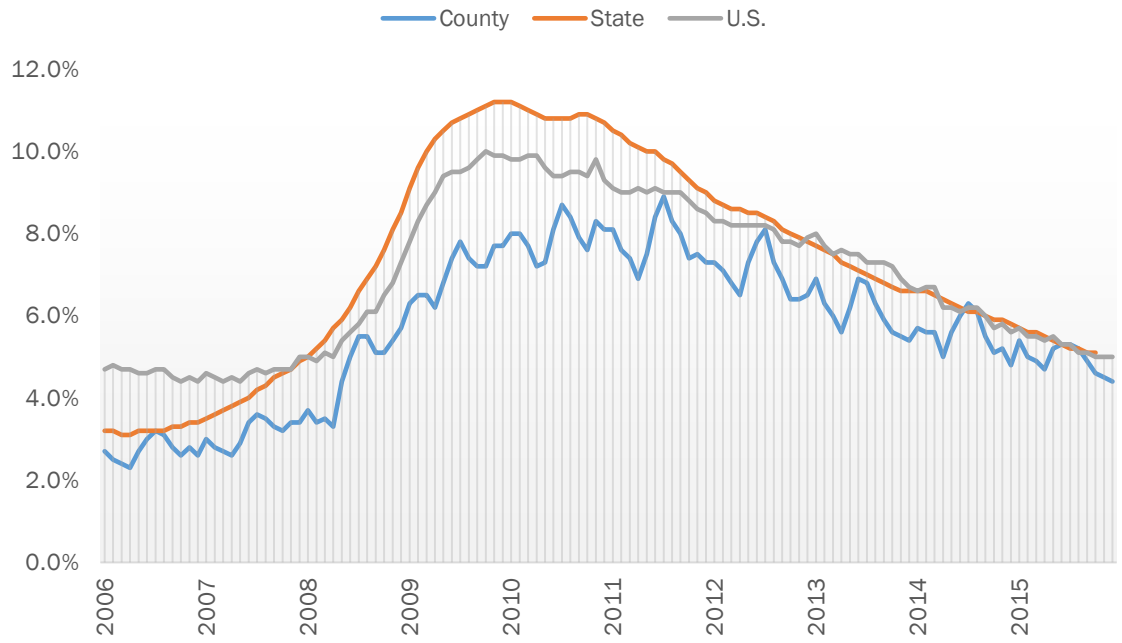


Sources: U.S. Energy Information Administration and Michael Baker International, Inc., 2016.

2.4.1 Economic Conditions

The previous chapter includes a review of historical and forecast socioeconomic conditions for the City of Tallahassee, Leon County, State of Florida, and U.S. The purpose was to see how local area socioeconomic conditions compared to those of larger geographies. For example, **Figure 2-4** illustrates the historical unemployment rates for Leon County, State of Florida, and U.S. It is anticipated that the high number of public sector jobs within the city (state government employees, university employees, etc.) helped to keep Leon County's unemployment lower than that of the state and country between 2006 and 2015; however, the unemployment rate for the state as a whole exceeded that of the country during much of the economic recession (primarily due to the largely tourism-based economy of the state and the 'housing bubble'). There are times when statistical relationships can be made between the economic growth of a local area and aviation activity levels. At TLH, such a statistical relationship would be difficult to ascertain as the population and employment within the local area have been increasing while aviation activity levels have been decreasing. Therefore, this forecasting effort did not rely heavily on historical and forecast economic trends to perform projections of future aviation demand for TLH.

Figure 2-4
Historical Unemployment (2006-2015)



Sources: U.S. Bureau of Labor Statistics and Michael Baker International, Inc., 2016.

An important consideration for this forecasting effort is that the Capital City has a large non-permanent population of students and state politicians that would prefer more convenient aviation transportation options due to the semi-remote location of Tallahassee compared to the large population areas in the state (particularly in South Florida). The same consideration applies to the year-round population of the local area. In the article, *GetBlue: An effort to bring JetBlue to Tallahassee* (FSView & Florida Flambeau: Florida State University, February 16, 2016), it

discusses how it is inconvenient for students to travel between FSU and other areas of the state and country by air out of TLH. Students want more convenient air transportation options at TLH so they do not have to: 1) spend numerous hours in a car to reach their homes that poses safety risks and adds wear and tear to vehicles (e.g., 10 hours to Miami), 2) spend additional money and time to travel to an airport with greater connectivity, and/or 3) simply avoid travelling all together because of the inconveniences and therefore miss seeing their families entirely. The residents of Tallahassee started the GetBlue campaign (http://getbluetallahassee.com/) in an effort to encourage JetBlue to fly in and out of TLH. FSU recently pledged $1 million towards the effort and the goal is to connect TLH to Fort Lauderdale/Hollywood International Airport (FLL), which is a major connection point for JetBlue destinations.

The City of Tallahassee was also recently awarded a $750,000 grant from the USDOT's Small Community Air Service Development Program (SCASDP). The grant is awarded to communities that seek to provide assistance to:

- An air carrier to subsidize service to and from an underserved airport for a period not to exceed three years;
- An underserved airport to obtain service to and from the underserved airport; and/or
- An underserved airport to implement such other measures to improve air service both in terms of the cost of such service to consumers and the availability of such service, including improving air service through marketing and promotion of air service and enhanced utilization of airport facilities.

The grant is awarded to 11 airports each year and TLH was the only recipient in Florida in 2015. Because TLH currently has only one westbound route to/from Dallas/Fort Worth International Airport (DFW) on American Airlines, there have been discussions about using the grant to attract United Airlines to conduct flights between TLH and George Bush Intercontinental Airport (IAH) in Houston. Therefore, while it is important to have a strong economy to maintain and attract air service, these types of grants and 'requests for service' may help entice airlines to test a market to evaluate whether a long-term investment would be worthwhile.

2.4.2 Load Factor Trends

Historical load factors for scheduled airline service were also reviewed for all U.S. airports, TLH, ECP, and the four other Non-Hub Primary Commercial Service Airports in Florida: Daytona Beach International Airport (DAB), Gainesville Regional Airport (GNV), Melbourne International Airport (MLB), and Punta Gorda Airport (PGD). Load factors are defined as "passenger-miles as a proportion of available seat-miles in percent" and are tracked by the BTS. As shown in **Table 2-4** and **Figure 2-5**, scheduled airline load factors at TLH were lower than those for the U.S. as a whole and many Florida airports during the period between 2011 and 2015. This does not mean that airlines are not operating profitably at TLH. It is provided to highlight that there is room for passenger growth on existing scheduled flights without an immediate need to increase frequencies and/or utilize larger aircraft, which is often what occurs during peak period. Tallahassee is also a different market than many of the other airports shown because it does not

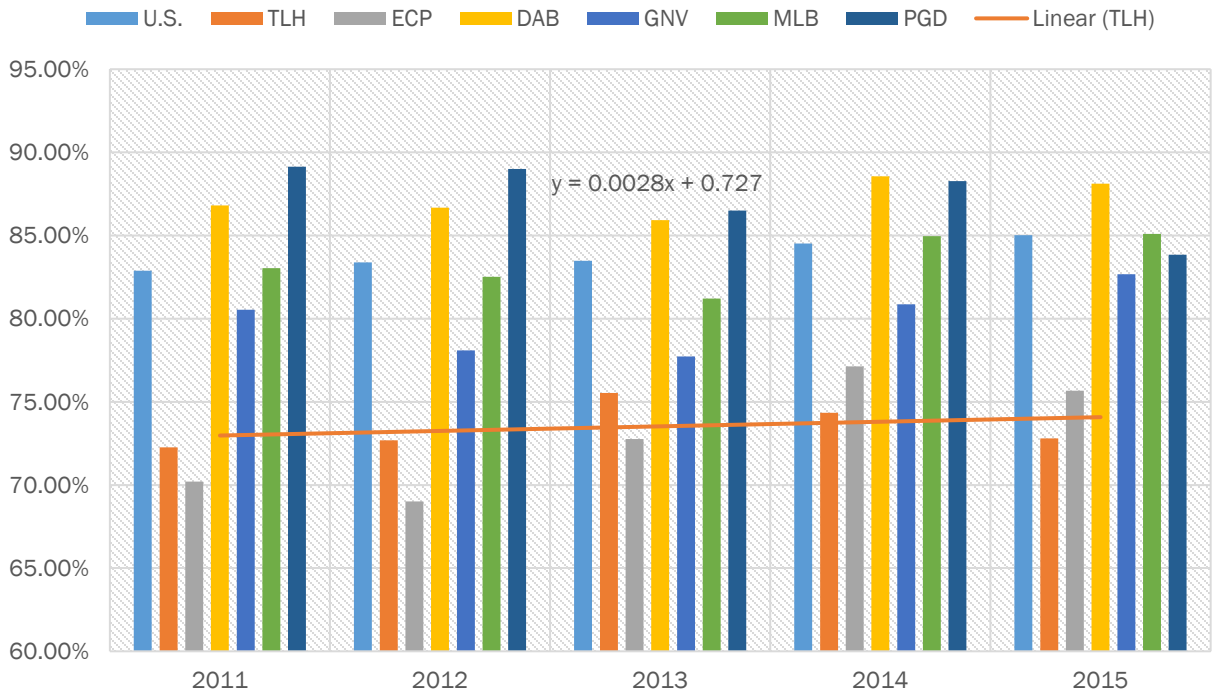
serve beachfront tourist destinations where airlines increase service during the busy season; rather, TLH provides regular year-round service where seasonal fluctuations are not as extreme. In looking at the five years of data for TLH, a trend line was produced that may be useful for projecting the airport's future load factor growth (refer to **Figure 2-5**) - the trend line projects future values to grow at an AAGR of 0.45%. By increasing the previously-determined scheduled load factor percentages for turboprops and jets by the 0.45% AAGR, the future load factor percentages in **Table 2-5** were calculated. Within the FAA Aerospace Forecast Fiscal Years 2036, load factors for domestic regional jets are projected to be at 81.00% by 2035, which is nearly the same as the forecast for jets at TLH in the same year.

Table 2-4
Airport Load Factor Comparison (2011-2015)

Year	U.S.	TLH	ECP	DAB	GNV	MLB	PGD
2011	82.88%	72.26%	70.20%	86.81%	80.54%	83.03%	89.13%
2012	83.38%	72.68%	69.02%	86.68%	78.09%	82.52%	89.00%
2013	83.48%	75.54%	72.77%	85.93%	77.73%	81.21%	86.50%
2014	84.51%	74.34%	77.14%	88.55%	80.87%	84.97%	88.28%
2015	85.01%	72.81%	75.66%	88.12%	82.68%	85.09%	83.85%
AAGR 2011-2015	0.64%	0.19%	1.89%	0.38%	0.66%	0.61%	-1.52%
2015 Enplanements (Scheduled)		331,073	434,869	299,394	209,267	217,441	404,402

Sources: BTS Load Factor database, BTS T-100 Domestic Segment database, FAA 2015 TAF, and Michael Baker International, Inc., 2016.

Figure 2-5
Load Factor Comparison (2011-2015)



Sources: BTS Load Factor database and Michael Baker International, Inc., 2016.

Table 2-5 TLH Scheduled Airline Load Factor Forecast		
Year	**Turboprop**	**Jet**
2015	62.22%	73.27%
2020	63.64%	74.95%
2025	65.10%	76.66%
2030	66.59%	78.41%
2035	68.11%	80.20%
AAGR 2015-2035	0.45%	0.45%
Source: Michael Baker International, Inc., 2016.		

2.4.3 Airport-Specific Factors

The name of the airport was recently changed from 'regional' to 'international' and ongoing terminal improvements, air service campaigns, and other initiatives are helping to not only build local excitement about what is occurring at TLH, but the City of Tallahassee was also selected as the site for a nationwide air service development conference that was held in April 2016. The City intends to provide a continuously-improving customer service experience at TLH. The City also intends to designate the airport property as an FTZ in order to provide a site where new facilities, jobs, and businesses could be fostered without being subject to high import/export fees. Although it is difficult to apply numbers to what these and other initiatives may result in at TLH, the City's proactive approach to making the airport more marketable and ready for aviation development, non-aviation development, and international travel and trade opportunities may be encouraging for potential investors.

2.4.4 FAA Next Generation Air Transportation System (NextGen)

NextGen includes a series of improvements to the national aviation system that are intended to make air travel more safe, convenient, and dependable. By investing in new technologies and replacing aging systems, NextGen initiatives are focused on improving schedule predictability, reducing environmental impacts, flying more direct routes, limiting ground holding, better circumventing poor weather, providing better approaches and access to airports, and improving safety for accident avoidance. The FAA's investment in NextGen initiatives should help to improve access and approach capability for airports around the U.S., as has been the case at TLH with the rollout of Localizer Performance with Vertical Guidance (LPV) approaches that provide horizontal and vertical course guidance to aircraft via Global Positioning System (GPS). Through the recommendations of this study and the FAA's ongoing NextGen initiatives, it is anticipated that TLH will continue to become more accessible and that airlines will be able to continue to save time and money through more efficient route planning.

2.5 Airline Forecasts

The airline forecasts were conducted for both scheduled airline passengers and operations as well as for unscheduled airline passengers and operations that are typically associated with athlete transport by the local universities and visiting teams. For the FAA's purposes, the key variable for airlines is the number of passenger enplanements or departures that occur from a commercial service airport. The number of annual enplanements determines how much AIP entitlement funds an airport will receive for that year and also determines the airport's role within the National Plan of Integrated Airport Systems (NPIAS).

Two separate airline forecast scenarios were conducted for TLH. The first represents a baseline scenario where airline passengers and operations would continue to grow at a steady rate throughout the course of the 20-year planning period. The second scenario assumes that new service would be induced at TLH via the addition of new airlines and/or routes. The purpose of conducting two scenarios is because the FAA will typically only approve a forecast that is consistent with the latest edition of the TAF unless there is sufficient evidence to prove otherwise. Because there are no firm commitments at this time, it is important to produce a baseline forecast for FAA approval purposes and to have a separate and more aggressive forecast for planning purposes within this Master Plan Update. Below are descriptions of the two airline forecast scenarios. Note that only Scenario 1 was carried through the remaining sections of this chapter.

2.5.1 Airline Forecast Scenario 1

The first step for Scenario 1 was to select a growth rate that would be appropriate to conduct the baseline enplanement forecast. Multiple growth rates were reviewed from FAA, FDOT, the socioeconomic forecasts in Chapter 1, and previous studies for the airport; however, it was ultimately determined that recent history is the best predictor of how enplanements at TLH might grow without any new/induced demand. As mentioned earlier, the enplanement growth that occurred at TLH from 2011 to 2015 produced a trend line that results in an AAGR of 1.74%, which was applied through 2035 to determine the scheduled and unscheduled enplanement forecasts for Scenario 1 in **Table 2-6**. Enplanements under Scenario 1 increase from 334,263 in 2015 to 471,648 by 2035 (or 943,295 total passengers by 2035).

The airline operations forecasts under Scenario 1 were calculated based on the enplanement forecasts and the load factor forecasts in **Table 2-5**, with the exception of the unscheduled operations forecast that was maintained at a constant ratio due to the different operating scenario (i.e., charter). For the scheduled operations, the values were calculated as follows:

Scheduled Operations = Scheduled Enplanements x 2 ÷ (Average Seat Configuration x Load Factor %)

For 2020 scheduled turboprop operations, the equation would be:

Scheduled Operations (2,411) = 26,120 x 2 ÷ (34.04 x 63.64%)

This means that new scheduled operations would not be added each year until the forecast load factor percentage is exceeded. Therefore, unlike many forecasts which simply apply a similar

growth rate to both enplanements and operations, this forecast assumes that a certain load factor threshold must be met before additional operations are added (refer to lower AAGRs for operations than enplanements in **Table 2-6**), which would be more appropriate considering some of the historical load factor percentages at TLH. Combined, scheduled and unscheduled airline operations are forecast to increase from 13,313 in 2015 to 17,116 by 2035.

2.5.2 Airline Forecast Scenario 2

Scenario 2 assumes that a new airline and/or route(s) would be added to TLH during the planning period in order to portray a scenario primarily for terminal planning purposes. Although the City of Tallahassee is actively pursuing new air service options, there are currently no firm commitments by operators. Scenario 2 builds upon Scenario 1 by adding the following flights to the mix:

- 2017 (JetBlue Embraer 190 with 100 Seats) – 1 Daily Departure and 1 Daily Arrival at 2017 Jet Load Factor Percentage
- 2017 (Possible New Airline or Route Based on Existing Sample) – 50% of 2015 DFW Passengers on American Airlines (34,208) at 2017 Jet Load Factor Percentage
- 2023 (JetBlue Embraer 190 with 100 Seats) – 2 Daily Departures and 2 Daily Arrivals at 2023 Jet Load Factor Percentage
- 2023 (Possible New Airline or Route Based on Existing Sample) – 100% of 2015 DFW Passengers on American Airlines (68,416) at 2023 Jet Load Factor Percentage

Following the addition of the flights described above, all of the procedures described under Scenario 1 were then performed to calculate the airline enplanement and operations forecasts for Scenario 2. Although the addition of these flights under Scenario 2 may seem arbitrary, they were specifically selected to complement previous capacity assessments and programming studies that have been conducted for the passenger terminal building. **Figure 2-6** illustrates the comparison between Scenarios 1 and 2 for total airline enplanements and **Figure 2-7** provides the comparison for total airline operations.

Under both scenarios in 2015 and 2035, the average passenger seating capacity for scheduled airline turboprops would be 34.04 and for scheduled airline jets would be 76.75. Therefore, the existing and forecast scheduled airline fleet is anticipated to remain similar to the current mix if 34-passenger turboprops, regional jets, and narrow-body jets. Peak airline passenger and operational demands are calculated in conjunction with the facility requirements.

2.6 Air Cargo Forecasts

The air cargo activity at TLH primarily consists of scheduled operations by FedEx using either Cessna 208 Caravan turboprops on feeder routes (primarily in Florida) or Boeing 757-200 Freighter jets that primarily fly between TLH and FedEx's hub at Memphis International Airport (MEM). FedEx previously flew 727-200 Freighter jets into Tallahassee, but the aircraft began to be phased out beginning in December 2010 until the 757 completely took over FedEx's jet operations at the airport in January 2013. Because it appears that FedEx will continue to utilize

757s for the foreseeable future at TLH, it is likely that a 757 will continue to be the airport's most demanding aircraft that conducts 500 or more annual operations (i.e., the critical aircraft).

Similar to the airline forecasts, forecasts of air cargo were conducted for scheduled and unscheduled operations, enplaned and deplaned cargo tonnage, by aircraft type, and also for belly cargo that is transported by the scheduled airlines. Since at least 2011 at TLH, the amount of enplaned and deplaned pounds of air cargo has steadily declined to a low in 2015. The recent 2015 trend is something that FedEx experienced for domestic air cargo primarily because the rapidly-growing e-commerce industry (e.g., Amazon and others) is relying heavily on ground transportation of shipments. In early 2016, Amazon announced that the company was going to lease several 767 Freighter jets to run its own/partnered air cargo service. These types of things are important to point out because of the growing influence of e-commerce in the U.S.

The FAA Aerospace Forecast Fiscal Years 2016-2036 continues to project that domestic Air Cargo Revenue Ton Miles (RTMs) will increase at an AAGR of 1.0% between 2015 and 2025. RTMs are the weight in tons multiplied by the mileage carried. All factors in **Table 2-7** were increased by an AAGR of 1.00% to calculate the air cargo forecasts for TLH.

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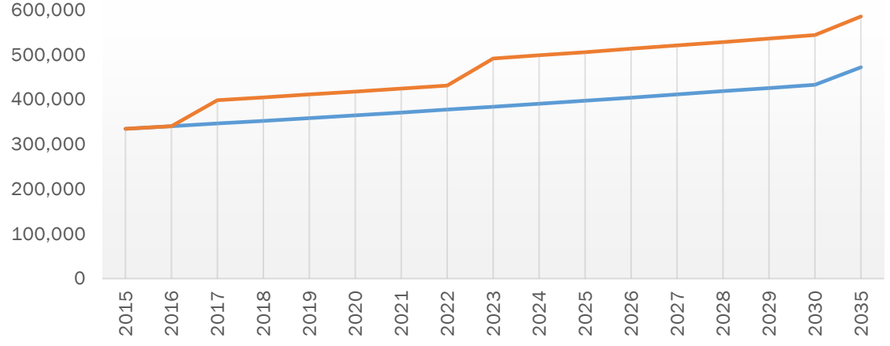
Table 2-6
Airline Forecast Scenarios (2015-2035)

Year	Total Enplanements	Scheduled Enplanements				Unscheduled Enplanements		Total Passengers	Scheduled Operations				Unscheduled Operations		Total Operations
		Turboprop	Jet	Total	% Total Enplanements	Jet	% Total Enplanements		Turboprop	Jet	Total	% Total Operations	Jet	% Total Operations	
Airline Scenario 1															
2015	334,263	23,966	307,107	331,073	99.05%	3,190	0.95%	670,144	2,292	10,936	13,228	99.36%	85	0.64%	13,313
2020	364,401	26,120	334,713	360,833	99.02%	3,569	0.98%	728,803	2,411	11,638	14,049	99.33%	95	0.67%	14,145
2025	397,147	28,468	364,800	393,268	99.02%	3,879	0.98%	794,295	2,569	12,401	14,970	99.31%	103	0.69%	15,073
2030	432,809	31,027	397,591	428,618	99.03%	4,190	0.97%	865,617	2,738	13,213	15,951	99.30%	112	0.70%	16,063
2035	471,648	33,816	433,330	467,146	99.05%	4,501	0.95%	943,295	2,917	14,079	16,996	99.30%	120	0.70%	17,116
AAGR 2015-2035	1.74%	1.74%	1.74%	1.74%	0.00%	1.74%	0.00%	1.72%	1.21%	1.27%	1.26%	0.00%	1.74%	0.47%	1.26%
Airline Scenario 2															
2015	334,263	23,966	307,107	331,073	99.05%	3,190	0.95%	670,144	2,292	10,936	13,228	99.36%	85	0.64%	13,313
2020	417,394	26,120	387,705	413,825	99.15%	3,569	0.85%	834,787	2,411	13,481	15,892	99.41%	95	0.59%	15,987
2025	505,555	28,468	473,207	501,675	99.23%	3,879	0.77%	1,011,109	2,569	16,086	18,655	99.45%	103	0.55%	18,759
2030	543,694	31,027	508,477	539,504	99.23%	4,190	0.77%	1,087,388	2,738	16,898	19,636	99.43%	112	0.57%	19,748
2035	585,068	33,816	546,751	580,567	99.23%	4,501	0.77%	1,170,136	2,917	17,764	20,681	99.42%	120	0.58%	20,801
AAGR 2015-2035	2.84%	1.74%	2.93%	2.85%	0.01%	1.74%	-1.07%	2.83%	1.21%	2.46%	2.26%	0.00%	1.74%	-0.51%	2.26%

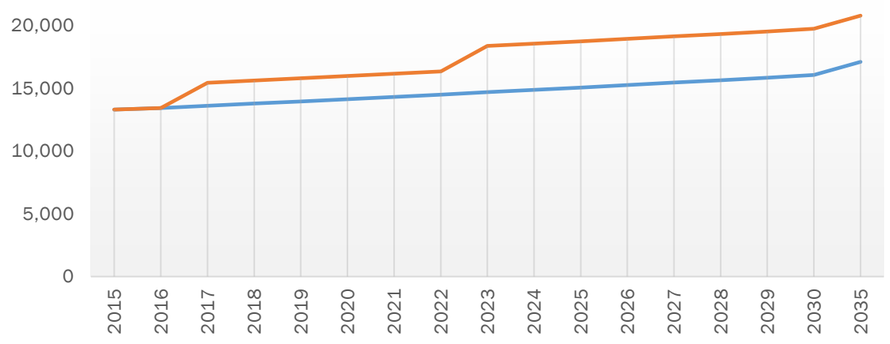
Source: Michael Baker International, Inc., 2016.

Figure 2-6
Airline Enplanements Forecast Comparison (2015-2035)



Source: Michael Baker International, Inc., 2016.

Figure 2-7
Airline Operations Forecast Comparison (2015-2035)



Source: Michael Baker International, Inc., 2016.

Table 2-7
Air Cargo Forecasts (2015-2035)

Year	Total Enplaned Cargo (lbs.)	Scheduled Enplaned Cargo				Unscheduled Enplaned Cargo		Enplaned Bell Freight/Mail		Total Cargo (lbs.)	Scheduled Operations (Critical Aircraft)				Unscheduled Operations		Total Operations
		Turboprop (lbs.)	Jet (lbs.)	Total (lbs.)	% Total	Jet (lbs.)	% Total	Airlines (lbs.)	% Total		Turboprop	Jet	Total	% Total	Jet	% Total	
2015	10,361,616	741,149	9,408,332	10,149,481	97.95%	15,342	0.15%	196,793	1.90%	19,045,447	842	524	1,366	99.71%	4	0.29%	1,370
2020	10,890,163	778,955	9,888,251	10,667,207	97.95%	16,125	0.15%	206,831	1.90%	21,780,325	885	551	1,436	99.71%	4	0.29%	1,440
2025	11,445,670	818,690	10,392,652	11,211,341	97.95%	16,947	0.15%	217,382	1.90%	22,891,341	930	579	1,509	99.71%	4	0.29%	1,513
2030	12,029,515	860,451	10,922,781	11,783,232	97.95%	17,812	0.15%	228,471	1.90%	24,059,029	978	608	1,586	99.71%	5	0.29%	1,591
2035	12,643,141	904,343	11,479,953	12,384,296	97.95%	18,720	0.15%	240,125	1.90%	25,286,281	1,027	639	1,667	99.71%	5	0.29%	1,672
AAGR 2015-2035	1.00%	1.00%	1.00%	1.00%	0.00%	1.00%	0.00%	1.00%	0.00%	1.43%	1.00%	1.00%	1.00%	0.00%	1.00%	0.00%	1.00%

Source: Michael Baker International, Inc., 2016.

2.7 Military Operations Forecast

According to the FAA Terminal Area Forecast Summary for Fiscal Years 2015-2040, "because military operations forecasts have national security implications, the Department of Defense (DOD) provides only limited information on future aviation activity. Hence, the TAF projects military activity at its present level except when FAA has specific knowledge of a change. For instance, DOD may announce a base closing or may shift an Air Force wing from one base to another." Therefore, the number of local and military operations were held at 2015 levels throughout the duration of the 20-year planning period (refer to **Table 2-8**).

Table 2-8
Military Operations Forecast (2015-2030)

Year	Itinerant (IT)		Local (LOC)		Total Military Operations
	Operations	% Total	Operations	% Total	
2015	10,151	77.70%	22.30%	2,914	13,065
2020	10,151	77.70%	22.30%	2,914	13,065
2025	10,151	77.70%	22.30%	2,914	13,065
2030	10,151	77.70%	22.30%	2,914	13,065
2035	10,151	77.70%	22.30%	2,914	13,065
AAGR 2015-2035	0.00%	0.00%	0.00%	0.00%	0.00%

Source: Michael Baker International, Inc., 2016.
AAGR – Average Annual Growth Rate

2.8 General Aviation Operations and Based Aircraft Forecasts

Many elements compose the broad definition of general aviation activity. In simplest terms, general aviation includes all segments of the aviation industry except those conducted by scheduled air carriers and the U.S. military. General aviation activities may include pilot training, sightseeing, aerial photography, law enforcement, and medical flights, as well as business, corporate, and personal travel. General aviation operations are divided into the categories of local or itinerant. Local operations are arrivals or departures performed by aircraft that remain within the airport traffic pattern, or those that occur within sight of the airport. Local operations are most often associated with training activity and flight instruction (e.g., touch-and-goes). Itinerant operations are arrivals or departures that do not remain within the airport traffic pattern and/or that originate from another airport. The FAA defines an operation as either a single aircraft landing or takeoff. Under this definition, touch-and-goes are considered two operations (one takeoff plus one landing) and are deemed local operations. Itinerant operations are typically comprised of private, business/corporate, and air taxi flight activity, but may also include law enforcement and medical flights.

Although the FAA does not project growth in general aviation operations for TLH within the 2015 TAF, the FAA Aerospace Forecast Fiscal Years 2016-2036 projects Itinerant General Aviation Operations at Airports with FAA and Contract Traffic Control Service to grow at an AAGR of 0.3% between 2015 and 2036 and Local General Aviation Operations to grow at an AAGR of 0.4% during the same time. Conversely, the 2015 TAF projects based aircraft at TLH to grow at an AAGR of 0.92 between 2015 and 2035. In order to be consistent with the FAA's general aviation based

aircraft growth expectations for TLH, the forecast of itinerant and local general aviation operations in **Table 2-9** utilized the same 0.92% AAGR.

Table 2-9
GA Operations Forecast (2015-2030)

Year	Itinerant (IT)		Local (LOC)		Total GA Operations
	Operations	% Total	Operations	% Total	
2015	23,017	76.18%	7,197	23.82%	30,214
2020	24,101	76.18%	7,536	23.82%	31,636
2025	25,235	76.18%	7,891	23.82%	33,126
2030	26,423	76.18%	8,262	23.82%	34,685
2035	27,667	76.18%	8,651	23.82%	36,318
AAGR 2015-2035	0.92%	0.00%	0.92%	0.00%	0.92%

Source: Michael Baker International, Inc., 2016.
AAGR – Average Annual Growth Rate

As shown in **Table 2-10** and **Figure 2-8**, the general aviation operations by aircraft type forecast was determined by using projected growth rates from the FAA Aerospace Forecast Fiscal Years 2016-2036 for General Aviation and Air Taxi Hours Flown. Growth rates were specifically applied for turboprops, jets, and helicopters, while remainders were applied to piston aircraft based on their existing share of total general aviation operations. The general aviation based aircraft by type forecast in **Table 2-11** was also determined using projected growth rates from the FAA Aerospace Forecast, in addition to making realistic growth assumptions for based pistons and helicopters.

Table 2-10
GA Operations by Aircraft Type Forecast (2015-2035)

Year	Single-Engine Piston (SEP)	Multi-Engine Piston (MEP)	Turboprop	Jet	Helicopter	Total GA Operations
2015	17,133	2,560	3,346	5,161	2,014	30,214
2020	17,159	2,564	3,622	6,012	2,279	31,636
2025	17,071	2,551	3,922	7,004	2,578	33,126
2030	16,846	2,517	4,246	8,159	2,917	34,685
2035	16,458	2,459	4,596	9,504	3,301	36,318
AAGR 2015-2035	-0.20%	-0.20%	1.60%	3.10%	2.50%	0.92%

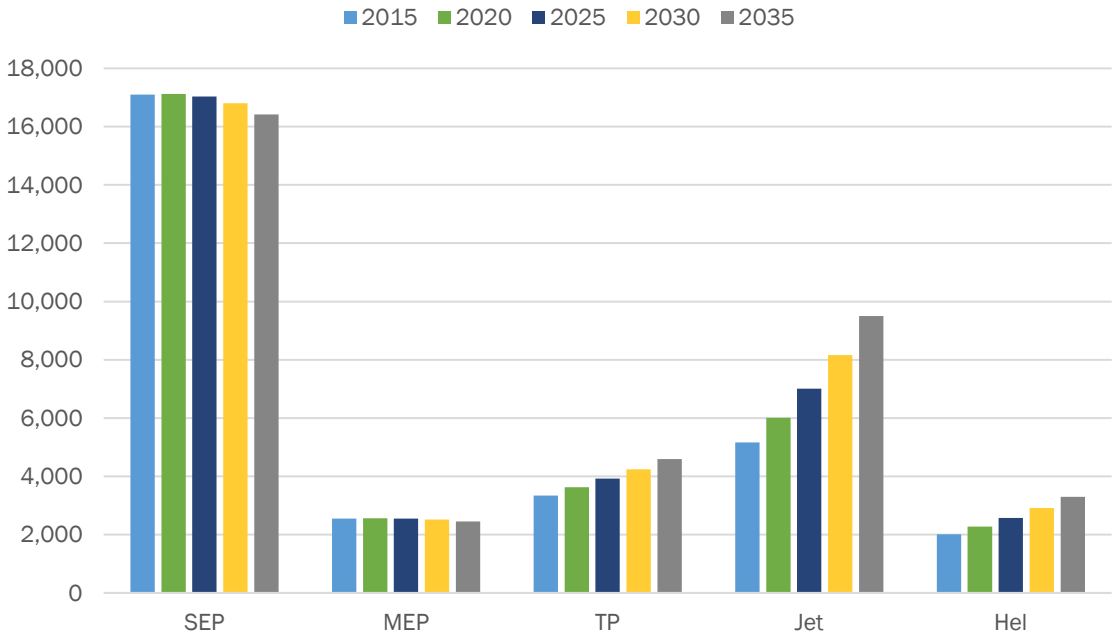
Source: Michael Baker International, Inc., 2016.
AAGR – Average Annual Growth Rate

Table 2-11
GA Based Aircraft by Type Forecast (2015-2035)

Year	Single-Engine Piston (SEP)	Multi-Engine Piston (MEP)	Turboprop	Jet	Helicopter	Total GA Based Aircraft
2015	84	10	6	4	15	119
2020	88	10	6	5	16	125
2025	92	10	7	5	16	131
2030	96	10	8	6	17	138
2035	101	10	8	7	18	145
AAGR 2015-2035	0.92%	0.00%	1.60%	3.10%	0.92%	0.98%

Source: Michael Baker International, Inc., 2016.
AAGR – Average Annual Growth Rate

Figure 2-8
GA Operations by Type Forecast (2015-2035)



Source: Michael Baker International, Inc., 2016.

2.9 Combined Operations Forecasts

The previous forecasting efforts were combined to create the overall operations local and itinerant operations forecast in **Table 2-12**, which results in total operations at TLH increasing from 57,921 in 2015 to 68,122 by 2035. **Figure 2-9** illustrates the specific breakdown of operations by user group and shows that general aviation activity is forecast to remain the most prevalent category of aviation activity at TLH throughout the 20-year planning period. The combined operations by aircraft type forecast is presented in **Table 2-13**.

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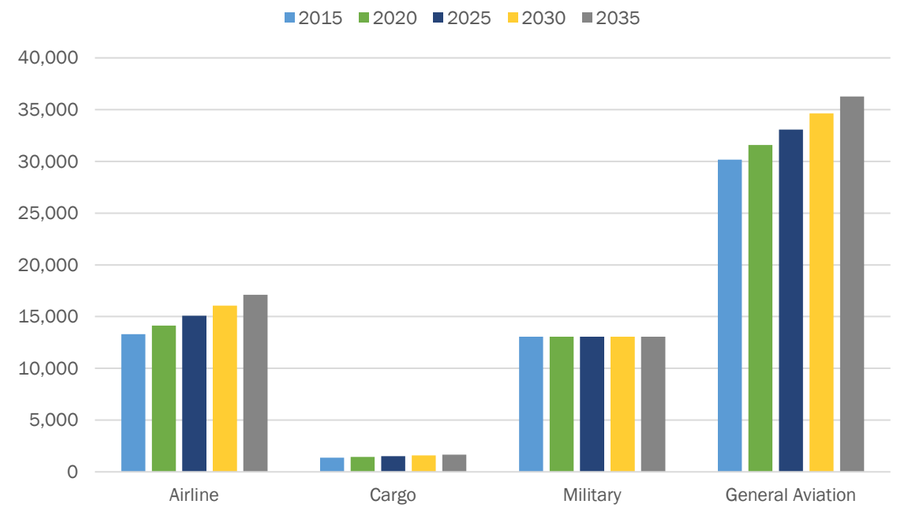
Table 2-12
Combined Local and Itinerant Operations Forecast (2015-2035)

Year	Itinerant (IT)						Local (LOC)				Total Operations
	Airline	Cargo	Military	General Aviation	IT Total	% Total Operations	Military	General Aviation	LOC Total	% Total Operations	
2015	13,313	1,370	10,151	22,976	47,810	82.54%	2,914	7,197	10,111	17.46%	57,921
2020	14,145	1,440	10,151	24,058	49,793	82.65%	2,914	7,536	10,450	17.35%	60,243
2025	15,073	1,513	10,151	25,190	51,928	82.78%	2,914	7,891	10,805	17.22%	62,733
2030	16,063	1,591	10,151	26,376	54,180	82.90%	2,914	8,262	11,176	17.10%	65,356
2035	17,116	1,672	10,151	27,618	56,557	83.02%	2,914	8,651	11,565	16.98%	68,122
AAGR 2015-2035	1.26%	1.00%	0.00%	0.92%	0.84%	0.03%	0.00%	0.92%	0.67%	-0.14%	0.81%

Source: Michael Baker International, Inc., 2016.
AAGR – Average Annual Growth Rate

Figure 2-9
Operations by User Group Forecast (2015-2035)



Source: Michael Baker International, Inc., 2016.

Table 2-13
Combined Operations by Aircraft Type Forecast (2015-2035)

Year	Jet					Turboprop					SEP		MEP		Helicopter		Military		Total Operations
	Airline	Cargo	GA	Total	% Total	Airline	Cargo	GA	Total	% Total	GA/Total	% Total	GA/Total	% Total	GA/Total	% Total	Total	% Total	
2015	11,021	528	5,161	16,710	28.85%	2,292	842	3,346	6,480	11.19%	17,099	29.52%	2,555	4.41%	2,012	3.47%	13,065	22.56%	57,921
2020	11,733	555	6,012	18,300	30.38%	2,411	885	3,622	6,919	11.48%	17,124	28.43%	2,559	4.25%	2,276	3.78%	13,065	21.69%	60,243
2025	12,504	583	7,004	20,091	32.03%	2,569	930	3,922	7,421	11.83%	17,035	27.16%	2,545	4.06%	2,575	4.10%	13,065	20.83%	62,733
2030	13,325	613	8,159	22,097	33.81%	2,738	978	4,246	7,961	12.18%	16,809	25.72%	2,512	3.84%	2,913	4.46%	13,065	19.99%	65,356
2035	14,199	644	9,504	24,347	35.74%	2,917	1,027	4,596	8,541	12.54%	16,419	24.10%	2,453	3.60%	3,296	4.84%	13,065	19.18%	68,122
AAGR 2015-2035	1.27%	1.00%	3.10%	1.90%	1.08%	1.21%	1.00%	1.60%	1.39%	0.57%	-0.20%	-1.01%	-0.20%	-1.01%	2.50%	1.67%	0.00%	-0.81%	0.81%

Source: Michael Baker International, Inc., 2016.
AAGR – Average Annual Growth Rate

2.10 Instrument Operations Forecast

According to the FAA report, Forecasting Aviation Activity by Airport, instrument operations consist of "arrivals, departures, and overflights conducted by an FAA approach control facility for aircraft with an Instrument Flight Rule (IFR) flight plan or special Visual Flight Rule (VFR) procedures." At TLH, IFR activity is tracked by the ATCT and consisted of 35,679 operations or 61.60% of total activity. During the forecast period, it is anticipated that the percentage of IFR operations will increase at the same AAGR as total operations, which equates to 49,353 operations by 2035 and 72.42% of total activity. The increasing IFR trend should be appropriate considering the FAA's ongoing NextGen improvements that are being conducted to improve access to airports and efficiency within the nation's airspace system.

Table 2-14
Instrument Operations Forecast (2015-2035)

Year	Total Operations	Instrument (IFR)		Visual (VFR)	
		Operations	% Total Operations	Operations	% Total Operations
2015	57,921	35,679	61.60%	22,242	38.40%
2020	60,243	38,645	64.15%	21,598	35.85%
2025	62,733	41,908	66.80%	20,825	33.20%
2030	65,356	45,467	69.57%	19,889	30.43%
2035	68,122	49,353	72.45%	18,769	27.55%
AAGR 2015-2035	0.81%	1.64%	0.81%	-0.85%	-1.65%

Source: Michael Baker International, Inc., 2016.

2.11 Peaking Forecasts

This section includes the peaking forecasts for operations and general aviation passengers only. Peaking considerations for the passenger terminal and airline activity are presented as part of the facility requirements. Peaking forecasts are conducted so that airports can plan for times when the highest concentration of activity occurs. **Table 2-15** presents the peak activity forecasts for TLH and the methodology for each component is detailed below.

- **Average Peak Month (APM) –** Through a review of historical ATCT records, it was found that the APM represented 10.21% of annual activity in 2015.
- **Average Day Peak Month (ADPM) –** An average month contains 30.42 days (365 ÷ 12). The ADMP was calculated by dividing the APM by 30.42.
- **Average Day Peak Hour (ADPH) –** The ADPH at TLH can include a combination of touch-and-go training operations and itinerant activity and was estimated at 17.50% of the ADPM. The IFR and VFR peak hours were calculated based on the percentages shown in **Table 2-14**.

Table 2-15 Peaking Forecasts (2015-2035)					
Year	APM	ADPM	ADPH	IFT Peak Hour	VFR Peak Hour
2015	5,914	194	34	21	13
2020	6,151	202	35	23	13
2025	6,405	211	37	25	12
2030	6,673	219	38	27	12
2035	6,955	229	40	29	11
AAGR 2015-2035	0.81%	0.81%	0.81%	1.64%	-0.85%
Source: Michael Baker International, Inc., 2016. AAGR – Average Annual Growth Rate					

2.12 Forecast Summary

According to the FAA's June 2008 Review and Approval of Aviation Forecasts guidance, total enplanements, operations, and based aircraft forecasts are considered consistent with the TAF if they differ by less than 10% in the five-year forecast period and 15% in the 10-year forecast period. As shown in **Table 2-16**, all forecasts are consistent with the TAF even the based aircraft forecast. The TAF did not have the correct based aircraft values in 2015 as the airport reported, but the overall growth rates are very close for the Master Plan Update at TAF forecasts over the 20-year planning period.

Table 2-16 TAF Comparison Table						
Item	2015	2020	2025	2030	2035	AAGR 2015-2035
Enplanements						
Master Plan	334,263	364,401	397,147	432,809	471,648	1.74%
2015 TAF	335,550	366,077	405,823	433,429	468,366	1.68%
Difference	-0.38%	-0.46%	-2.14%	-0.14%	0.70%	N/A
Operations						
Master Plan	57,921	60,243	62,733	65,356	68,122	0.81%
2015 TAF	59,148	59,794	61,290	62,598	64,271	0.42%
Difference	-2.07%	0.75%	2.35%	4.41%	5.99%	N/A
Based Aircraft						
Master Plan	119	125	131	138	145	0.98%
2015 TAF	99	104	109	114	119	0.92%
Difference	-16.81%	-16.68%	-16.79%	-17.14%	-17.71%	N/A
Source: Michael Baker International, Inc., 2016. AAGR – Average Annual Growth Rate						

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Chapter 3

Facility Requirements

Master Plan Update

TALLAHASSEE
INTERNATIONAL AIRPORT

3.0 Facility Requirements

The airport facility requirements analysis focuses on assessing the aviation and non-aviation components of Tallahassee International Airport (TLH) including the runways and taxiways, passenger terminal aircraft storage facilities, supporting infrastructure (e.g. roadways and parking), and undeveloped properties. Assessing the ability of TLH's existing facilities to accommodate current and future demand involves translating the forecasted aviation activity into specific physical features.

TLH plays a critical role in the economic development of the City of Tallahassee. As previously noted in prior sections, the Master Plan Update will focus on supporting the vision and goals for the airport. The City is currently in the process of developing TLH as a Foreign Trade Zone (FTZ) on different parcels of the airport. The FTZ will serve to offset U.S. Custom's duty payments for goods entering the United States and is in line with the goal of supporting the economic development of the City of Tallahassee, providing sites where new facilities, jobs, and businesses are fostered without being subject to high import/export fees. These become important considerations of the facility requirements when planning for future facilities and land development opportunities for land use at TLH.

In addition to supporting the goals and vision of the City of Tallahassee, it is important to consider meeting the criteria for Federal Aviation Administration (FAA) design standards as identified in FAA Advisory Circular (AC) 150/5300-13A, Airport Design, and other appropriate guiding documents. The objective is to identify the adequacy of the existing airport facilities and outline what new facilities may be needed, and when they may be needed to accommodate forecast demands during the 20-year planning period from 2015 to 2035. Having established these facility requirements, alternatives for providing these requirements will be evaluated in subsequent chapters.

The chapter identifies the requirements for airfield and landside facilities to accommodate the arrival, departure, and ground movement of aircraft. The airside facilities will include all facilities that support the movement of aircraft (e.g., runways, taxiways, navigational aids and lighting systems). The landside facilities will include: terminal area, and general aviation landside facilities. This will typically include facilities that integrate the airfield with the public (e.g., hangars, fixed base operator (FBO), aircraft parking aprons, aircraft fueling, surface access and automobile access, utilities, and other related support facilities. Air cargo facilities will be analyzed as a separate airfield category, these facilities include the air cargo apron, and air cargo facility. Facility requirements have been developed for the various airport functional areas listed below.

- Commercial Aviation requirements;
- General Aviation requirements;
- Cargo Aviation requirements;
- Support Facilities;
- Ground access, circulation, and parking requirements;

- Infrastructure and utilities;
- Land use compatibility and control; and
- Airport Security Analysis.

3.1 Planning Horizon

Specific components of the airfield and landside system can be evaluated to determine their capacity to accommodate future demand using the updated aviation demand forecast established for TLH. Although the facility requirements section will be based on projected levels of demand for 5, 10, and 20-year timeframes, it is equally as significant to supplement the timeframes with actual forecast demand (**Table 3-1**). This is determined by establishing planning horizon milestones to consider the reasonable range of aviation demand projections. The time frame for addressing development needs usually involves short-term (0-5 years), mid-term (6-10 years), and long-term (11-20 years) planning periods. The short-term analysis focuses on the immediate action items, the mid-term focuses on the more detailed analysis and the long-term primarily focuses on the ultimate role of the airport.

As presented previously in the forecast chapter, actual activity at the airport will vary over time and may be higher or lower than what the demand forecast predicts. Using the time frames as milestones allows the airport the flexibility to make decisions and develop facilities according to need generated by actual demand levels.

Table 3-1
Planning Horizon Activity Levels

	Base Year (2015)	5 Year (Short-term 2020)	10 Year (Mid-term 2025)	20 Year (Long-term 2035)
Demand Indicators				
Enplaned Passengers	334,263	364,401	397,147	471,648
Air Cargo (lbs.)	10,361,616	10,890,163	11,445,670	12,643,141
Total Based Aircraft	119	125	131	145
Annual Operations (Combine Local & Itinerant)				
Airline	13,313	14,145	15,073	17,116
Air Cargo	1,370	1,440	1,513	1,672
General Aviation	30,173	31,594	33,081	36,269
Military	13,065	13,065	13,065	13,065
Total Operations	57,921	60,244	62,732	68,122

Source: Michael Baker International, Inc., 2016.

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3.2 City of Tallahassee Vision Statement

In 2010, the Tallahassee City Commission adopted the vision statement (below). Although the vision statement is for the City as a whole, specific elements are applicable of the goals and objectives for TLH.

Tallahassee, Florida, a city that remembers its past while focusing on the future – a vibrant capital city: fostering a strong sense of community, cherishing our beautiful natural environment, and ensuring economic opportunities for all citizens.

The City of Tallahassee vision statement is used to support future development objectives for TLH. In support of the strategic vision, this chapter will translate the forecast demand into specific types and quantities of facilities that can adequately serve the identified demand. Future land parcels will be identified for developing facilities to support the Foreign Trade Zones (FTZ) designation, which will complement the new international airport designation by allowing businesses to import and export goods by reducing U.S. Customs delays, and high Customs taxes on merchandise.

As previously mentioned, the FTZ designation will support the City of Tallahassee's vision of economic development by encouraging businesses to take part in foreign commerce and stimulating the local economy through international trade opportunities. The airport and the City's economic development department should continue working together to actively market TLH for such opportunities. This is emphasized through support of a cost-competitive environment, favorable tax structure, no personal income tax, industry-specific incentives and workforce training programs. This Master Plan Update will identify areas where targeted development projects could occur at TLH and/or the redevelopment of existing facilities may be beneficial to supporting the City of Tallahassee's vision statement.

3.3 Review of 2006 Requirements and Recommendation

Part of this requirements analysis effort is to evaluate previously recommended facility improvements and projects to identify their current status. It is important to recognize the numerous projects that have been completed in response to the previous Master Plan effort. A majority of the previous recommendations for facility requirements in the 2006 approved Master Plan Update have been implemented. The projects were reviewed to identify the status of completion. The previously recommended improvements which have not been implemented will be revaluated. **Table 3-2** identifies the projects and their current status.

Table 3-2 2006 Facility Requirements Summary	
Runways	Routine pavement maintenance for all runways (***Ongoing***) Widen and extend Runway 18-36 blast pads ***(Complete)*** Reconstruct Runway 9-27 ***(Complete)*** Conduct Benefit-Cost Analysis for potential Runway 18-36 extension ***(Complete)*** Potential Runway 18-36 extension ***(Complete)*** Maintain all imaginary and safety related surfaces ***(Ongoing)*** Maintain RPZ clear of obstacles ***(Ongoing)***
Taxiways	Widen Taxiways C, D, E, and F to 75 feet ***(Complete)*** Straighten Taxiway C ***(Complete)*** Add fillet pavement where appropriate ***(Ongoing)*** Widen Taxiway W ***(Complete)*** Rehabilitate Taxiway Z as a ramp ***(Incomplete)*** Construct high-speed exit taxiways along Runway 9-27 ***(Complete- Non-preferential)*** Construct new taxiway connector at the southwest corner of the existing apron ***(Complete)*** Enhance connections between the taxiway system north of Runway 9-27 and east of Runway 18-36 ***(Ongoing)*** Rehabilitate taxiway pavements throughout planning period ***(Ongoing)*** Construct run-up areas for Runway 18 ***(Complete)*** Construct by-pass taxiway for Runway 9 and 27 ***(Incomplete)*** Rehabilitate Lively taxiway ***(Complete)***
Airfield (Navigational, Lighting, Signage)	Conduct Environmental Assessment for precision approach ***(Complete)*** Establish RNAV precision approach to Runway 9 and 18 ends ***(Complete)*** Relocate Remote Transmitter/Receiver (RTR) ***(Complete)*** Replace ASR-8 with ASR-11 ***(Complete)*** Rehabilitate beacon ***(Ongoing)*** Refurbish all runway and taxiway lighting ***(Ongoing)*** Install MITL along Taxiway P ***(Complete)*** Install MALSR off Runway 9 and 18 ends when RNAV precision approach capability is available ***(Complete)*** Equip new cargo apron with blue edge lights ***(Complete)*** Add and replace signage as necessary ***(Ongoing)***
Pavement Markings	Periodic remarking of all pavement surfaces (***Ongoing***) Upgrade north GA apron marking (***Unknown***) Relocate lead-in-lines (***Complete***)
Security	Upgrade video surveillance camera systems ***(Complete)***
Air Cargo	Construct cargo apron space to accommodate four B727 aircraft ***(Complete)*** 4,400 square feet of storage space for FedEx. ***(Complete)*** 13,500 square feet of office/storage space ***(Complete)*** 60 automobile parking spaces. ***(Complete)*** Provide 23,400 square feet of tractor-trailer parking and storage ***(Complete)*** Construct access road to cargo area ***(Complete)***
Helicopter Facilities	Construct helicopter blast pads ***(Incomplete)*** Create approach/takeoff procedures for helicopters ***(Incomplete)***
General Aviation Facilities	Rehabilitate or construct 12,930 square yards of aircraft apron space Construct new FBO ***(Complete)*** Construct self-fueling facility ***(Complete)*** Reconfigure landside access (***Ongoing***) Redevelopment of the old concourse (***Ongoing***) Refurbish or demolish Ivan Monroe hangar (Flightline) ***(Complete)*** Relocate fence along Lively Technical Center taxiway (***Ongoing***) Extend Lively apron Extend State of Florida Forestry Service apron ***(Complete)***
Utility	Construct canopy or roof system on top of existing fuel storage facility Construct new electrical vault Conduct a storm-water master plan Develop a centralized GIS system that would identify airport utility
Access and Infrastructure	Widen Capital Circle SW ***(Ongoing)*** Construct divisional islands on Capital Circle SW ***(Ongoing)***
Source: 2006 TLH Airport Master Plan Update	

3.4 Airfield Capacity

Airfield capacity is a function of the airport's physical facilities or components; its layout or geometry; its operating environment, including the airspace associated with the airport and specific Airport Traffic Control (ATCT) and flight procedures; the mix of aircraft using the airport; and weather conditions (i.e., ceiling, visibility, and winds).

This purpose of the airfield capacity analysis is to assess the capability of the airfield facilities to accommodate forecast levels of aircraft operations. Estimates of airfield capacity were developed in accordance with the methods presented in FAA AC 150/5060-5, Airport Capacity and Delay (Capacity AC). This methodology does not account for every possible situation at an airport, but rather the most common situations observed at U.S. airports when the Capacity AC was adopted. The Capacity AC provides a methodology for determining the Hourly Airfield capacity, Annual Service Volume (ASV), and Delay, which are defined below:

- **Hourly Airfield Capacity –** An airport's hourly airfield capacity represents the maximum number of aircraft that can be accommodated under conditions of continuous demand during a one-hour period. Using peak hour forecasts, the hourly airfield capacity is determined for both VFR and IFR activity.
- **Annual Service Volume (ASV) –** The ASV estimates the annual number of operations that the airfield configuration should be capable of handling with minimal delays. The ASV accounts for peaking characteristics in its calculation of 12-month demand as well as periods of low-volume activity.
- **Delay –** The average anticipated delay is based on a ratio of forecast demand to the calculated ASV. According to the Capacity AC, "as demand approaches capacity, individual aircraft delay is increased. Successive hourly demands exceeding the hourly capacity result in unacceptable delays."

3.4.1 Annual Capacity

According to the Capacity AC methodology, the annual capacity estimates were based on comparing the long-range forecast for TLH to determine if there are future capacity concerns. TLH's ASV was determined to be 225,000 annual operations for two perpendicular runways. **Table 3-3** identifies the ratio of annual demand to annual capacity ranges from 25% in 2015 to 30% in 2035. The Capacity AC recommends that an airport begin planning for additional runway capacity when demand reaches 60% and begin construction when demand reaches 80% of the ASV. **Table 3-3** shows that operations levels forecast will not cause concern for capacity.

Table 3-3
Capacity Analysis

Annual Demand / Capacity	2015	2020	2025	2030	2035
Forecast Annual Operations	57,921	60,243	62,733	65,356	68,122
Annual Service Volume (ASV)	225,000	225,000	225,000	225,000	225,000
Annual Demand/ Capacity	25%	27%	28%	29%	30%

Source: Michael Baker International, Inc., 2016

FAA Order 5090.3C, Field Formulation of the National Plan of Integrated Airport Systems (NPIAS), also indicates that improvements for airfield capacity purposes should begin to be considered once operations reach 60% to 75% of the annual service volume (ASV). Since this range is not anticipated to be reached at TLH, major capacity improvements such as new runways should not be considered necessary over the course of the 20-year planning horizon.

3.5 Airside Facilities

The airside facilities are directly related to the movement of aircraft. These include the runways, taxiways and airfield lighting. An evaluation of the airside components includes the following:

- Runway use and wind coverage;
- Critical aircraft identification;
- Identification of design standards;
- Airfield design standards compliance;
- Runway length analysis;
- Runway width analysis;
- Runway pavement strength analysis;
- Taxiway system; and
- Airfield lighting, markings, signage, and navigational aids.

3.5.1 Runway Use and Wind Coverage Analysis

Tallahassee International Airport has two perpendicular runways (Runways 9-27 and 18-36), with a left traffic pattern. Runway 9-27 is currently the primary runway measuring 8,000 feet in length and 150 feet in width Runway 9-27 is primarily utilized for commercial and cargo operations. The airport's secondary runway, Runway 18-36, is currently 7,000 feet in length and 150 feet in width. Each runway is served by full length parallel taxiways, exit taxiways and taxilane connectors. Runway 9-27 is served by parallel Taxiway B, Runway 18-36 is served by Taxiway A.

The FAA AC 150/5300-13A, Airport Design (Airport Design AC) recommends that a runway orientation provide at least 95% wind coverage for any aircraft forecasted to use the airport on regular basis. If runway coverage cannot be provided by a single runway a crosswind runway is recommended. The Airport Design AC notes that the 95% wind coverage is computed on the basis that crosswinds not exceed the following aircraft classes:

- 10.5 knots for A-I and B-I
- 13 knots for A-II and B-II
- 16 knots for A-III, B-III, and C-I through D-III
- 20 Knots for A-IV through D-VI

Wind coverage for Runways 18-36 and 9-27 was presented in **Table 1-4** of the inventory chapter of this Master Plan Update report. Based on the hourly wind observation data obtained from the National Climatic Data Center (NCDC), the orientation of Runways 18-36 and 9-27 provide

sufficient wind coverage that exceeds the FAA's recommended standard of 95% wind coverage for all aircraft classes. **Table 3-4** identifies the current wind coverage for TLH for all weather conditions. Given the present layout and adequate wind coverage, no additional crosswind runway or realignment is required.

Table 3-4
Runways 9-27 and 18-36 Coverage Analysis (2005-2015)

	All Weather Coverage % (Knots)				Visual Flight Rule (VFR) Coverage % (Knots)				Instrument Flight Rule (IFR) Coverage % (Knots)			
Runway	10.5	13	16	20	10.5	13	16	20	10.5	13	16	20
9-27	95.94	97.90	99.63	99.95	95.67	97.47	99.24	99.85	95.98	97.98	99.70	99.97
18-36	96.09	97.88	99.48	99.88	96.11	97.63	98.99	99.64	96.06	96.06	99.56	99.92
Combined	99.60	99.92	99.99	100.00	99.32	99.80	99.97	100.00	99.65	99.65	100.00	100.00
	121,273 Observations				18,278 Observations				97,300 Observations			

Source: Station 722140 Tallahassee International Airport, Florida, 2005-2015.

3.5.2 Critical Aircraft Identification

According to FAA AC 150/5070-6B, Airport Master Plans, the Critical (Design) Aircraft is defined as "the most demanding aircraft with at least 500 annual operations that operates, or is expected to operate, at the airport." FAA AC 150/5000-17, Critical Aircraft and Regular Use Determination, defines the critical aircraft as the most demanding aircraft type, or grouping of aircraft with similar characteristics regularly using the airport. Regular use is defined as 500 annual operations, either a takeoff or landing excluding touch-and-go.

The existing critical aircraft must be identified based on documented aeronautical activity, typically for the most recent 12-month period that is available. The future critical aircraft is based on a FAA-approved forecast and any change to the existing critical aircraft must be supported by a credible forecast. The 2006 Master Plan Update identified the Boeing 737-800 and C-130 as the existing and future critical aircraft for both runways at TLH. Although review of the aeronautical activity for the most recent 12-month period did show operations by the previously identified critical aircraft, aeronautical activity did not show regular use (500 annual operations) of either aircraft during 2015.

Based on the review of the aviation activity forecast, the appropriate existing and future critical aircraft meeting the 500 annual operations requirement threshold for Runways 9-27 and 18-36 is the Boeing 757-200. The Boeing 757-200 family of aircraft consists of passenger commercial aircraft and package freighter aircraft versions. At TLH, the aircraft is primarily used for cargo freight operations operated by Federal Express (FedEx) and some passenger commercial airline operations operated by Delta Airlines and American Airlines. The Boeing 757-200 has a wingspan of 125 feet, an approach speed of 137 knots, and a maximum takeoff weight of 255,500 pounds. **Table 3-3** identifies the critical aircraft and its characteristics.

3.5.3 Airport Reference Code

The FAA developed minimum standards for the planning and design of airport facilities. These standards are described in the Airport Design AC which provides criteria for characterizing aircraft

into an Airport Reference Code (ARC). The ARC is defined by the critical Aircraft Approach Category (AAC) which is based on the approach speed and the Airplane Design Group (ADG) which is based on the tail height and wingspan of critical aircraft.

The Airport Design AC provides guidance on defining the Airport Reference Code (ARC). The ARC is used to relate airport criteria to the operational and physical characteristics of the critical aircraft at the airport. The ARC is composed of two components. The first is the Aircraft Approach Category, depicted by a letter and relates to the aircraft approach speed. The Airport Design AC groups the approach speeds into five categories shown in **Table 3-5**. Aircraft included in the approach categories A and B typically include small piston aircraft. Category C consists of business jets, regional jets, and narrow-bodied commercial aircraft. Categories D and E include aircraft with higher performance business and narrow-bodied jets as well as larger wide-bodied commercial and military aircraft.

The second component of the ARC is the airplane design group, which is depicted by a Roman numeral. The critical aircraft is categorized by its wingspan or tail height. This component is primarily used when planning for taxiways and apron space area. Aircraft included in ADG I and II are primarily small piston aircraft, business jets, turboprop aircraft and some commercial regional jets. ADG III includes large business jets and most regional and narrow body commercial aircraft. ADG IV and V include commercial jetliners and military service. ADG VI includes the largest transport aircraft such as the Airbus A380. **Table 3-5** identifies the group categories. The airfield design standards identified in the 2011 Airport Layout Plan (ALP) Update were based on ARC Category C-IV which were the most demanding type anticipated to operate at the airport. Review of the current and forecast aircraft operational activity determined that the ARC is expected to remain the same for this Master Plan Update.

Forecasted activity presented in the forecast chapter indicate that operations from C-IV aircraft will increase throughout the planning period, primarily due to the Boeing 757-200. Later sections of this Master Plan Update consider the characteristics of the Boeing 757-200 and a Runway Design Code (RDC) of C-IV to determine the facility requirements at TLH. **Table 3-5** identifies the RDC of the critical aircraft. It is important to note that not all airport facilities will be evaluated to accommodate the most demanding aircraft. Specific airside and landside facilities, such as taxiways intended for small aircraft and general aviation (GA) sections of the airport, are designed to accommodate less demanding aircraft. These sections of the airfield will be analyzed for general aviation aircraft and a RDC of B-II.

Table 3-5
Runway Design Code (RDC) and Critical Aircraft

Critical Aircraft	
Critical Aircraft	Being 757-200PW
Aircraft Type	Jet
Aircraft Approach Category/Approach Speed	C / 137 Knots
Airplane Design Group/Wingspan	IV / 125 Feet
Runway Design Code (RDC)	RDC C-IV
Tail Height	45.0 Feet
Main Gear Width	28.2 Feet
Cockpit to Main Gear	72.2 Feet
Taxiway Design Group (TDG)	TDG-4
Max Takeoff Weight (MTOW)	255,500 Pounds
Max Landing Weight (MLW)	210,000 Pounds
Max Passengers	Cargo Freight

Runway Design Code				
Aircraft Approach Category (AAC)		Airplane Design Group (ADG)		
Category	Approach Speed (Knots)	Group	Tail Height (Feet)	Wingspan (Feet)
A	<91	I	<20	<49
B	91 to <121	II	20 to <30	49 to <79
C	121 to <141	III	30 to <45	79 to <118
D	141 to <166	IV	45 to <60	118 to <171
E	>166	V	60 to <66	171 to <214
		VI	66 to <80	214 to <262

Sources: FAA AC 150/5300-13A, Airport Design, and Boeing Aircraft Company.

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3.5.4 Airfield Design Standards

The runways, taxiways and aircraft parking aprons at TLH were analyzed for compliance with FAA design standards and the ability to handle existing and forecast levels of demand. The FAA defines the requirements for airfield design standards in the Airport Design AC. These include the numerous safety area and separation standards that must be followed to ensure that aircraft have adequate wingtip-to-wingtip clearances, overrun protection, and obstruction–free movement areas. The selection of the appropriate design standards for airfield facilities is primarily based on the characteristics of the most demanding aircraft (critical aircraft) currently and forecasted to use the airport on regular basis. In addition to the Airport Design AC, the NPIAS states that "Airport dimensional standards should be selected in accordance with the critical aircraft that will make substantial use of the airport in the planning period. Substantial use is defined as 500 or more annual itinerant operations or scheduled commercial service."

Although many of the airfield design standards are self-explanatory, important features as the Runway Safety Area (RSA), Runway Object Free Area (ROFA), and Runway Protection Zone (RPZ) are further defined and discussed in **Table 3-6**, Airfield Compliance Requirements.

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Table 3-6 Airfield Compliance Requirements	
Design Standards	**Description/ Current Status**
Runway Safety Area (RSA)	The RSA is a rectangular surface that is centered on the runway. The FAA dictates that RSAs shall be: "1) cleared and graded and have no potentially hazardous ruts, humps, depressions, or other surface variations; 2) drained by grading or storm sewers to prevent water accumulation; 3) capable, under dry conditions, of supporting snow removal equipment, aircraft rescue and firefighting equipment, and the occasional passage of aircraft without causing structural damage to the aircraft; and 4) free of objects, except for objects that need to be located in the RSA because of their function."
Runway Object Free Area (ROFA)	The ROFA must be clear of ground objects protruding above the RSA edge elevation and is a rectangular surface that is centered on the runway. The ROFA is intended to "enhance the safety of aircraft operations by having the area free of objects, except for objects that need to be located in the ROFA for air navigation or aircraft ground maneuvering purposes.
Runway Obstacle Free Zone (ROFZ)	The ROFZ Is an imaginary volume of airspace which precludes the object penetrations, including taxing and parked aircraft. The only objects allowed in the ROFZ are navigational aids mounted on frangible bases which are fixed in their location by function (i.e. airfield signs).
Runway Protection Zone (RPZ)	The RPZ's function is to enhance the protection of people and property on the ground. This is achieved through airport owner control over RPZs. Such control includes clearing RPZ areas (and maintaining them clear) of incompatible objects and activities. Control is preferably exercised through the acquisition of sufficient property interest in the RPZ." In 2012, the FAA issued a memorandum on Interim Guidance on Land Uses within a Runway Protection Zone. The information in the memorandum will be used to coordinate any potential changes to the RPZs with the FAA. The RPZ for Runway 9-27 extends off the airport property beyond the 27 end. The RPZ extends onto the Thomas P. Smith Water Reclamation Facility (TPSWRF), which is currently owned by the City of Tallahassee. Specific ordinances are in place to prohibit further development in the RPZ.
Runway/Taxiway Separation	The design standards for separation between runways and parallel taxiways are a function of the critical design aircraft and the instrument approach visibility minimum. The runway to taxiway separation standard for RDC C-IV runways is 400 feet (centerline to centerline). Parallel Taxiways A, and B meet this standard and should be maintained for the planning period.
Hold Separation	Hold lines are markings on taxiways leading to runways. Before advancing onto the runway, pilots are to stop short of the hold line. Runways 9-27 and 18-36 separation from runway centerline to the hold line meet the current standard and should be maintained for the planning period
Source: FAA Advisory Circular 150/5300-13A, Airport Design, Michael Baker International, Inc. 2016	

Tables 3-7 through 3-9 summarize the airfield design standards for existing conditions at TLH, with non-standard or non-preferential conditions identified in red. The standards are based on the C-IV Runway Design Code (RDC). However as previously stated, not all facilities need to be designed to accommodate the critical aircraft. Some airside and landside facilities, such as the general aviation areas that are not intended to serve larger aircraft, may be designed to accommodate less demanding aircraft. **Table 3-9** presents the airfield design standards for the general aviation areas with an RDC of B-II (small aircraft). The criteria identified in blue are specific to the general aviation areas. **Figure 3-2** depicts areas on the airfield that are non-standard or do not currently conform to the FAA design standards.

Table 3-7
Evaluation of Existing Airfield Design Standards (Runway 9-27)

Design Standard	Required Dimension	Runway 9 Evaluation	Runway 27 Evaluation
Runway Design Code (RDC)	C-IV		
RW Approach Visibility Minimums	Varies by End	1 ¼	½ Mile
Runway (RW) Width	150’	Meets Standards	
RW Safety Area (RSA) Width	500’	Meets Standards	
RSA Length Beyond RW End	1000’		
RW Object Free Area (ROFA) Width	800’	Meets Standards	
ROFA Length Beyond RW End	1000’		
RW Obstacle Free Zone (ROFZ) Width	400’	Meets Standards	
ROFZ Length Beyond RW End	200’		
RW Protection Zone (RPZ) Inner Width	500’	Meets Standards	Meets Standards
RPZ Outer Width	1010’	Meets Standards	Meets Standards
RPZ Length	1700’	Meets Standards	Meets Standards
RPZ Notes	Not Applicable	RPZ Extends off Airport Property (27 End)	
RW Blast Pad Width	200’	Meets Standards (200’)	
RW Blast Pad Length	200’		
RW Shoulder Width	25’	Meets Standards	
Taxiway (TW) Width (TDG-4)	50’	Meets Standards	
TW Safety Area (TSA) Width	171’	Meets Standards	
TW Object Free Area (TOFA) Width	259’	Meets Standards	
Taxilane (TL) Object Free Area Width	225’	Meets Standards	
TW Shoulder Width (TDG-4)	20’	Meets Standards	
RW Centerline to Parallel TW Centerline	450’	Meets Standards (600’)	
RW Centerline to Holdline	250’	Meets Standards (275’)	
RW Centerline to Aircraft Parking Area	500’	Meets Standards	
TW Centerline to Parallel TW/TL Centerline	400’	Meets Standards	
TW Centerline to Fixed or Movable Object	129.5’	Meets Standards	
TL Centerline to TL Centerline	198’	Meets Standards	
TL Centerline to Fixed or Movable Object	112.5’	Meets Standards	
RW Surface Gradient and Line of Sight	2.0	Meets Standards	

Source: Michael Baker International, Inc., 2016.

Table 3-8
Evaluation of Existing Airfield Design Standards (Runway 18-36)

Design Standard	Required Dimension	Runway 18 Evaluation	Runway 36 Evaluation
Runway Design Code (RDC)	C-IV		
RW Approach Visibility Minimums	Varies	1 Mile	½ Mile
Runway (RW) Width	150’	150’ (Meets Standards)	
RW Safety Area (RSA) Width	500’	Meets Standards	
RSA Length Beyond RW End	1000’		
RW Object Free Area (ROFA) Width	800’	Meets Standards	
ROFA Length Beyond RW End	1000’		
RW Obstacle Free Zone (ROFZ) Width	400’	Meets Standards	
ROFZ Length Beyond RW End	200’		
RW Protection Zone (RPZ) Inner Width	500’	Meets Standards	Meets Standards
RPZ Outer Width	1010’	Meets Standards	Meets Standards
RPZ Length	1700’	Meets Standards	Meets Standards
RPZ Notes	Not Applicable	Not Applicable	
RW Blast Pad Width	200’	Meets Standards (200’)	
RW Blast Pad Length	200’		
RW Shoulder Width	25’	Meets Standards	
Taxiway (TW) Width (TDG-4)	50’	Meets Standards	
TW Safety Area (TSA) Width	171’	Meets Standards	
TW Object Free Area (TOFA) Width	259’	Meets Standards	
Taxilane (TL) Object Free Area Width	225’	Meets Standards	
TW Shoulder Width (TDG-4)	20’	Meets Standards	
RW Centerline to Parallel TW Centerline	400’	Meets Standards (400’)	
RW Centerline to Holdline	250’	Meets Standards (275’)	
RW Centerline to Aircraft Parking Area	500’	Meets Standards	
TW Centerline to Parallel TW/TL Centerline	400’	Meets Standards	
TW Centerline to Fixed or Movable Object	129.5’	Meets Standards	
TL Centerline to TL Centerline	198’	Meets Standards	
TL Centerline to Fixed or Movable Object	112.5’	Meets Standards	
RW Surface Gradient and Line of Sight	2.0	Meets Standards	

Source: Michael Baker International, Inc., 2016.

Table 3-9 Evaluation of Existing Airfield Design Standards (General Aviation Areas)		
Design Standard	**Required Dimension**	**GA Evaluation**
Runway Design Code (RDC)	B-II	
RW Approach Visibility Minimums	Not Applicable	Not Applicable
Runway (RW) Width	75’	Not Applicable
RW Safety Area (RSA) Width	150’	Not Applicable
RSA Length Beyond RW End	300’	
RW Object Free Area (ROFA) Width	300’	Not Applicable
ROFA Length Beyond RW End	500’	
RW Obstacle Free Zone (ROFZ) Width	Not Applicable	Not Applicable
ROFZ Length Beyond RW End	Not Applicable	
RW Protection Zone (RPZ) Inner Width	500’	Not Applicable
RPZ Outer Width	700’	Not Applicable
RPZ Length	1,000’	Not Applicable
RPZ Notes	Not Applicable	Not Applicable
RW Blast Pad Width	95’	Not Applicable
RW Blast Pad Length	150’	
RW Shoulder Width	10’	Not Applicable
Taxiway (TW) Width	35’	Meets Standards
TW Safety Area (TSA) Width	79’	Meets Standards
TW Object Free Area (TOFA) Width	131’	Meets Standards
Taxilane (TL) Object Free Area Width	115’	Meets Standards
TW Shoulder Width	15’	Meets Standards
RW Centerline to Parallel TW Centerline	400’	Not Applicable
RW Centerline to Holdline	Not Applicable	Not Applicable
RW Centerline to Aircraft Parking Area	Not Applicable	Not Applicable
TW Centerline to Parallel TW/TL Centerline	105’	Meets Standards
TW Centerline to Fixed or Movable Object	65.5’	Meets Standards
TL Centerline to TL Centerline	97’	Meets Standards
TL Centerline to Fixed or Movable Object	57.5’	Meets Standards
RW Surface Gradient and Line of Sight	Not Applicable	Not Applicable
Source: Michael Baker International, Inc., 2016.		

3.5.5 Runway Length Analysis

Runway length requirements are based on the critical aircraft (current or projected), using the airport on a regular basis. TLH serves a variety of aircraft ranging from small GA propeller aircraft to large commercial jets on a regular basis. Runway length is determine based on a series of steps presented in the in FAA AC 150/5325-4B, Runway Length Requirements for Airport Design (Runway Length AC), and the critical aircraft's Aircraft Performance Manual (APM). According to Runway Length AC, when the maximum takeoff weight of the critical aircraft exceeds 60,000 pounds, the recommended runway length is determined based on the individual aircraft. In addition, the FAA states the design objective for the primary runway is to provide length for all aircraft that will regularly use it without causing operational weight restrictions.

The 2006 Master Plan Update assessed the runway length for both runways using the Runway Length AC methodology. The findings suggested that weight restrictions for some aircraft would need to be implemented for Runway 18-36. The weight restrictions were used to ensure aircraft are able to take off on the available runway length. Since the 2006 Master Plan Update, both runways (Runways 9-27 and 18-36) at TLH have undergone substantial upgrades. The two-phase upgrades included an extension of Runway 18-36 in early 2012, and reconstruction of Runway 9-27 with electrical and navigation systems in 2014. Runway 9-27 was reconstructed to correct for design standard deficiencies for line-of-sight issues and Runway 18-36 was extended to a length of 7,000 feet. The extension of Runway 18-36 increased the capability of the runway and enabled Runway 9-27 to be closed for rehabilitation, while continuing to accommodate operations. In addition to the extension project, the keel section of Runway 18-36 was reconstructed to improve the condition of the pavement.

Aircraft Performance Manual Based Length Calculations

Similar to the 2006 Master Plan Update, the runway length analysis was calculated based on the methodology presented in Table 1.1 of FAA AC 150/5325-4B (see **Table 3-10** below). The Maximum Takeoff Weight (MTOW) of the critical aircraft dictates how the runway length analysis is determined. According to the Runway Length AC, runway length analysis for regional jets and aircraft with a MTOW of more than 60,000 pounds should be calculated using the Aircraft Performance Manuals (APM) of the aircraft using the airport on a "substantial use" basis (i.e., 500 annual operations). In addition to the Runway Length AC, the FAA Order 5090.3C, Field Formulation of the National Plan of Integrated Airport Systems (NPIAS), states, "airport dimensional standards (such as runway length and width, separation standards, surface gradients etc.) should be based on the critical aircraft that will make substantial use (500 or more annual itinerant operations) of the airport during the planning period.

The methodology is governed by multiple factors including: airport elevation, runway gradient (difference between runway low and high end elevation), runway conditions (wet and dry), aircraft takeoff and landing weights, mean maximum and daily temperatures, and length of trips/haul. All of these factors were considered in the runway length requirements. The Runway Length AC states that the length of haul determines the operating takeoff weight for the design aircraft under evaluation.

Review of the historical 2015 operations activity determined that few, if any, aircraft operations would actually depart TLH at MTOW. Approximately 74% of the aircraft departing from TLH were flying routes of less than 500 nautical miles, 25% between 500 and 999 miles, and one percent occurred within the 1,000 to 1,499-mile range. Since this analysis is based on the ability of the runway system to accommodate existing and future destinations, which do not include long haul routes, the operating takeoff weights were used.

Table 3-10
Aircraft Weight Categorization for Runway Length Requirements (Boeing 757-200 Series)

Aircraft Weight Category Maximum Certified Weight (MTOW)			Design Approach	Location of Design Guidelines
12,500 Pounds or less	Approach Speed less than 30 knots		Family Grouping of Small Aircraft	Chapter 2: Paragraph 203
	Approach speeds of at least 30 knots but less than 50 knots		Family Grouping of Small Aircraft	Chapter 2: Paragraph 204
	Approach Speeds of 50 knots or more	With less than 10 Passengers	Family Grouping of Small Aircraft	Chapter 2: Paragraph 205 (Figure 2-1)
		With more than 10 Passengers	Family Grouping of Small Aircraft	Chapter 2: Paragraph 205 (Figure 2-2)
Over 12,500 pounds but less than 60,000 pounds			Family Grouping of Large Aircraft	Chapter 3: Figure 3-1 or 3-2 & Tables 3-1 or 3-2
60,000 pounds or more			Individual Large Aircraft	Chapter 4: Aircraft Performance Manual (APM)

Based on the Runway Length AC methodology, runway length is determined based the airport's mean high temperature (92.0 degrees Fahrenheit) for the hottest month of July, elevation (83 feet), the length of haul performed by aircraft operating the runway, and the APM. Aircraft Performance Manual (APM) charts published for the Boeing 757-200 with various engine models (Pratt & Whitney, Rolls Royce) were used to determine the runway length. **Table 3-11** shows runway length requirements for the Boeing 757-200 for the Pratt & Whitney and Rolls Royce series engine models.

Runway 9-27

Runway 9-27 accommodates a wide range of aircraft and is the primary runway used by turboprop, jet, and cargo aircraft. The runway is currently 8,000 feet long and is grooved to provide adequate drainage during wet runway conditions. As presented in **Table 3-11**, the landing and takeoff requirements for both engine models of the Boeing 757-200 (critical aircraft) are based on the aircraft performance manual. The distances flown by these aircraft are between 500 and 1,000 nautical miles and are not heavily loaded by passengers or fuel. In addition, cargo aircraft are primarily flying short haul routes to and from Memphis, Tennessee (FedEx). Analysis of aircraft activity at TLH determined that few, if any, aircraft will be operating at MTOW. Given this factor, it was determined that the critical aircraft operate at 90% useful loads. **Table 3-11** presents operational requirements for the Boeing 757-200 at 90% useful loads. As presented in **Table 3-11**, the takeoff and landing lengths are adequate to serve the Boeing 757-200 at TLH. Therefore, no recommended changes to the runway length are necessary at this time.

Runway 18-36

Table 1-2 of the FAA Runway Length AC guidance, states, "an additional runway is used for capacity, noise mitigation, or regional jet service, then it should have a runway length equal to 100% of the primary runway length." However, if the "secondary primary" runway cannot be built to meet the length of the primary runway length (9-27), it should be designed to accommodate the most demanding aircraft regularly using it without causing operational weight restrictions.

Although Runway 18-36 was historically referred to as a crosswind runway, according to Part 150 Records of Approval, *Operational Control No. 1* (Operational Control 1) the runway is utilized as an additional primary runway for noise mitigation purposes. Operational Control 1 details the need for a modification of Air Traffic Control procedures to increase the use of Runway 9-27 departures of air carrier and military jet activity by approximately 40% and to reduce military and jet activity by 40% on Runway 18-36.

Since Runway 18-36 is used for noise mitigation, the runway should technically be 100% of the length of the primary runway (9-27). As previously noted in this section, since Runway 18-36 has been extended to 7,000 feet, TLH does not have further plans to extend the runway. As shown in **Table 3-11,** the current runway length of 7,000 feet accommodates the critical aircraft and no changes to the runway length are recommended at this time.

Table 3-11
Boeing 757-200 Series Runway Length Requirements

Design Criteria	Data			
Aircraft Type	Boeing 757-200 Pratt & Whitney (PW2040 Series)		Boeing 757-200 Rolls Royce (RB. 211-535E4 Series)	
Airport Elevation	83 Feet above Mean Sea Level (MSL)		83 Feet above Mean Sea Level (MSL)	
Maximum Takeoff Weight (MTOW)	255,500 (LBS)		255,500 (LBS)	
90 % Useful Load	229,950 (LBS)		229,950 (LBS)	
Maximum Landing Weight (MLW)	210,000 Pounds (LBS)		210,000 (LBS)	
100% Design Takeoff Weight	255,500 Pounds (LBS)		255,500 (LBS)	
Runway	Runway 9-27	Runway 18-36	Runway 9-27	Runway 18-36
Difference in centerline elevation	12.1' (60.6'-48.5')	26.7' (83'-56.3')	12.1' (60.6'-48.5')	26.7' (83'-56.3')
Takeoff Length Requirements (20° Flaps, Standard Day + 25°F, 90 % Useful Load, Dry)	5,900' Feet	5,900' Feet	5,995' Feet	6,400' Feet
Takeoff Length adjusted for difference in Elevation	6,021' Feet	6,167' Feet	6, 116' Feet	6,667' Feet
Takeoff Length Requirements (20° Flaps, Standard Day + 25°F, 90 % Useful Load, Wet)	6,200' Feet	6,200' Feet	5,900' Feet	5,900' Feet
Takeoff Length adjusted for difference in Elevation (Wet)	6,321' Feet	6,467' Feet	6,021' Feet	6,167' Feet
Runway Landing Length Requirements (Dry)	3,900' Feet		4,600' Feet	
Runway Landing Length Requirements (Wet)	4,500' Feet		5,250' Feet	

Source: FAA Advisory Circular 150/5325-4B, Runway Length Requirements, Boeing 757-200 Aircraft Performance Manual (APM) for Airport Planning August 2002, FAA 5010 Airport Master Records Form, NOAA Temperature Data 1981-2010

3.5.6 Runway Width

According to the Airport Design AC, the required width of a runway is a function of the critical aircraft (Boeing 757-200) ADG designation. The pavement must be wide enough to accommodate the dimensions of the critical aircraft. The minimum width for an ARC C-IV runway width with a precision instrument approach is 150 feet. Runways 9-27 and 18-36 meet the 150 feet width requirement and are adequate for accommodating operations through the 20-year planning period. In addition, the Airport Design AC recommends that runways designed for operations from aircraft in ADG IV or higher have paved shoulders. Currently, both Runways 9-27 and 18-36 have paved shoulders

3.5.7 Runway Pavement Strength

Runway pavement strength is critical to the safe operations of aircraft operating at TLH. According to AC 150/5320-6F, Airport Pavement Design and Evaluation (Pavement Guidance), the critical aircraft expected to use the airport during the planning period is used to determine the required pavement strength, or weight bearing capacity, of airfield surfaces. The required pavement strength is based on the weight of the aircraft, landing gear type and aircraft operations numbers. Pavement design strength is not the maximum allowable weight: limited operations by heavier aircraft other than the critical aircraft may be allowable; however, it is important to note that frequent operations by heavier aircraft will shorten the lifespan of the pavement. At TLH, pavement must be able to support multiple operations of large commercial/cargo aircraft on a daily basis.

The existing runway pavement strengths are reported to be:

- Runway 18-36: Single Wheel (S) 115,000 lbs. Dual Wheel (D) 170,000 lbs. Dual Tandem (2D) 330,000 lbs.
- Runway 9-27: Single Wheel (S) 115,000 lbs. Dual Wheel (D) 170,000 lbs. Dual Tandem (2D) 330,000 lbs.

The existing pavement strength for Runways 9-27 and 18-36 is sufficient and should be maintained throughout the planning period to accommodate large commercial aircraft usage such as the Boeing 757-200. However, as previously mentioned in the inventory chapter of this Master Plan Update, a review of the pavement conditions for Runway 18-36 indicated poor conditions. These sections are outside of the keel section along the entire length of the runway. Pavement rehabilitation of these sections is recommended during the 20-year planning period. **Figure 3-1** illustrates the current pavement conditions at the airport.

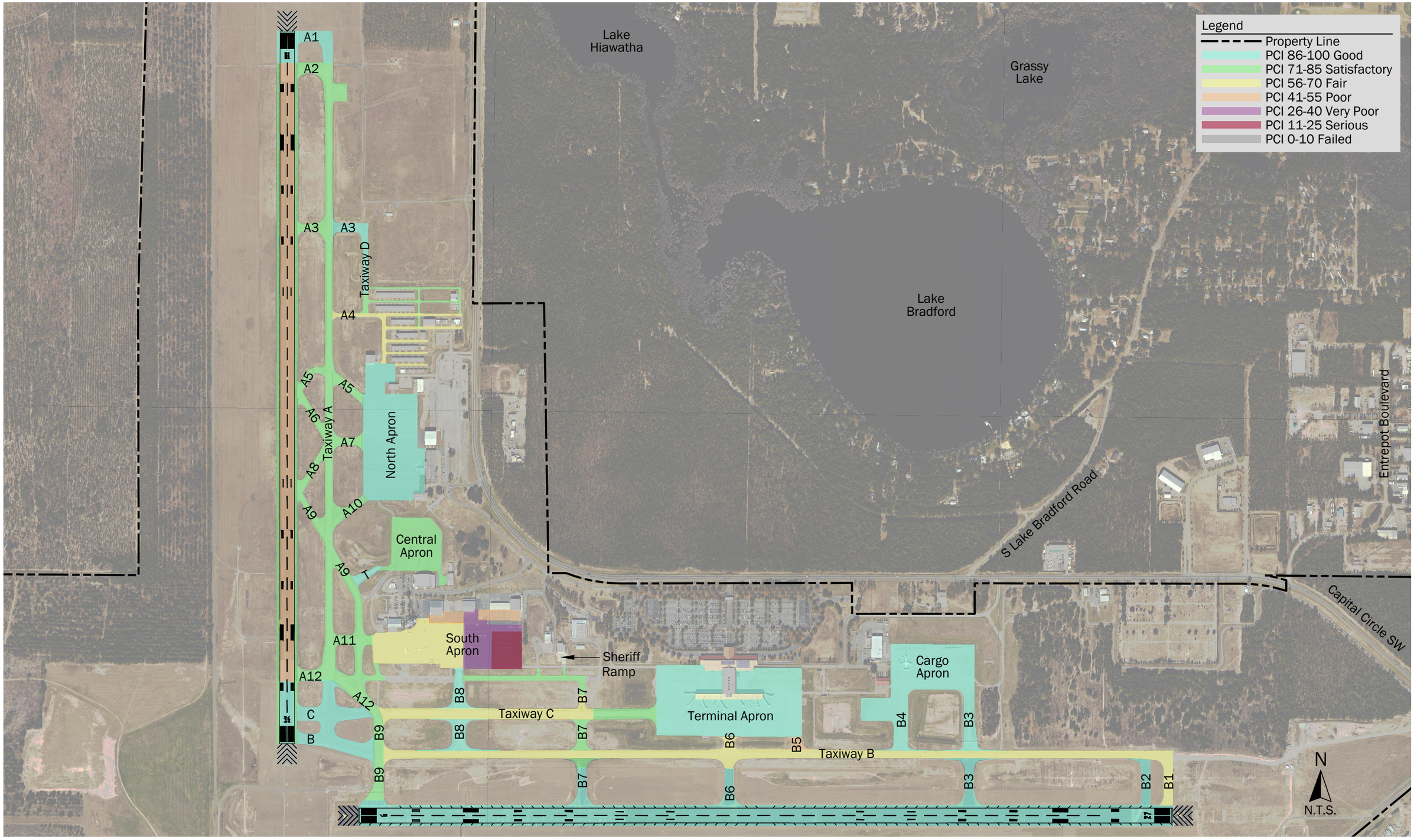

Figure 3-1 Airfield Pavement Condition Index

3.5.8 Taxiway System

Effective taxiway systems provide the orderly movement of aircraft and enhance operational efficiency and safety by reducing the potential for congestion, runway crossings, and pilot confusion. The Airport Design AC provides guidance on recommended taxiway and taxilane layouts to avoid runway incursions and to enhance the overall safety at the airport.

The existing taxiway system serving Runways 9-27 and 18-36 has two full-length parallel taxiways for both runways with multiple exit taxiways and connector taxilanes. The system of taxiways and taxilanes at TLH provide access to the runways, aircraft parking areas, general aviation facilities, terminal building, and cargo facilities. The recommended width for the taxiway system is based on the Taxiway Design Group (TDG). The TDG is a function of the critical aircraft's (Boeing 757-200) Main Gear Width (MGW) and Cockpit to Main Gear dimensions. The recommended TDG for taxiways serving the Boeing 757-200 is TDG-IV. The widths for taxiways classified under TDG-IV is 50 feet. As previously noted in the inventory chapter, the taxiways associated with Runways 9-27 and 18-36 meet or exceed the recommended width of 50 feet. However, taxiways leading to the general aviation facilities of the airport have varying widths. Considering that these taxiways serve smaller aircraft using the general aviation facilities, it is not necessary to have a width of 50 feet. The general aviation area is classified as B-II and requires 35-foot taxiway length.

Similar to the Runway Safety Areas (RSAs), all taxiways have a Taxiway Safety Area (TSA) and Taxiway Object Free Area (TOFA) centered on the taxiway centerline. The design standards associated with taxiway safety areas are also based on the Main Gear Width (MGW) and the Cockpit to Main Gear (CMG) distance of the critical design aircraft expected to use both taxiways.

Taxiway Design Configuration

The Airport Design AC provides recommended guidance on taxiway and taxilane layouts to enhance safety by avoiding runway incursions. A runway incursion is defined by the FAA as "unauthorized intrusion onto a runway, regardless of whether or not an aircraft presents a potential conflict." The Airport Design AC, states that, "existing taxiway geometry should be improved whenever feasible, with emphasis on designated hot spots."

In addition to the Airport Design AC, FAA Engineering Brief 75 (EB-75), Incorporation of Runway Incursion Prevention into Taxiway and Apron Design, provides guidance on design strategies of taxiways and aprons to help prevent runway incursions. According to EB-75, "these design strategies are only recommendations. They are not a set of standards that must be followed whenever possible. Airfield design is often a process that must balance safety, efficiency, capacity, and other factors. There will be cases where the strict application of these recommendations is unjustified and unwise. Instead, use the recommendations as a checklist to insure the runway incursion aspects of any design proposal are properly considered." Many of these recommendations have also been incorporated into the Airport Design AC.

- Limit the number of aircraft crossing an active runway
    - The preference is for aircraft to cross in the last third of the runway whenever possible, since within the middle third of the runway the arriving/departing aircraft is usually on the ground and traveling at a high rate of speed
- Optimize pilots' recognition of entry to the runway (increase situational awareness) through design of taxiway layout, for example:
    - Use a right angle for taxiway-runway intersections (except for high speed exits)
    - Limit the number of taxiways intersecting in one spot
    - Avoid wide expanses of pavement at runway entry
- Insure the taxiway layouts take operational requirements and realities into account to:
    - Safely and efficiently manage departure queues
    - Avoid using runways as taxiways
    - Use taxiway strategies to reduce the number of active runway crossings
    - Correct runway incursion "hot spots"

The existing taxiway system at TLH generally provides efficient movement of aircraft; however, several situations on the taxiway have the potential to cause an increase in the number of runway incursions at TLH. The Airport Design AC provides new recommendations for taxiway design. One particular recommendation that is applicable to TLH is limiting direct access to runways from aprons without a perpendicular turn to reduce the potential for runway incursions.

The non-preferential taxiway designs include several taxiways that provide direct apron-to-runway access. As depicted in **Figure 3-2**, Taxilanes B3 and B6 provide direct access from apron onto Runway 9-27. Taxiway B3 provides direct access from the Cargo Apron and Taxiway B6 provides direct access from the Terminal Apron, resulting in aircraft leaving the non-movement area to taxi directly onto Runway 9-27 without impediment, causing pilot confusion, and increasing the potential for a runway incursion. These taxiways will be further evaluated in the alternatives chapter to consider various designs to improve taxiway layout providing perpendicular access to the runway.

Right angle intersections are the standard for all runway/taxiway intersections, except where there is a need for a high-speed exit. Right angle taxiways provide the best visual perspective to a pilot approaching an intersection with the runway to observe aircraft in both the left and right directions. EB-75 suggests airports avoid acute-angled taxiways to exit the runway because the abrupt angle requires the pilot to slow down considerably on the runway to negotiate the turn, resulting in additional runway occupancy time, decreasing efficiency, increasing the possibility of a runway incursion and creates difficulty with pilots' recognition of the runway entrance. **Figure 3-2** presents several locations along Taxiway A where acute angle taxiways (Taxiways A5, A6, A8, and A9) are used.

In addition to the above standards and recommendations, the FAA recently revised the standards for taxiway fillet geometry as part of the Airport Design AC, which are areas where taxiways turn and extra pavement is needed to meet the necessary turn radii of the critical aircraft.

Recommendations for improved fillet geometry are presented as part of the alternatives analysis to acknowledge these non-conforming airfield design issues.

Runway/Taxiway Separation

The design standards for the separation between runways and parallel taxiways are a function of the critical aircraft (Boeing 757-200) and the instrument approach visibility minimum. The separation standard for RDC C-IV is 400 feet from the runway centerline to the parallel taxiway centerline. This standard applies to the taxiway/taxilane segments that are parallel to Runways 18-36 and 9-27. Taxiway A is 400 feet from Runway 18-36; therefore, Taxiway A meets separation design standards. Taxiway B is 600 feet from Runway 9-27, and Taxiway C is 1,000 feet from Runway 9-27 and 400 feet from Taxiway B. All parallel taxiways meet or exceed separation standards and are sufficient for the planning period.

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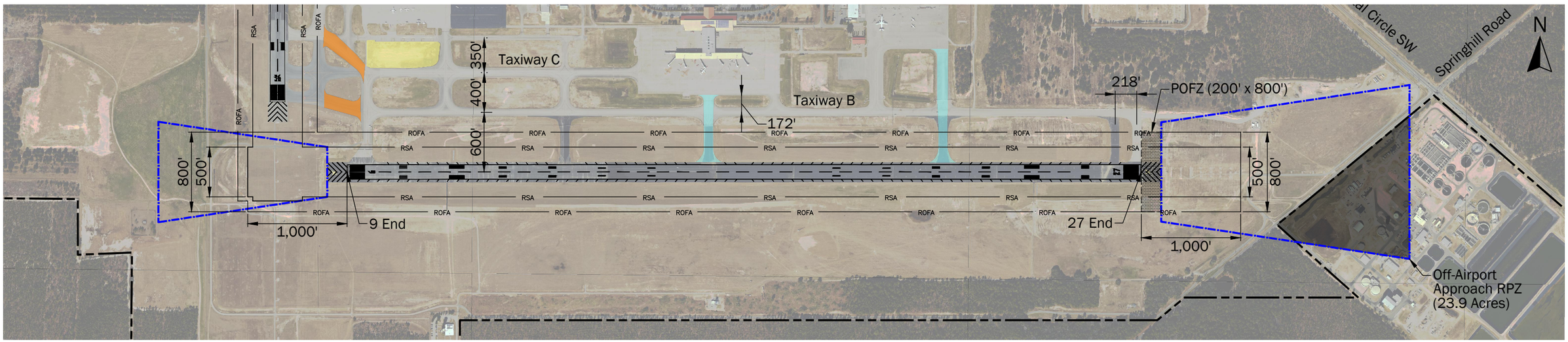
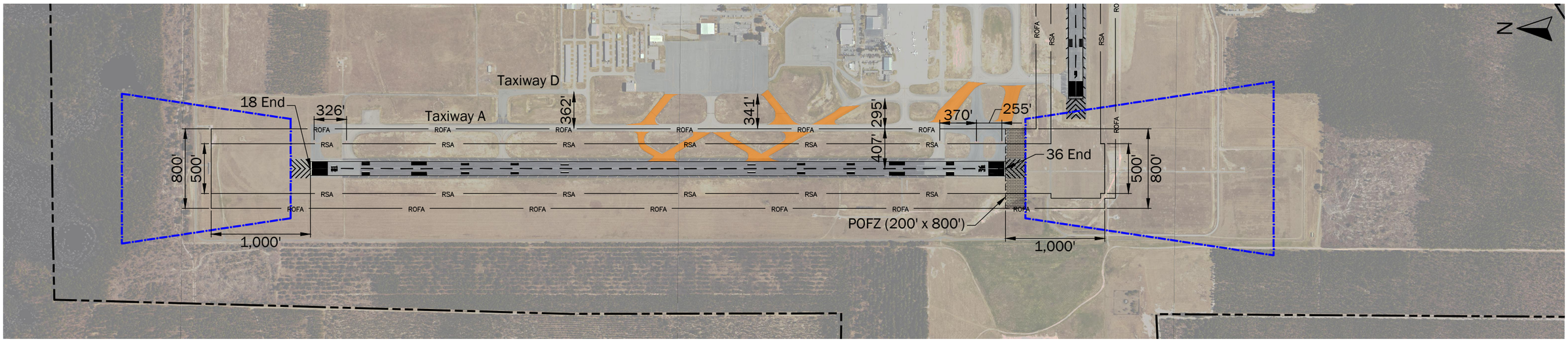
Legend

- Property Line
- Approach Runway Protection Zone
- Runway Safety Area (RSA)
- Runway Object Free Area (ROFA)
- Off-Airport Approach RPZ
- Non-Preferential Direct Access Taxiway
- Helicopter Rotor Backwash Disturbed Land
- Acute Angle Taxiways



Runway 9-27 (8,000' x 150')



Runway 18-36 (7,000' x 150')

0 1,000' 2,000'

Scale: 1" = 1,000'

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Michael Baker INTERNATIONAL

Figure 3-2 Airfield Design Standards Analysis

3.6 Federal and State Service Levels

As previously noted in the inventory chapter of this Master Plan Update, the 2015-2019 NPIAS report designates Tallahassee International Airport as a Primary Non-hub Airport. Public-use airports included in the NPIAS are grouped into two major categories; primary and non-primary. Primary airports are further categorized into Large, Medium, Small, and Non-hubs. Non-primary airports are further categorized into National, Regional, Local, Basic, and Unclassified. Review of the current forecast operations data does not validate a change in the Federal role. **Table 3-12** highlights the current Commercial Service levels of the NPIAS.

Table 3-12
NPIAS Commercial Service Levels

NPIAS Service Level	Requirement/ Criteria
Primary-Large Hub	Airports with at least 1% of all annual passenger enplanements
Primary-Medium Hub	Airports with at least 0.25% to 1 % of all annual passenger enplanements
Primary-Small Hub	Airports with at least .05% to .25% of all annual passenger enplanements
Primary-Non-hub	Airports with less than .05% of all annual passenger enplanements but more than 10,000 annual passenger enplanements
Non-primary	Airports with 2,500 to 10,000all annual passenger enplanements
Source: National Plan of Integrated Airport Systems (NPIAS) 2015-2019	

The Florida Aviation System Plan (FASP) 2025 further designates the airport as a Commercial Service airport. The FASP is a state level planning document, completed in 2005 and updated in 2012, by Florida Department of Transportation (FDOT). The plan provides a description and assessment of the performance of the current aviation system as well as guidance for the future development of aviation in the state. This process incorporates the traditional aviation system planning elements provided in most system plans but also includes an analysis of the intermodal aspects of the State transportation system and a strategic planning element. Currently, FDOT is preparing a comprehensive update of the FASP that is being conducted in parallel to the TLH Master Plan Update. During this statewide planning process, aviation professionals throughout the state are afforded the opportunity to identify and validate system priorities and industry standards. The most recent updates for TLH pertaining to airport roles, and system requirements were reviewed and used as appropriate for the current update of the TLH Airport Master Plan.

The FASP highlights the importance of Northwest Florida's aviation services to the state's present and future economic prosperity. As previously mentioned in the inventory chapter, this region is home to a rapidly growing technological, public service and education sectors. The population growth in the region is fueled by the multiple higher education facilities (FSU, Tallahassee Community College, and Florida A&M University). These facilities tend to rely on the commercial itinerant traffic of faculty and students. In addition to the commercial operations traffic, TLH is also positioned to become a Foreign Trade Zone (FTZ), which in turn will boost cargo operations and stimulate the local economy. The FASP identified the Northwest Florida region as the Great Northwest, because of its rapid growth and urbanization.

The FASP categorizes the airport system by establishing roles for each of the Florida public airports. The Florida Public Airport roles include Commercial Service Airports, General Aviation Reliever, General Aviation, Heliport, and Seaplane Base. Currently, TLH is considered a

Commercial Service Airport. The FASP also established facility and service objectives for each individual roles. The objectives range from policy initiatives as well as specific facility recommendations that airports should meet to properly serve their function. These recommendations were considered during the master planning process.

3.7 Airfield Lighting, Markings, Signage, and Navigational Aids

The following sections describe the requirements for airfield lighting, markings, signage, and navigational aids at TLH. Lighting, signage and navigational aids on the airport increase the utility of an airfield by increasing visibility and enhancing safety.

3.7.1 Airfield Lighting

Airfield lighting at TLH consists of the runway lights, threshold lights, approach lights, apron lighting and taxiway edge lights.

Approach Lighting

Approach lighting is currently available on the ends of Runways 9-27 and 18-36. Runway End Identifier Lights (REIL) are available at the approach end of Runways 9 and 18 to support the GPS LPV approaches. However, based upon discussions with airport operations and airport traffic control tower staff, a Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights (MALSR) is proposed for Runway 9. This system is recommended to enhance runway instrument approach visibility issues historically experienced by pilots during nighttime or low visibility conditions primarily caused by the proximity of the vast open and undeveloped land west of the airport. This proposed approach lighting improvement will potentially serve to enhance the existing Runway 9 RNAV (GPS) non-precision instrument approach procedure with Localizer Performance with Vertical Guidance (LPV) offering cloud base ceiling and visibility minimums as low as 200 feet and ½ mile respectively.

An Approach Lighting System with Sequenced Flashing Lights in an ILS Category (CAT) II configuration (ALSF-2) is installed on the approach end of Runway 27. Runway 36 has a Medium Intensity Approach Lighting System with Sequenced Flashing Lights (MALSR). The MALSR approach system is used to support CAT I approaches and will meet existing needs. However, it is recommended that an ALSF-2 approach lighting system be installed on the approach end of Runway 36 to improve future approach capabilities to CAT II. Another option may include an opportunity for the City to participate in the FAA's *Enhanced Low Visibility Operations (ELVO)* program. It is envisioned that the City could leverage its existing Medium Approach Light System with Runway Alignment Indicator Lights (MALSR) and Runway Visibility Range (RVR) facilities to provide enhanced (i.e., lower) cloud ceiling base and visibility minimums supporting Special Authorization (SA) Category I/II Precision Instrument Approach Operations to Runway 36. These recommendations are further considered and discussed in later sections of this Master Plan Update.

Runway Lighting

Approach and runway lighting consists of High Intensity Runway Lights (HIRLs) located along the edges of Runways 9-27 and 18-36. HIRLs emit white light in all places except in the caution zone (i.e., the last 2,000 feet of the runway), "In the caution zone (last 2,000 ft.), yellow lights are substituted for white lights; they emit a yellow light in the direction facing the instrument approach threshold and white light in the opposite direction. The yellow lights indicate caution on rollout after landing." The runway threshold lights emit green on the side of approaching aircraft and red on the other side. They should be maintained over the 20-year planning period.

Taxiway Lighting

Both parallel taxiways are equipped with Medium Intensity Taxiway Lights (MITLs). The blue lights used to outline the edges of the taxiways during periods of darkness or restricted visibility conditions. FAA Advisory Circular 150/5340-30J, Design and Installation Details for Airport Visual Aids, recommends MITLs in addition to any runway with medium or high intensity runway lights. Several taxiways on the airport are equipped with newer LED type taxiway lights. In the future it is recommended that all remaining taxiway lights be replaced with LED as they reach the end of their useful service life.

Apron Lighting

Apron lighting is provided via blue edge lights for the Terminal Apron, North Apron, Central Apron and Cargo Apron. Existing apron edge lights consist of both LED and traditional lighting. The blue apron lights are also supplemented with fixed light poles. Other than regular scheduled maintenance, it is recommended that traditional edge lights are replaced with LED lights as they reach the end of their useful service life.

Rotating Beacon

As previously mentioned, the rotating beacon is located near the fuel farm. The 2006 Master Plan identified the airport beacon as nearing the timeframe for rehabilitation (15-20 years). According to FAA AC 150/5345-12F, Specification for Airport and Heliport Beacons. It is recommended that the airport beacon be evaluated for rehabilitation or replacement during this planning period. Replacement of the beacon is recommended due to the age of the equipment.

3.7.2 Airfield Markings

Runway Pavement Markings

Runway pavement markings are white in color. The type and complexity of the markings are determined by the approach threshold category to the runway end. The minimum required runway markings for a runway at TLH include:

- Visual (landing designator, centerline)
- Precision (landing designator, centerline, threshold, aiming point, touchdown zone, edge)

Pavement markings are designed according to FAA AC 150/5340-1M, Standards for Airport Markings. As a requirement for Part 139 certification, all entrance taxiways with a runway holding position marking are to have enhanced taxiway centerline markings and surface painted runway holding position markings. Currently all taxiways meet the Part 139 requirement. Runways 9-27 and 18-36 have the proper markings for precision instrument runways. The taxiways at TLH are equipped with centerline stripes and runway holding position markings and conform to FAA standards. However, a majority of the taxiways do not have taxiway edge markings to depict the width of taxiway, which can be confusing particularly in the areas where there is a wide expanse of pavement and at intersections.

3.7.3 Airfield Signage

Airfield signage supplements pavement markings by providing location and directional information to pilots and ground vehicles. Signage found on the airfield includes runway hold position signs, runway distance remaining signs, taxiway location signs, and taxiway direction signs. The FAA recommends that all airports install and maintain a system of runway and taxiway guidance signs in accordance with the standards found in FAA Advisory Circular 150/5340-18G, Standards for Airport Signage Systems (Airport Signage AC). Common signs include mandatory instruction signs, location signs, boundary signs, direction/destination signs, information signs and distance remaining signs. Airports certified under 14 CFR Part 139 are required to have an updated sign plan to identify taxi routes and holding positions. The plan should be consistent with Airport Signage AC.

Currently, airfield signage at TLH is adequate and consistent with Airport Signage AC guidance standards. The existent airfield signage is sufficient and should be maintained throughout the planning period. However, signage improvements should be considered in conjunction with future airfield development projects.

3.7.4 Navigational Aids & NEXGEN Systems

Navigational aids (NAVAIDs) are ground based electronic or visual devices that assist pilots with identifying the location of an airport, the runway threshold, and aid in approach to landing. They provide safe and efficient operations of aircraft on the airport property or within the vicinity of an airport. Currently, there are 9 instrument approaches available at TLH. Instrument approach procedures have been established using GPS, RNAV, VOR, as well as instrument landing systems (ILS). The variety of different approaches allows for the flexibility of multiple users to have an option in choice of approach.

Runway 27 is equipped with a Category II (CAT II) precision instrument approach, which consists of an Instrument Landing System (ILS) with Runway Visual Range Visibility minimums of 1,200 feet and a decision height of 158 feet. The precision ILS approach to Runway 27 is supplemented by an ALSF II (Approach Lighting System with Sequenced Flashing Lights). The ALSF II is used on Category II runways during instrument landing approach to align the aircraft with the centerline of the runway and to establish vertical orientation. The ILS system is the most precise and accurate approach NAVAID currently available. Runway 36 is equipped with multiple approach capabilities.

The most precise and accurate of the approaches is the High Altitude Instrument Procedure (HI-ILS). The HI-ILS allows the aircraft operator to begin the approach at a high altitude (17,000 feet).

Runway 9 is currently equipped with an LPV approach, which is a non-precision instrument RNAV (GPS) approach. RNAV instrument approaches allow aircraft to choose any course with a network of navigation beacons, instead of navigating directly to and from beacons. Similar to the Runway 9 approach, Runway 18 is also equipped with a non-precision instrument approach (RNAV GPS). Both runways are equipped with Precision Approach Path Indicators (PAPI-4) and Runway End Identifiers Lights (REILs) to support the runway approach. The current approach to Runway 18 is adequate for the 20-year planning period, no additional equipment is required at this time. As mentioned previously, a Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights (MALSR) is proposed for Runway 9. This proposed approach lighting improvement will potentially serve to enhance the existing Runway 9 RNAV (GPS) non-precision instrument approach procedure with Localizer Performance with Vertical Guidance (LPV) offering minimums similar to that typically offered by Category-I Instrument Landing Systems.

The 2006 Master Plan Update indicated the need to protect the airspace at the Runway 9 and 18 approaches for the potential to install instrument landing systems (ILS). However, Appendix BB of the FAA AIP Handbook, Establishment and Category Upgrade Policy for Instrument Landing Systems, indicates the FAA would be moving away from ground-based instrument landing systems to GPS approaches using Area Navigation (RNAV). RNAV approaches provide equivalent instrument approach capability as ground-based equipment can for Category I (CAT I) approaches. In addition to the FAA guidance, the forecast operations do not justify the need for additional ILS Precision approaches. Hence, it is highly unlikely that the FAA will fund the installation of ILS Precision approaches for Runways 9 and 18. The current GPS LPV approaches are adequate and will accommodate the future demand. **Table 3-13** summarizes the existing and future instrument approach features for Runways 9-27 and 18-36, which are utilized to establish airfield design standards and the associated long-term requirements for TLH.

Table 3-13
Existing and Ultimate Navigational Aids

Runway End	Runway 9		Runway 27		Runway 18		Runway 36	
	Existing	Ultimate	Existing	Ultimate	Existing	Ultimate	Existing	Ultimate
Part 77 Approach	Non-Precision	Same	Precision (CAT II)	Same	Non-Precision	Same	Precision (CAT I)	Precision (CAT II)
Part 77 Approach Slope	34:1	Same	50:1	Same	34:1	Same	50:1	Same
Instrument Approaches	GPS (LPV)	Same	ILS, LOC, GPS (LPV)	Same	GPS (LPV)	Same	Hi-ILS, ILS, GPS (LPV)	Same
Horizontal Minimums	6,000 Feet	2,400 Feet	1,800 Feet	Same	¾ Mile	Same	2,400 Feet	1,800 Feet
Approach Lighting	REIL	MALSR	ALSF2	Same	REIL	Same	MALSR	ALSF-2
Visual Glide Slope Indicator	PAPI-4	Same	PAPI-4	Same	PAPI-4	Same	PAPI-4	Same
Runway Markings	Precision	Same	Precision	Same	Precision	Same	Precision	Same

Source: Michael Baker International. Inc., 2018.

Weather Reporting Equipment

TLH is currently equipped with an Automated Surface Observing System (ASOS). The system reports and collects sky conditions, visibility, wind, temperature, dew point, relative humidity, pressure, and obstructions to vision. The ASOS provides up to 12 data updates each hour to pilots via radio communications and telephone. The current ASOS system is adequate for the 20-year planning period.

FAA's Next Generation Air Transportation System (NextGen)

The national airspace system is transitioning form ground-based NAVAIDs to satellite-based NAVAIDs during the Nation's update of the air transportation infrastructure through the Next Generation Air Transportation System (NextGen) program. Satellite-based navigation has become a priority for the FAA over VOR technology. One of the main benefits of NextGen will be the impact on aircraft navigation by converting all ground-based navigational equipment to satellite technology. In addition, the NextGen system will update and enhance GPS technology, reduce congestion, increase airspace capacity, avoid delays, reduce fuel consumption, and increase safety.

3.8 Landside Facilities

This section describes the landside facility requirements needed to accommodate TLH's operational activity throughout the planning the period. These areas of particular focus include the terminal building, hangars, aprons and tie-down areas, automobile parking, access, as well as the various associated support facilities. Various methodologies have been applied to the forecasts presented in Chapter 2 of this Master Plan Update. To determine if the current facilities can accommodate the forecast operations. The landside facilities include the following:

- Commercial Passenger Terminal Building;
- General Aviation (Aircraft storage, Aprons; GA Terminal; Fixed Base Operator)
- Airport Traffic Control Tower;
- Airfield Maintenance;
- Fixed Base Operator (FBO);
- Aviation Fuel Storage; and
- Ground Access and Parking.

3.8.1 Commercial Passenger Terminal Building

A detailed terminal area planning (TAP) study was performed as part of the previous 2006 TLH Airport Master Plan Update. The TAP evaluated multiple scenarios for addressing future demand shortfalls related to major functions in the passenger terminal, including ticketing, baggage claim, security screening, concessions and passenger holding. Recommendations from the study were consolidated into a single Preferred Terminal Concept which included improvements to the lower, main and upper levels of the passenger terminal. The passenger terminal development recommendations contained in the 2006 study were determined to be valid for use in this Master Plan Update and are incorporated into the Preferred Development Concept contained in

Chapter 5, Alternatives Refinement. However, based upon the passenger demand forecasts contained in Chapter 2, the demand trigger points associated with the future terminal facility improvements are not anticipated to occur until the long-term planning period of this Master Plan Update.

3.8.2 General Aviation Facilities

The majority of the existing general aviation aircraft storage facilities at TLH are located on the west side of the airport, adjacent to Runway 18-36 and Taxiway A. The general aviation (GA) area accommodates a wide range of facilities and businesses. GA facilities are necessary to accommodate airport activity by all aviation segments except commercial passenger service. These facilities support operations for recreational flying, corporate aviation, military, law enforcement operations, and some portions of cargo activity. The requirements for the GA area are based on data presented in the inventory, activity forecasts, and information obtained during meetings with TLH airport staff. The primary components associated with general aviation needs include:

- Aircraft Parking (Hangar & Aircraft Tie-down Facilities)
- General Aviation Terminal
- Fixed Base Operator (FBO)
- Helicopter Parking Pads (Helipads)

Based Aircraft Storage

The Airport Design AC states that; effective apron design tends to segregate based and itinerant aircraft so that maximum capacity can be prioritized in the configuration of the based aircraft apron, while flexibility can be prioritized in the configuration of the itinerant aircraft apron. In addition, the Airport Cooperative Research Program's (ACRP) General Aviation Facility Planning Guidance (GA Facility Planning Guidance), suggests that the based aircraft apron requires minimal interaction with other facilities. Currently, TLH based aircraft storage is primarily located in the North General Aviation (GA) Apron and Central Apron, separated from the itinerant aircraft storage areas.

Flightline Aviation currently manages the apron tie-down and hangar leases for based aircraft at TLH. Apron and hangar storage areas for aircraft based at TLH vary between box hangars, T-hangars, and designated apron tie-down locations. In previous years it was assumed that a certain percentage of based aircraft, mostly single- and multi-engine piston aircraft, would desire apron tie-down parking because it is the lowest cost storage option. However, these days, most owners want to be able to protect their aircraft from poor weather and vandalism, therefore opting for hangar storage. Apron tie-downs are the least expensive storage option due to aircraft being exposed to the elements. Single-engine and multi-engine aircraft primarily occupy the apron tie-downs and T-hangars. Conventional/box hangars are a more expensive option primarily occupied by turboprop, corporate jets and smaller aircraft (single engine, multi-engine, and helicopter). A majority of the based aircraft in the conventional/box hangars belong to government entities such as: Civil Air Patrol, United States Forest Service, and the State of Florida.

Although some of the existing facilities and tenants at TLH may be able to accommodate additional based aircraft, they are mostly occupied and it would be preferential for new facilities to be developed. For this analysis, it was assumed that all forms of based aircraft storage are full at TLH. Therefore, in order to accommodate any new based aircraft, the construction of a new facility would be needed.

This section evaluates the need for apron space and hangar storage at the airport throughout the 20-year planning period for based aircraft. **Table 3-14** identifies the percentages used to determine future based aircraft storage preferences based on historical trends.

Table 3-14
Based Aircraft Parking Preferences

Storage Type	Single Engine	Multi-Engine	Turboprop	Jet	Helicopter
Apron Tie-down	20%	20%	0%	0%	50%
T-Hangars	80%	60%	0%	0%	10%
Conventional Hangar	0%	20%	100%	100%	40%
Total	100%	100%	100%	100%	100%

Source: Michael Baker International, Inc., 2016

The aircraft storage percentages were applied to the based aircraft forecasts for the 20-year planning period to identify the storage needs at the five-year benchmarks. **Table 3-15** identifies the based aircraft requirements for each aircraft. The number of based aircraft is forecast to increase from 118 in 2015 to 144 by 2035. The additional 26 based aircraft include 17 single-engine aircraft, two turboprop, three jet aircraft, and three helicopters. Multi-engine aircraft were not forecast to grow, therefore they remain at 10 based aircraft for the 20-year planning period.

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Table 3-15
Aircraft Storage Demand

Storage Type	Single-Engine	Multi-Engine	Turboprop	Jet	Helicopter	Total
2015						
Apron	17	1	0	0	8	26
T-Hangar	67	6	0	0	0	73
Conventional	0	2	6	4	8	20
Total	84	9	6	4	15	118
2020						
Apron	18	2	0	0	8	28
T-Hangar	70	6	0	0	0	76
Conventional	0	2	6	5	8	21
Total	88	10	6	5	16	125
2025						
Apron	18	2	0	0	8	28
T-Hangar	74	6	0	0	0	80
Conventional	0	2	7	5	8	22
Total	92	10	7	5	16	130
2030						
Apron	19	2	0	0	9	30
T-Hangar	77	6	0	0	0	83
Conventional	0	2	8	6	9	25
Total	96	10	8	6	17	137
2035						
Apron	20	2	0	0	9	31
T-Hangar	81	6	0	0	0	87
Conventional	0	2	8	7	9	26
Total	101	10	8	7	18	144

Source: Michael Baker International, Inc. 2016
Note: *Numbers may not add up due to rounding.*

Table 3-16 illustrates the based aircraft storage preferences by 2035. These include the addition of 14 single engine T-Hangar units, five conventional box hangar units (three jet and two Turboprops) and five tie-downs (four single engine and one helicopter). The alternatives analysis will illustrate concepts for hangar development and apron expansion, so the airport has a plan in place to react to unforeseen demands that may arise.

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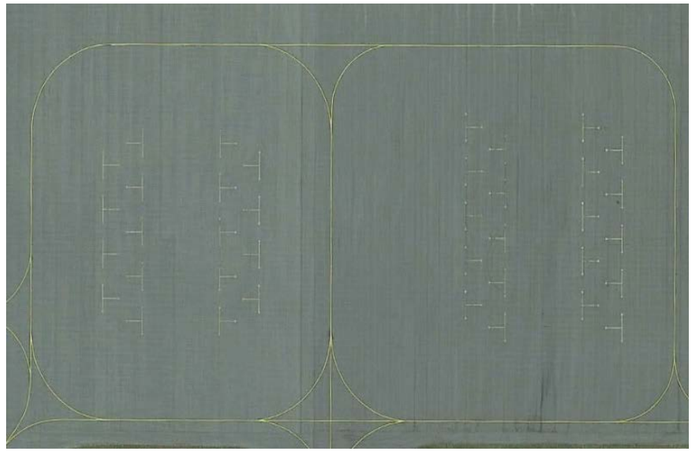
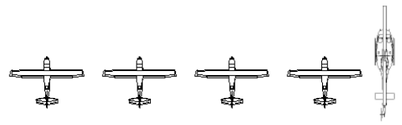
Table 3-16
2035 Based Aircraft Storage Requirements

Apron Tie-Down



2035 Requirement Calculation

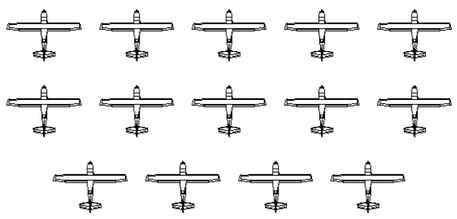
Aircraft	Piston	Multi-Engine	TP/ Jet	Helicopter
Requirement %	20%	20%	0%	50%
2035 Requirement	4	0	0	1
5 Tie-Downs Required by 2035				



T-Hangar

2035 Requirement Calculation

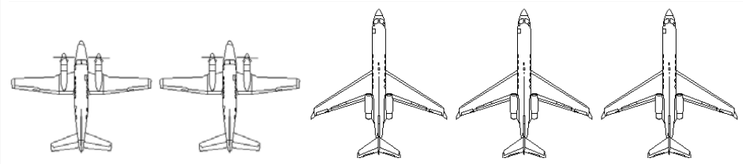
Aircraft	Piston	Multi-Engine	TP/ Jet	Helicopter
Requirement %	80%	60%	0%	0%
2035 Requirement	14	0	0	0
14 T-Hangar Bays Required by 2035				



Conventional Hangar

2035 Requirement Calculation

Aircraft Type	Piston	Multi-Engine	TP/ Jet	Helicopter
Requirement %	0%	20%	100%	40%
2035 Requirement	0	0	5	0
SF Requirement	1,500 SF	2,500 SF	5,000 SF	1,500 SF
2035 Requirement	0	0	25,000 SF	0
25,000 SF of Conventional Hangar Space Required by 2035				



Source: Michael Baker International, Inc., 2016.
Note: The sample piston, jet, turboprop, and rotorcraft aircraft shown in this table are provided for illustration purposes only.

In addition to the capacity needs it is important to consider operational factors. According to the Airport Design AC, effective aircraft parking storage spaces for based aircraft are typically separate from transient aircraft. In comparison to a transient aircraft apron, a based aircraft apron needs very minimal interaction with other facilities. The GA Facility Planning Guidance suggests that a based aircraft apron should include: high density, sized for Group I aircraft or larger, expandable, vehicle access, nearby vehicle parking with simple walking access, good drainage, and locations for fuel sump dump, chocks, fire extinguisher and other emergency items.

Transient Aircraft Apron

As previously noted in the inventory chapter, the South General Aviation Apron is the primary apron for transient aircraft parking. The apron is located directly to the east of Runway 18-36, south of the Central Apron and is approximately 649,980 square feet or 72,220 square yards (SY) in size. The apron accommodates GA transient aircraft parking (i.e., single engine, multi engine, helicopter, turbo prop and jet aircraft) and supports multiple businesses including Million Air (FBO), the General Aviation Terminal, and GSE maintenance.

The Airport Design AC suggests that future demand for aircraft parking apron can be estimated based on itinerant aircraft operations. Demand for aircraft parking apron by itinerant GA aircraft operations is estimated at 50% of average day peak month (ADPM) operations. According to the Airport Design AC, the area required per aircraft for a typical itinerant/transient apron will vary based on the design aircraft or fleet mix. The analysis assumed space requirements to include 300 square yards (SY) for small GA aircraft and 1,000 (SY) for large aircraft (i.e. jets and multi-engine aircraft). According to historical operations data, 53% of the total itinerant aircraft were determined to be larger aircraft and 46% were determined to be small GA aircraft. As presented in **Table 3-17**, additional transient apron parking space will be required in the future.

Table 3-17
Transient Apron Demands

Year	ADPM	50 % ADPM	300 SY Per Aircraft		1,000 SY Per Aircraft		Total (Square Yards)	Surplus/ Deficit (SY)
			46%	SY	53%	SY		
2015	194	97	45	13,386	51	51,410	64,796	7,424
2020	202	101	46	13,938	54	53,530	67,468	4,752
2025	211	106	49	14,559	56	55,915	70,474	1,746
2030	219	110	50	15,111	58	58,035	73,146	-926
2035	229	115	53	15,801	61	60,685	76,486	-4,266

Source: Michael Baker International, Inc., 2016

In addition to the Airport Design AC requirements for transient aircraft parking. The ACRP GA Facility Planning Guidance suggests that the ideal transient apron should include the following: low density, sized for Group II aircraft or larger, expandable, at least two access points, full circulation around parking positions, ample area lighting, pull-through parking positions, adjacent to the terminal building, passenger boarding area, graded for adjacent hangars, vehicle access, visibility from the runway or parallel taxiway, easy egress to the non-secure side of the fence, ample signage, good drainage, locations for fuel sump pump, and locations for fuel sump dump, chocks, fire extinguisher and other emergency items. The South GA Apron conforms to the suggested requirements in the GA Facility Planning Guidance.

General Aviation Terminal Building

The General Aviation Terminal is located on the South Apron adjacent to the ARFF building and is currently operated by Million Air. The facility is a 2-story structure measuring 4,980 square feet and provides a pilot's lounge, flight-planning room, waiting room, pilot's supplies, restrooms, and offices. The FAA recommends separation of general aviation facilities from the more highly secured areas near the airline terminal. The current layout at TLH accomplishes this separation.

The ACRP's GA Facility Planning Guidance was used to determine if the capacity of the building is adequate to accommodate future demand. The building capacity calculation is based on a factor of 2.5 people (pilots and passenger) per peak-hour operation and an area of 100 square feet per person. **Table 3-18** present's the GA Terminal capacity demands for the 20-year planning period at five-year milestones. Based on this analysis, TLH's GA Terminal has sufficient capacity to accommodate future demand.

Table 3-18
General Aviation Terminal Demands

Year	Factor	Square Feet	Peak Hour Operations (IFR and VFR)	GA Existing Terminal Square Footage	Required Building Square Footage	Surplus (Deficit)
2015	2.5	100	34	11,400 SF	8,500 SF	2,900 SF
2020	2.5	100	35	11,400 SF	8,750 SF	2,650 SF
2025	2.5	100	37	11,400 SF	9,250 SF	2,150 SF
2030	2.5	100	38	11,400 SF	9,500 SF	1,900 SF
2035	2.5	100	40	11,400 SF	10,000 SF	1,400 SF
Source: Michael Baker International, Inc., 2016						

In addition to the capacity requirements, the GA Facility Planning Guidance suggests the GA Terminal have maximum visibility of the runway and taxiway, provide good visibility of the airfield, have safe and efficient access from primary roadways, be in close proximity to the based and transient aircraft aprons, and have adequate automobile parking.

Fixed Base Operator (FBO)

As previously noted in the inventory chapter, the current fixed base operator at TLH is Million Air. The facility is located on the South Apron where the current GA Terminal building is. Roadway access is available via Capital Circle SW and multiple automobile parking spaces are available. The facility is sufficient for the current and future activity.

Helicopter Parking Pads (Helipads)

FAA AC 150/5390-2C, Heliport Design (Heliport Design AC) is the primary technical guidance for planning helicopter landing facilities. Per the Heliport Design AC, helicopter landing area sites must be capable of accommodating several helicopter types operating at TLH. There are currently six helipads located on the South Apron, south of the Million Air. A total of 15 helicopters are based at various storage facilities, including: helicopter tie-downs, T-hangars, and conventional hangars. Various helicopters ranging in size are operated by multiple agencies (i.e. The State of Florida Division of Forestry, Leon County Sheriff's Department, and some military rotorcraft). These include: Bell UH-1H (Huey), Bell OH 58A+ (Kiowa), Bell 206B, and the Bell 209, illustrated in Table 3-19.

According to the Heliport Design AC, the dimensions of the helicopter landing pad (helipad) are dependent on the helicopter size. The more demanding requirement will dictate what is required of a particular facility. Of the helicopters operating at TLH it was determined that the most demanding aircraft type is the UH-1H (Huey), due to its main rotor diameter (48 feet). The aircraft is used primarily for military operations. The helipad designs conform to the Heliport Design AC guidelines and can accommodate the current helicopters operating at TLH. However, concern over the current helipad location was presented during talks with airport personnel.

Helicopter aircraft operations at the current location, disturb the land adjacent to the helicopter parking apron due to the helicopter rotor wake, produced by the high velocity of the back wash from the rotors. An analysis of the future demand for helicopter parking indicates a need for an additional three helicopter parking pads. Chapter 4, Preliminary Alternatives, evaluates the relocation of the current helipads to address the helicopter rotor wake issues and the additional three helipads to accommodate for the future demand.

The GA Facility Planning Guidance recommends 100 feet of separation between helicopter parking positions. The current separation of the transient aircraft apron and the helipad parking facilities conform to the separation guidelines.

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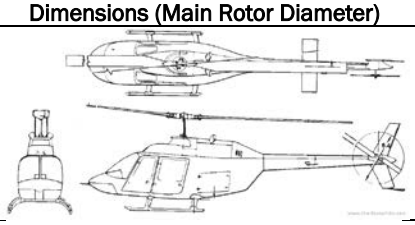
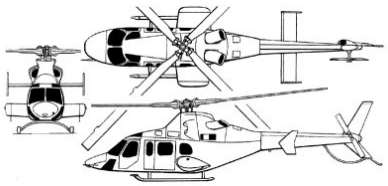
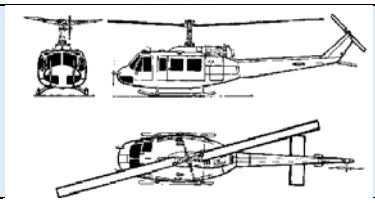
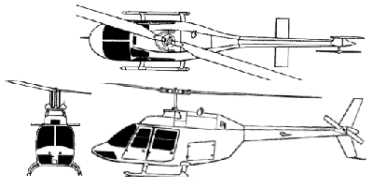
Table 3-19 Helicopter Dimensions	
Helicopter	**Dimensions (Main Rotor Diameter)**
Bell 206B	33'0" 
Bell 209	44'0" 
Bell UH-1H (Huey)	48'0" 
Bell OH58A+ (Kiowa)	35'0" 
Source: Bell Helicopter Aircraft Performance Manual (APM)	

3.8.3 Airport Traffic Control Tower (ATCT) & Terminal Radar Approach Control (TRACON)

As mentioned in the inventory chapter, the Airport Traffic Control Tower (ATCT) is located south of Runway 9-27 near Springhill Road, adjacent to the airport service road. The building contains administrative support offices and the Terminal Radar Approach Control (TRACON). There are approximately 50 automobile parking spaces that serve the ATCT. These facilities are capable of meeting projected levels of demand and needs throughout the planning period.

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3.8.4 Aircraft Rescue and Fire Fighting (ARFF)

As part of the 14 CFR Part 139 certification requirements, airports providing air carrier operations are required to have an Aircraft Rescue and Firefighting facility (ARFF). TLH is currently served by an ARFF building that is approximately 4,400 square feet and is located on the South Apron in between the GSE Maintenance building and the GA Terminal building. FAA AC 150/5210-15, Airport Rescue and Firefighting Station Building Design recommends the ARFF facility to be placed in a central position that allows for rapid response time anywhere on the airport. Based on the need for the ARFF facility to optimize lower emergency response times, the location of the existing ARFF facility is ideal since it is centrally located.

CFR Part 139 certified airports are required to maintain equipment and personnel based on an ARFF Index established according to the length of aircraft and scheduled daily flight frequency. There are five indices, A through E, with A being applicable to the smallest aircraft and E the largest aircraft. TLH falls within ARFF Index C, based on an average of five or more scheduled departures per day by large air carrier aircraft with a length between 126 feet and 159 feet (i.e., Boeing 757-200). The FAA has established specific requirements for ARFF equipment. These requirements vary depending on the size of the aircraft regularly using the airport (critical aircraft). Table 3-20 below presents the vehicle requirements and capacities for each index level.

Table 3-20
Aircraft Rescue and Firefighting Index Requirements

Index	Aircraft Length	Index Determination
Index A	<90’	1) One ARFF vehicle with 500 lbs. of sodium-based dry chemical or 2) One vehicle with 450 lbs. of potassium-based dry chemical and 100 lbs. of water and AFFF for simultaneous water and foam application
Index B	90’-126’	1) One vehicle with 500 lbs. of sodium based dry chemical and 1,500 gallons of water and AFFF or 2) Two vehicles, one with the requirements for Index A and the other with enough water and AFFF for a total quantity of 1,500 gallons
Index C	126’-159’	1) Three vehicles, one having Index A, and two with enough water and AFFF for all three vehicles to combine for at least 3,000 gallons of agent or 2) Two vehicles, one with Index B and one with enough water and AFFF for both vehicles to total 3,000 gallons
Index D	159’-200’	1) One vehicle carrying agents required for Index A and 2) Two vehicles carrying enough water and AFFF for a total quantity by the three vehicles of at least 4,000 gallons
Index E	>200’	1) One vehicle with Index A and 2) Two vehicles with enough water and AFFF for a total quantity of the three vehicles of 6,000 gallons

Source: 14 CFR Part 139, FAA AC 150/5300-13A, Airport Design

3.8.5 Airport Maintenance Facilities

TLH airport maintenance facilities are located northeast of the Cargo Apron, adjacent to the Southside Cemetery. Airport maintenance facilities are typically located in more remote areas

because they are non-revenue generating facilities. The maintenance area encompasses approximately two acres and includes three buildings. Access to the facility is provided via Capital Circle SW and on airport perimeter road. The current facility is adequate to meet the current and anticipated demand.

3.8.6 Airport Fuel Storage Facilities

Fuel storage facilities at TLH consist of multiple tanks located south of the Central Apron area. The fuel farm has six above ground storage tanks with three fuel types. The area is fenced, lighted and has ample land available for fuel trucks to maneuver. Fuel storage consists of 120,000 gallons of Jet A fuel, 25,000 gallons of 100LL (Low Lead), and 10,000 gallons of unleaded fuel. Remote a self-serve 100LL fuel tank is also located on the east side of the South Apron. Fuel is delivered to the fuel farm via tanker truck and transferred to commercial, general aviation and air cargo aircraft by refueling vehicles. Refueling operations take place on the Terminal Apron, GA Aprons, and Cargo Apron and are conducted by Million Air.

Jet A & Avgas (100LL) Fuel Storage Capacity

Adequate fuel storage for future demand is determined based on the forecast of aircraft operations and historical annual fuel sales are used to establish a baseline. Historical annual fuel sales at the airport from 2010 to 2015 are presented in **Table 3-21**. As depicted, an average of 3,787,406 total gallons of Jet A fuel was sold during the 2010 to 2015 period. During the same period, an average of 155,504 gallons of 100LL was sold. In addition, it should be noted that approximately 66% of the Jet A fuel sold at the airport, is used for commercial airline operations and approximately 34% is for GA Jet A operations. GA Jet A operations include; GA Itinerant, Itinerant Military, and Local Military operations. On average, the total fuel sold at the airport consists of 96% Jet A fuel and four percent 100LL.

The historical average of Jet A fuel sales per commercial airline operation is depicted in **Table 3-22**. As presented, an average of 136.5 gallons of fuel is sold per operation given that historically commercial airlines account for 96% of Jet A sales. The average gallons-per-operation ratio is then applied to the forecast operations to project future commercial airline Jet A fuel consumption. As presented in **Table 3-22**, approximately 3,323,366 gallons of commercial airlines Jet A fuel are forecast to be sold at the airport by 2035. **Table 3-22** also shows the forecast demand in Jet A fuel sales at the airport for GA aircraft consumption is expected to increase from approximately 1,184,428 gallons in 2015 to approximately 1,337,069 gallons in 2035.

For general aviation demand, historical gallons-per-operation ratio for Avgas from 2010-2015 was utilized. GA aircraft typically include single and twin-engine aircraft. The total general aviation operations include; local civil operations and GA itinerant operations. **Table 3-22** illustrates the historical gallons-per-operation ratio for Avgas. The table indicates that an average of 4.744 gallons of fuel were sold per general aviation aircraft from 2010 to 2015. As shown, demand for Avgas fuel at the airport is anticipated to increase from 146,488 gallons in 2015 to 172,293 gallons in 2035.

Table 3-21
Historical Aviation Fuel Flowage History

Year	Commercial Airline: Jet A		General Aviation: Jet A		Total Jet A		General Aviation: Avgas		Total
	Fuel	Percentage	Fuel	Percentage	Fuel	Percentage	Fuel	Percentage	
2010	3,516,379	73%	1,288,075	27%	4,804,454	96%	190,468	4%	4,994,922
2011	2,470,391	64%	1,385,044	36%	3,855,435	96%	154,098	4%	4,009,533
2012	2,451,107	69%	1,124,456	31%	3,575,563	96%	151,404	4%	3,726,967
2013	2,552,102	68%	1,214,382	32%	3,766,484	96%	152,957	4%	3,919,441
2014	2,169,928	62%	1,304,387	38%	3,474,315	96%	137,610	4%	3,611,925
2015	2,038,201	63%	1,209,984	37%	3,248,185	96%	146,488	4%	3,394,673
Average	2,533,018	66%	1,254,388	34%	3,787,406	96%	155,504	4%	3,942,910

Source: Michael Baker International, Inc. 2016

Table 3-22
Historical and Forecast Commercial, GA Jet A, Avgas Demand

Jet A: Commercial

Historical Demand								
Year	**Total Jet A Fuel Sales**	**Jet-A Fuel Sales**	**Percent of Historical Total Fuel Sales**	**Operations**	**Gallons Per Operation Ratio**	**Forecast Demand**		
2010	4,804,454	3,516,379	96%	24,265	144.916			
2011	3,855,435	2,470,391	96%	19,226	128.492	**Year**	**Forecast Operations**	**Average Gallons per Operations Ratio**	**Projected Annual Demand (Gallons)**
2012	3,575,563	2,451,107	96%	19,134	128.102	**2015**	16,710	136.5	2,280,915
2013	3,766,484	2,552,102	96%	17,325	147.307	**2020**	18,300	136.5	2,497,950
2014	3,474,315	2,169,928	96%	15,682	138.371	**2025**	20,091	136.5	2,742,422
2015	3,248,185	2,038,201	96%	15,462	131.820	**2030**	22,097	136.5	3,016,241
Average	3,787,406	2,533,018	96%	18,516	136.501	**2035**	24,347	136.5	3,323,366

Jet A: General Aviation

2010	4,804,454	1,288,075	34%	43,764	29.432				
2011	3,855,435	1,385,044	34%	42,824	32.343	**2015**	**36,082**	**32.826**	**1,184,428**
2012	3,575,563	1,124,456	34%	35,777	31.430	**2020**	37,166	32.826	1,220,011
2013	3,766,484	1,214,382	34%	38,387	31.635	**2025**	38,300	32.826	1,257,236
2014	3,474,315	1,304,387	34%	34,505	37.803	**2030**	39,488	32.826	1,296,233
2015	3,248,185	1,209,984	34%	35,262	34.314	**2035**	40,732	32.826	1,337,069
Average	3,787,406	1,254,388	34%	38,420	32.826	**2035**	40,732	32.826	1,337,069

Avgas

Historical Avgas Demand				Forecast Avgas Demand			
Year	**Total Avgas Fuel Sales**	**General Aviation Operations**	**Gallons Per Operation Ratio**				
2010	190,468	38,395	4.961				
2011	154,098	39,668	3.885	**Year**	**Forecast Operations**	**Average Gallons per Operation Ratio**	**Projected Annual Demand (Gallons)**
2012	151,404	32,211	4.700	**2015**	29,394	4.744	139,445
2013	152,957	30,347	5.040	**2020**	31,636	4.744	150,081
2014	137,610	28,123	4.893	**2025**	33,126	4.744	157,150
2015	146,488	29,394	4.984	**2030**	34,685	4.744	164,546
Average	155,504	33,023	4.744	**2035**	36,318	4.744	172,293

Source: Michael Baker International, Inc. 2016

Forecast demand and fuel storage requirements for Jet A and Avgas fuel at TLH throughout the planning period are illustrated in **Table 3-23**. Approximately 4,660,435 gallons of fuel is projected to be sold in 2035 and 172,293 gallons of Avgas fuel. The table also illustrates the deficit and surplus. As indicated no additional capacity will be needed to store a seven-day supply of Jet A or Avgas throughout the planning period. The current 120,000-gallon capacity for Jet A and 25,000-gallon capacity for Avgas storage is sufficient to meet the future demand.

Table 3-23
Projected Demand and Fuel Storage Requirements

Demand/ Year	Commercial Demand	GA Demand	Total Demand	7 Day Demand	Available Capacity	Surplus/ Deficit
Jet A						
2015	2,280,915	1,184,428	3,465,343	66,641	120,000	53,359
2020	2,497,950	1,220,011	3,717,961	71,499	120,000	48,501
2025	2,742,422	1,257,236	3,999,658	76,917	120,000	43,084
2030	3,016,241	1,296,233	4,312,474	82,932	120,000	37,068
2035	3,323,366	1,337,069	4,660,435	89,624	120,000	30,376
Avgas						
2015	N/A	139,445	139,445	2,682	25,000	22,318
2020	N/A	150,081	150,081	2,886	25,000	22,114
2025	N/A	157,150	157,150	3,022	25,000	21,978
2030	N/A	164,546	164,546	3,164	25,000	21,836
2035	N/A	172,293	172,293	3,313	25,000	21,687

Source: Michael Baker International, Inc. 2016

3.8.7 Ground Access

In order to be a functional terminal area, the passenger terminal building, airside apron, and landside roads and parking must work in harmony to serve the needs of airline passengers. The terminal area is a complex facility comprised of many interrelated parts and each part must be analyzed to determine the effectiveness of the system as a whole. This section provides the quantitative analysis for each component of the terminal area and identifies where and when changes may be needed during the planning period.

This section discusses ground access to the commercial terminal including primary access road demand, terminal curb frontage demand, and public, employee, and rental car parking demand for the years 2015, 2020, 2025 and 2035. Ground access and terminal roadways serve passengers, employees, visitors, and anyone who travels to and from the airport. Circulation systems within the airport boundaries should minimize congestion and support efficient access to the passenger terminal building. It is important to ensure that the access and terminal roadway systems provide adequate capacity to meet the projected demand imposed by vehicular traffic without creating excessive or unwarranted delay.

Primary Access Road

Primary access to the airport is provided by the western portion of Capital Circle (SR 263). In addition to serving as a perimeter highway around the western, southern, and eastern sides of Tallahassee, Capital Circle provides direct access to Interstate 10 which is located 6.5 miles north of the airport. FDOT has plans to expand Capital Circle SW near the airport from two-lane rural

road to a six-lane urban roadway with bike lanes and sidewalks. Improvements will include enhanced connections and signalized intersections to accommodate existing and future demand and to increase the road's Level of Service (LOS) and ease of accessing TLH. The location of the proposed connections is later evaluated as part of the alternatives analysis. Overall, the primary access road system is anticipated to meet the requirements throughout the 20-year planning period.

Terminal Access Roads

Terminal access roads connect the primary access roads with the terminal buildings and parking facilities. They should be designed to allow smooth channeling of traffic into the appropriate lanes for safe and unobstructed access to the terminal curbs, parking lots, and other public facilities. Traffic circulation should be one-way in a counterclockwise direction for convenience of right-side passenger loading and unloading. Recirculation of vehicles to the passenger terminal should also be permitted. Additionally, traffic streams should be separated at an early stage and with appropriate signage to avoid congestion and assure lower traffic volume on the terminal frontage roads. Ground access to the airport terminal is provided via the Terminal Loop Road, which is a one-way limited access roadway with two lanes that possesses all of the recommended attributes.

The guidance provided in AC 150/5360-13A, Airport Terminal Planning, recommends that terminal area access roads be planned to accommodate 900 to 1,200 vehicles per lane per hour, with a minimum of two 12-foot lanes. Based upon this criterion and anticipated peak hour demand, expansion of the terminal access roadway will not be required to accommodate anticipated commercial demand as shown in **Table 3-24**.

Table 3-24
Terminal Access Roadway Capacity Demand

Year	Total Peak Hour Passengers	80% Automobile	Other	Avg. Day Peak Hour Vehicles [1]	Existing Roadway Capacity (VPH) [2]	VPH Surplus/ (Deficiency)
2015	1,000	800	100+200	1,100	1,800	700
2020	1,100	880	110+220	1,210	1,800	590
2025	1,200	960	120+240	1,320	1,800	480
2035	1,420	1,136	142+284	1,562	1,800	238

Sources: FAA AC 150/5360-13A, Airport Terminal Planning and Michael Baker International, Inc., 2018.
Notes:
1) ADPH vehicles includes all arriving and departing passenger traffic. Other includes higher occupancy vehicles and an allowance of an additional 20% for vehicles serving non-passenger traffic.
2) Capacity per lane at grade primary access road at or below 30 mph = 900 vehicles per hour. Estimate that 80 percent of users arrive by private vehicle. Remaining 20 percent arrive via higher occupancy commercial vehicles.

Terminal Frontage Road

The terminal frontage road is that section of the access road directly in front of the terminal building. The number of traffic lanes typically increases in this section of the roadway to allow for vehicles stopping at the departure and arrival terminal curbs, vehicular maneuvering, and sufficient travel lanes for through traffic. The terminal frontage road is a critical element of the overall terminal access roadway system and should maintain vehicular flow with minimum congestion.

The terminal frontage road is currently two lanes at the approach to the terminal, but splits into three lanes at a point about 300 feet west of the building. The terminal frontage road should be designed to accommodate 600 vehicles per lane per hour, when no obstructions are present. Since considerable merging from through lanes to and from the curb occurs on these roadways, at least two lanes should be provided adjacent to the curb. The inside lane is 15 feet wide and serves as curb parking and three 12-foot wide outside lanes provide vehicle maneuvering space to the terminal curb and for double parking during peak periods. With this configuration, designed for cars oriented parallel to the curbfront, the inside lane is considered to have no throughput capacity and the adjacent maneuvering lane is restricted to a capacity of 300 vehicles per hour. Two additional lanes are provided to meet the capacity required for circulating traffic at a rate of 600 vehicles per hour for each unrestricted 12 foot through lane. This results in a total capacity of 1,500 vehicles per hour. This should be adequate throughout the planning period.

Terminal Curb Frontage

Terminal curb frontage is required for loading and unloading passengers and baggage. The curb frontage is typically provided for private vehicles, taxis, limousines, and buses. The length is typically based upon the types of vehicles, and vehicle dwell times expected to occur at the terminal curb. At TLH, the curbfront includes a pick-up and drop-off lane adjacent to the curb, a maneuvering lane, and two through-lanes. Commercial taxi vehicles are currently parked in an area immediately to the east of the terminal with 24 spaces (at the exit from baggage claim). Eleven spaces are reserved for hotel shuttle, bus, and limousine pick-up along the curbside past baggage claim.

In order to determine the future curb-loading zone parking requirements, general constants must be assumed to take place. Since private automobiles are the predominant transportation mode, an average vehicle dwell time of two minutes per private vehicle, for each curb space, was allotted. This parking duration was based on the assumption of strict enforcement of the loading zone parking usage by airport security personnel. In addition to private automobile curbside requirements, space for limousine/buses must be considered. The location of commercial parking convenient to the baggage claim reduces the potential for long dwell times to cause congestion at the curb frontage. As shown in **Table 3-25**, increased commercial frontage will not be required through the year 2035 based upon anticipated peak hour demand.

Table 3-25
Passenger Terminal Curb Frontage Requirements

Item	2015	2020	2025	2035
Peak Hour Total Passengers	1,000	1,100	1,200	1,420
Vehicle (Lin Ft.) Demand	787	865	944	1,117
Existing Curb Length (Lin. Ft.)	950	950	950	950
Existing Double Parking Capacity (Lin Ft.)	1,900	1,900	1,900	1,900
Surplus/(Deficiency) (Lin Ft.)	1,113	1,035	956	783

Sources: FAA AC 150/5360-13A, Airport Terminal Planning, ACRP Report 25, Airport Passenger Terminal Planning and Design, and Michael Baker International, Inc., 2018.

3.8.8 Automobile Parking

Due to limited public transportation, passengers, visitors, and employees use private and rental automobiles to travel to and from the airport. Therefore, adequate parking facilities are essential to the passenger terminal and other airport facilities.

Public Parking Requirements

In determining the demand for public parking, it is recognized that parking areas need to provide parking for a near-peak period. The FAA design guidance uses the terms "long-term" and short-term" to describe categories of parking on airports. As previously described in the inventory of existing conditions, public parking at TLH is accommodated in several areas within the Terminal Loop Road. Hourly (short-term) parking (307 spaces) is located north of terminal building directly across the terminal access road adjacent to the rental car ready/return lot. Daily (long-term) parking (1,330 spaces) is located north of the short-term parking area within the Terminal Loop Road.

According to the AC 150/5360-13A, public parking spaces were determined by multiplying 1.5 times the number of peak hour passengers. According to the FAA design guidance, short-term use is estimated to be approximately 25 percent of the total parking requirements. Long-term parkers are expected to occupy 75 percent of the available parking spaces. Terminal parking requirements are summarized in **Table 3-26**. Comparing the existing facilities and long-term demand, an expansion of public parking facilities may be needed during the planning period.

Table 3-26
Public Parking Requirements

Item	2015	2020	2025	2035
Peak hour Passengers	1,000	1,100	1,200	1,420
Total Public Parking Space Demand[1]	1,500	1,650	1,800	2,030
Long-Term Parking Space Demand [2]	1,125	1,237	1,350	1,522
Short-Term Parking Space Demand [3]	375	412	450	508
Existing Parking Space Capacity (LT/ST)	1,330/307	1,330/307	1,330/307	1,330/307
Public Parking Surplus / (Deficit) (LT/ST)	170/(68)	93/(105)	(20)/(143)	(192)/(201)

Sources: FAA AC 150/5360-13A, Airport Terminal Planning and Michael Baker International, Inc., 2018.
Notes:
1) 1.5 times Peak Hour Passengers
2) Long-term demand = 0.75 * Total Parking Space Demand
3) Short-term demand = 0.25 * Total Parking Space Demand

Rental Car Parking

Currently, seven rental car agencies serve TLH including Avis, Alamo, Dollar, Enterprise, Hertz, National, and Thrifty. The rental car ready/return lot is located to the north of the terminal across the terminal area access road adjacent to the hourly and daily parking lots. The existing 244 ready/return spaces are subdivided between the on-site rental car companies. The number of spaces required to accommodate the forecast levels of rental car activity is dependent upon several factors. At TLH, the number of cars rented in their peak month were determined to equal approximately 25 percent of the airport's peak month enplanements, and returned cars equaled approximately 25 percent. The ready/return parking lot capacity is less than 100 percent of the

daily rented and returned cars because the rental car companies rotate their cars during the day from the return lot to the service area for cleaning and fueling, then to the storage or ready lot. At TLH, the intended capacity of the ready/return parking lot was projected to equal 25 percent of the average daily rented and returned cars, or each space accommodates four cars per day on average. The number of parking spaces in the ready/return lot depends on the staffing and operation of the agencies. A lower factor (fewer spaces) requires staff to rotate cars from the service and storage areas more often, whereas a higher factor (more spaces) allows a smaller staff and less frequent rotation of the cars.

As shown in **Table 3-27**, the total number of storage spaces is currently adequate, although the split between rental car companies may need review. The amount of rental car storage space at TLH is greater than airports of similar size due to a predominant business market with few rentals during the weekends. Therefore, the storage capacity needs to be 150 percent of the peak month average day rental activity. Comparing the existing facilities and long-term demand, an expansion of rental car ready/return parking facilities is warranted within the planning period. There are plans in the future to construct a consolidated rental car facility.

Table 3-27
Rental Car Parking Requirements

Item	2015	2020	2025	2035
Peak Month Enplanements	31,100	33,900	36,900	43,900
ADPM Enplanements	1,003	1,094	1,190	1,416
Ready/Return Space Requirements[1]	251	273	297	354
Rental Car Parking Space Capacity	244	244	244	244
Rental Car Parking Surplus / (Deficit)	7	(29)	(53)	(110)

Source: Michael Baker International, Inc., 2016.
Note:
1) 25% of ADPM enplanements

Employee Parking Requirements

A large surface lot northwest of the terminal building outside of the terminal frontage road provides 210 employee parking spaces. This was considered adequate for the peak period which is based on the automobiles for the maximum number of employees who may be working at a given time. This time period usually reflects the time of shift changes where early and late shift employees are both utilizing the facilities simultaneously. The employee lot is paved and equipped with access control devices to limit parking to only airport employees.

Employee parking space requirements are related to enplaned passengers. On a national basis, employee parking spaces per 100,000 enplanements range from 25 to 40. Using the higher value of 40 yields the estimated employee parking requirements for the commercial terminal at TLH as presented in **Table 3-28**.

Table 3-28 Employee Parking Requirements				
Item	2015	2020	2025	2035
Existing Employee Parking Capacity (No.)	210	210	210	210
Employee Parking Required (No.)	133	146	159	188
Surplus/(Deficiency)	77	64	51	22
Source: FAA AC 150/5360-13A, Airport Terminal Planning, and Michael Baker International, Inc., 2018.				

General Aviation Automobile Parking

Automobile parking in the GA area includes spaces at each of the three apron areas. Automobile parking associated with GA area serves the North Apron, Central Apron, and the South Apron. These include spaces used by passengers, visitors, employees, public transit, and taxis/shuttles. The GA parking lot is located adjacent to the North Apron and Flightline Aviation and allows access to the Central Apron. This parking lot is designated for General Aviation airport users (i.e., Aero Associates, and access to T-Hangars and Corporate Hangars). The parking lot provides approximately 50 paved vehicle parking spaces.

Tallahassee International Airport has sufficient on-airport public parking to accommodate the current and future need for parking in the GA area. As a result, no additional parking will be needed. TLH should maintain the current parking facilities throughout the planning period. Table 3-29 presents the standards and current status of the GA parking according to ACRP's GA Facility Planning Guidance. As presented, the current GA parking facilities serving the North Apron, Central Apron and South Apron meet the industry recommended requirements.

Table 3-29 General Aviation Automobile Parking Status	
Standard	Status
Provide safe and easy ingress and egress for the vehicles expected to use the spaces	*Meets Standards*
Be close to the facility they are serving	*Meets Standards*
Ensure employees do not have to cross active airfield pavements to reach their destination	*Meets Standards*
Ensure that pedestrians do not have to cross other roads to reach their destination	*Meets Standards*
Does not interfere with the possible expansion or construction of other airfield facilities	*Meets Standards*
Ensure that vehicles do not have to back out of the space directly into a primary road	*Meets Standards*
Source: *ACRP General Aviation Planning Guidance*, Michael Baker International Inc., 2016	

3.9 Air Cargo Facilities

The existing cargo facilities at the airport consist of the Cargo Apron, sorting facility (cargo building, and the staging area (delivery truck and vehicle parking). As previously noted in the forecast chapter of this Master Plan Update, air cargo activity at TLH consists of two distinct types of cargo operations. These include scheduled cargo carriers (Federal Express and DHL), as well as in the belly compartments of commercial service passenger aircraft. An evaluation of air cargo facility requirements was not included in the scope of services for this Master Plan Update; however, alternatives for air cargo expansion are presented later in the study.

3.10 Airport Utilities

Airport utilities include electric power, sanitary sewer, communications, and storm-water services. These utilities services have been determined to be sufficient to meet the existing and forecasted needs of the airport. TLH maintains its own system for storm sewer purposes. This system is considered to be adequate for the needs anticipated during the 20-year planning period. The current sanitary sewer system at TLH uses the adjacent Thomas P. Smith Water Reclamation Facility. The facility is located east of Runway 27 approach within the Runway 27 RPZ.

Future development of the northern and eastern portions of the airport necessary to support the expansion of the air cargo and general aviation areas will require a full complement of utility services. Also, additional development on the south and west side of the airfield would require significant utility extensions to support future development.

3.11 Airport Security

Security is a critical consideration when operating a safe airport. According to the Transportation Security Administration (TSA), *Recommended Security Guidelines for Airport Planning, Design, and Construction* (TSA Security Guidelines), "effective airside security relies heavily on the integrated application of physical barriers, identification and access control systems, surveillance or detection equipment, the implementation of security procedures, and efficient use of resources." It is critical to analyze the airport's general security requirements, general layout and boundaries to conform to the TSA Security Guidelines. The critical airside components at TLH are analyzed in accordance with the FAA standards and TSA Security Guidelines. **Table 3-30** identifies the security requirements of 14 CFR Part 139 and current status at TLH. However, new technologies are constantly being introduced to deter from security concerns. Installation of more current and up-to-date airport security equipment should be planned for during the 20-year planning period.

Table 3-30 Airside Security Checklist	
Standard/ Requirement	**Status**
Aircraft Operations Area - Comply with AC 150/5300-13A distance requirements	*Meets Standards*
FAA Safety and Operational Areas:	
Aircraft Movement Areas - Comply with AC 150/5300-13A	*Meets Standards*
Runways, taxiways, ramps, and/or aprons - Comply with AC 150/5300-13A	*Taxiway design deficiencies*
FAA Safety and operational areas - Comply with AC 150/5300-13A	*Meets Standards*
Object Free Area (ROFA) - Comply with AC 150/5300-13A	*Meets Standards*
Building Restriction Line - Comply with AC 150/5300-13A	*Meets Standards*
Runway Protection Zone (RPZ) - Comply with AC 150/5300-13A	*Meets Standards*
Runway Safety Area (RSA) - Comply with AC 150/5300-13A	*Meets Standards*
Glide Slope Critical Area - Comply with AC 150/5300-13A	*Meets Standards*
Localizer Critical Area - Comply with AC 150/5300-13A	*Meets Standards*
Approach Lighting System - Comply with AC 150/5300-13A	*Meets Standards*
Passenger Aircraft Parking Areas:	
Safe distance to fence/public access areas	*Meets Standards*
Safe distance to other parked aircraft	*Meets Standards*
Safe distance recommendations for prevention of vandalism	*Meets Standards*
Maintain visibility of areas around parked aircraft to monitor for unauthorized activity	*Meets Standards*
General Aviation Parking Areas:	
Exclude GA from the SIDA	*Meets Standards*
Distance GA form terminal area	*Meets Standards*
Coordinate with tenants	*Meets Standards*
Isolated/Security Parking Position:	
At least 100 meters form other aircraft structures	*Meets Standards*
Ensure separation from utilities and fuel	*Meets Standards*
Use CCTV to view the aircraft surrounding area	*Meets Standards*
Accommodate emergency staging area	*Meets Standards*
Avoid public viewing/proximity to area	
Airside Roads:	
Restrict access to authorized vehicles	*Meets Standards*
Perimeter roads should be airside	*Meets Standards*
Perimeter roads should provide unobstructed views of the fence	*Meets Standards*
Positioning of roads	*Meets Standards*
Maintain fencing clear area	*Meets Standards*
Airside Vulnerable Areas:	
NAVAIDs	*Meets Standards*
Runway Lighting	*Meets Standards*
Communications Equipment	*Meets Standards*
Fueling Facilities	*Meets Standards*
FAA ATCT	*Meets Standards*
Source: *TSA Recommended Security Guidelines for Airport Planning Design and Construction, FAR 14 CFR Part 139*, Michael Baker International, Inc., 2016	

3.12 Land Use Compatibility and Control

The purpose of the land use analysis is to review the airport's facilities in comparison to FAA standards in order to identify additional property that may be required for inclusion into the land property envelope. The additional properties may be necessary for land use compatibility purposes, future development needs, or to obtain control over a Runway Protection Zone (RPZ). FAA guidance recommends the airport provide positive land use control over the land in the RPZ. Control over the RPZ can be done through ownership, purchasing the airspace, and other land use rights through aviation easements. If ownership of the property is not possible, land use controls via zoning can be enacted.

3.12.1 Airport Property

The existing airport property encompasses approximately 2,485 acres according to the recently updated TLH Exhibit "A" Airport Property Inventory Map. It is not anticipated that any additional land will be required for the future development of the airport; however, the alternatives chapter will identify any needed land and **Figure 4-1** identifies the developable parcels available on the airport property. The parcels of land were analyzed in terms of their potential use, aircraft and automobile access, and feasibility of development. The intent was to evaluate the highest and best use for the vacant parcels, as well as to determine if additional property should be acquired to accommodate the airport's growth initiatives. The land use analysis should provide the airport with a plan to maximize development opportunities on the property and to generate additional revenues. The information included in this analysis places priority on reserving as much space as possible for aviation development and expansion.

The alternatives section will identify specific parcels that will be used for aviation and non-aviation development. As shown in **Figure 4-1** there are several parcels of land that are owned by TLH that are usable for aviation and non-aviation related land development. These areas were defined by the existing property line, the Runway Protection Zones (RPZ), and the Building Restriction Line (BRL). Alternatives will be developed to utilize the land and the needs will be identified in later sections of this Master Plan Update.

3.12.2 Airport Zoning

Airport zoning ordinances should include height restrictions and land use compatibility regulations. Development around airports can pose certain hazards to air navigation if certain steps are not taken to ensure that existing as well as future, buildings and other types of structures do not penetrate 14 CFR Part 77 imaginary surfaces (Part 77 Imaginary surfaces).

According to FAA guidelines, airport sponsors should implement height restrictions in the vicinity of the airport to protect the Part 77 Imaginary surfaces. The RPZ associated with the Runway 27 approach currently extends beyond the airport property. The main concern is maintaining clear obstacles of the Runway 27 RPZ. Currently, the RPZ extends past the property line onto the Thomas P. Smith Water Reclamation Facility. Approximately 24 acres of land are within the RPZ. The City of Tallahassee Code of Ordinances contain RPZ regulations that encompass several ordinances intended to control and maintain compatibility between TLH and surrounding land uses. The land use ordinances are contained in Section 10-254, *OA-1 Airport Vicinity District* (OA-A District). The OA-1 District is limited to development of compatible planned office development and high technology and research and development activities; however, it is not intended to accommodate industrial activities. Section 10-270, GO-1 Government Operational Heavy Infrastructure District, refers to areas designated as Government Operational areas (i.e., commercial service airports and water treatment plants).

3.13 Summary

The intent of this chapter has been to outline the various safety design standards and facilities required to accommodate the future potential demand at TLH for the next 20 years. Since the 2006 Master Plan Update, many changes have been implemented throughout the airfield to address the requirements of that specific study.

Overall, the review of the existing facilities and their ability to accommodate projected levels of demand has identified a few areas that should be the focus of future planning and development at TLH. **Table 3-31** presents a summary of the identified facility requirements for this Master Plan Update. The remaining sections of this report present recommendations to satisfy these facility requirements at TLH, including a phased development program over the next 20 years. Alternatives to address the projected demand will be developed in the next section.

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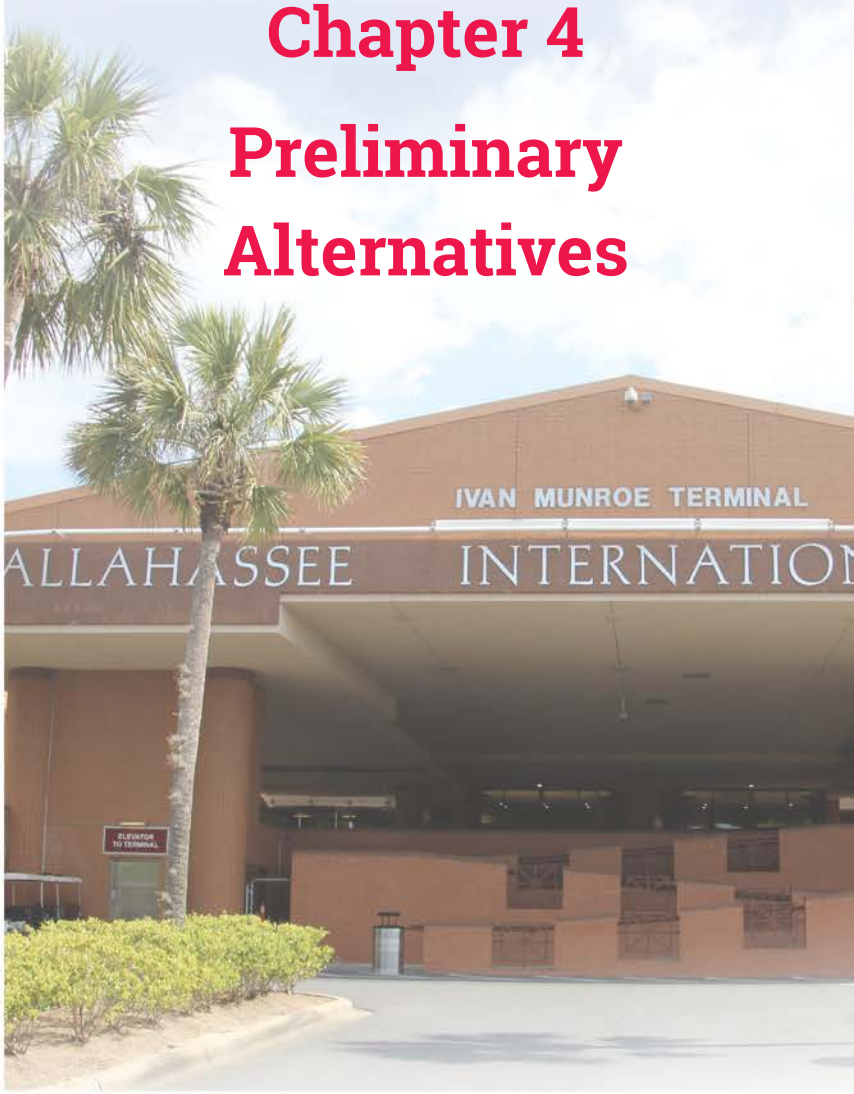
Table 3-31
Summary of Facility Requirements

Category	2015 (Base Year)	2020 (Short-Term)	2030 (Mid-Term)	2035 (Long-Term)
Critical Aircraft: Boeing 757-200 C-IV				
Runway 9-27				
Runway Design Code (RDC)	C-IV	Same as existing (maintain)		
Length (FT)	8,000'	Same as existing (maintain)		
Width (FT)	150'	Same as existing (maintain)		
Pavement Strength (LBS)	115,000 LBS 170,000 LBS 330,000 LBS	Routine pavement maintenance		
Lighting	HIRL	Same as existing (maintain)		
Markings	Precision	Same as existing (maintain)		
Runway 18-36				
Runway Design Code (RDC)	C-IV	Same as existing (maintain)		
Length (FT)	7,000'	Same as existing (maintain)		
Width (FT)	150'	Same as existing (maintain)		
Pavement Strength (LBS)	115,000 LBS 170,000 LBS 330,000 LBS (Maintain) Rehabilitate Runway 18-36		Routine pavement maintenance	
Lighting	HIRL	Same as existing (maintain)		
Markings	Precision	Routine markings maintenance		
Taxiways				
Full Length Parallel Taxiways A &B with associated entrance/ exit taxiway	Maintain	Address acute angle taxiway design (A5, A6, A8, A9, and A12) Mitigate for direct access from apron onto Runway 9-27 (B3 and B6) Consider by-pass taxiway at Runway 9 end Rehabilitate taxiway pavement throughout the planning period		
Navigational & Weather Aids				
ATCT, ASOS, Lighted Wind Cone	Maintain	Same as existing (maintain)		
4- Light PAPI - Runways 9-27 & 18-36	Maintain	Same as existing (maintain)		
REIL	Maintain	Same as existing (maintain)		
Instrument Approaches: ILS/LOC, RNAV GPS, VOR DME	Maintain	Same as existing (maintain) Upgrade Navigational Aids as needed throughout the planning period		
Lighting Markings & Signage				
Rotating Beacon	Maintain	Replacement recommended due to age		
HIRLs	Maintain	Same as existing (maintain)		
MITL	Maintain	Same as existing (maintain); Complete lighting upgrades to LED		
Precision Runway Markings	Maintain	Same as existing (maintain)		
Airfield Signage	Maintain	Continue to maintain signage in accordance with CFR Part 139 Add/replace signage as necessary		

Table 3-31 (Continued) Summary of Facility Requirements				
Category	**2015 (Base Year)**	**2020 (Short-Term)**	**2030 (Medium-Term)**	**2035 (Long-Term)**
Commercial Terminal				
Terminal Building		Address future demand (long-term) shortfalls in ticketing, baggage claim, security screening, concessions and passenger holding functions.		
Automobile Parking		Add short-term and rental car parking.		
General Aviation Terminal				
Automobile Parking	Maintain	Same as existing (maintain)		
Aircraft Storage				
T-Hangar (Units)	75 Units	3 (Single Engine)	7 (Single Engine)	4 (Single Engine)
Conventional Box Hangar (Units)	12 Units	1 (Jet)	4 (2 Turboprop, Jet, Helicopter)	1 (Jet)
Based Aircraft Tie-downs	78	2 (Single Engine, Helo)	2 (Single Engine)	1 (Single Engine)
Apron				
Transient Aircraft Apron (SY)	Sufficient (Maintain)	Sufficient (Maintain)	Additional 926 SY (8334 SF) required	4266 SY (38394 SF)
Support Facilities				
Fuel Storage 100LL	Maintain			
Fuel Storage Jet A	Maintain			
Security				
Airport Security	Upgrade security technology as needed.			
Land Use				
Land Acquisition	Acquire easement within the Runway 27 approach RPZ Designate non-aviation and aviation related development areas on airport property to further enhance potential revenue			
Source: Michael Baker International Inc., 2016				

Chapter 4

Preliminary Alternatives



Master Plan Update

TALLAHASSEE
INTERNATIONAL AIRPORT

4.0 Preliminary Alternatives

4.1 Background

The previous chapter of this Master Plan Update presented the facility requirements for the Tallahassee International Airport (TLH). The identified requirements include improvements to the airfield for safety and conformance with design standards, expansion of aprons and additional hangars in the landside area, on-airport circulation improvements, support facility recommendations, and future expansions of the passenger terminal and cargo facilities. This chapter presents the preliminary alternatives for TLH that are intended to illustrate potential options for satisfying the identified requirements during the 20-year planning period (2015 through 2035). The preliminary alternatives are intended for discussion purposes between the various airport stakeholders including airport tenants, the Technical Advisory Committee (TAC), City of Tallahassee, and the public. The individual components of each preliminary alternative were evaluated to aid in the selection of a preferred alternative that represents the desired development plan for TLH, which is presented in Chapter 5. For that reason, the preliminary alternatives should be viewed as flexible development plans that may be refined or combined to best satisfy the needs of the airport's stakeholders. They are intended to provide a clear understanding of the airport's possibilities and limitations for airfield and landside development. An evaluation of the following is presented in this chapter:

- Airport Land Use Analysis
- Airfield Design Standards Alternatives
- Terminal Alternative
- Airport Access Alternatives
- Air Cargo Alternative
- General Aviation Alternatives

A meeting was held on March 29, 2016 to present the preliminary alternatives to the TAC and a public meeting was held on the following day (March 30, 2016). The input and comments from those meetings were used to determine the long-term recommended plan for TLH (i.e., the preferred alternative). It is noted that the preliminary alternatives do not present all facilities and equipment that would be needed during the 20-year planning period; rather, alternatives are shown to evaluate potential impacts, understand the desires of airport stakeholders, and to provide sample illustrations of what the airport is capable of accommodating. The preferred alternative and Airport Layout Plan (ALP) illustrate many of the more finite facilities with locations dictated by the FAA and the ultimate layout of airfield and landside facilities.

4.2 Airport Land Use Analysis

The vision for the TLH landside development is to create a balanced, self-sustaining, facility that attracts investment, capitalizes on emerging market trends, and supports economic growth for the Tallahassee region. The airport includes a viable base of tenants, a strong educational

presence, availability of land and infrastructure, transportation access, and natural resources. The intent is to leverage these existing assets into development opportunities that differentiate TLH as a leading transportation, industrial, and commercial business center for the region.

Drawing from the findings determined earlier in the planning process, **Figure 4-1** depicts long-term opportunities that reflect coordinated actions among the public sector, private investors, and the airport. While individual projects and property development options may vary from the specific land uses shown, the uses shown should act as an overall benchmark for the highest, best, and most sustainable use of the parcels of airport property that are available for future development, as options for additional property acquisition are limited due to existing uses surrounding the airport. This land use framework will also act as the basis for more detailed site design in subsequent phases of the master planning process.

Considering the existing airfield configuration and preserving for the potential extension of Runway 9-27 to meet the airport's growing needs in the future, nine vacant parcels of developable airport property were analyzed in terms of their potential use, aircraft and automobile access, and feasibility of development. Furthermore, this land use analysis should provide the airport with a plan to maximize development opportunities on the property and to generate additional revenues. The information included in this analysis places priority on reserving space for aviation development and expansion before considering alternate uses. The results of this analysis were also coordinated with airport staff and the consultants responsible for establishing a new Foreign Trade Zone (FTZ) at the airport and attracting potential tenants/developers for the undeveloped parcels.

The parcels are illustrated in **Figure 4-1** and evaluated in **Table 4-1**. Development opportunities are organized into nine distinct areas. The consultant team initially considered each area's proximity to the runway system to determine the ability to support aviation-related activities, including aircraft Maintenance, Repair, and Overhaul (MRO) activities, freight and logistics, and flight training. Other economic development opportunities identified are associated with commercial, light industrial, and manufacturing uses. It is noted that stormwater improvements need to be conducted to make the parcels shovel-ready for development.

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Table 4-1
Land Use Analysis

Parcel	Approximate Acreage	Access to Runways	Potential Use	Access	Feasibility of Development
A	74	Yes	MRO/Freight and Logistics/Commercial/Flight Training/Manufacturing	Vehicle access could be provided from Capital Circle SW.	This area is best suited for aviation-related development. Buildings to be constructed in this area should not exceed a certain height to avoid encroachment of the transitional and inner approach surfaces. Development of this area is warranted by demand and will require the relocation of the Remote Transmitter/Receiver (RTR) to a location east of Runway 18-36.
B	27	Yes	MRO/Freight and Logistics/Commercial/Flight Training/Manufacturing	Vehicle access could be provided from Capital Circle SW.	The City may expand the cemetery on a portion of Parcel B through a lease from the airport. Buildings or hangars to be constructed in this area should not exceed a certain height to avoid encroachment of the transitional and inner approach surfaces. To be developed as warranted by demand.
C	56	No	Freight and Logistics/Commercial/Light Industrial/Manufacturing	Vehicle access could be provided from Capital Circle SW or Springhill Road.	Buildings to be constructed in this area should not exceed a certain height to avoid encroachment of the transitional and inner approach surfaces. To be developed as warranted by demand.
D	161	No	Freight and Logistics/Commercial/Light Industrial/Manufacturing	Vehicle access could be provided from Capital Circle SW or Springhill Road.	Buildings to be constructed in this area should not exceed a certain height to avoid encroachment of the transitional and inner approach surfaces. To be developed as warranted by demand.
E	100	Yes	MRO/Light Industrial	Vehicle access could be provided from Springhill Road and new road construction.	Buildings or hangars to be constructed in this area should not exceed a certain height to avoid encroachment of the transitional and inner approach surfaces. To be developed as warranted by demand.
F	236	Yes	MRO/Flight Training/Light Industrial/Manufacturing	Vehicle access could be provided from Airport Perimeter Road and new road construction from Springhill Road.	Eastern portion of this area is suitable for aviation-related development. Currently, the City is performing a study to determine the feasibility of developing portions of this site as an alternative energy resource. Buildings or structures to be constructed in this area should not exceed a certain height to avoid encroachment of the transitional and inner approach surfaces. To be developed as warranted by demand.
G	100	Yes	MRO/Flight Training/Light Industrial/Manufacturing	Vehicle access could be provided from Airport Perimeter Road and new road construction from Capital Circle SW.	Buildings or hangars to be constructed in this area should not exceed a certain height to avoid encroachment of the transitional and inner approach surfaces. To be developed as warranted by demand.
H	10	Yes	Freight and Logistics	Vehicle access could be provided from Capital Circle SW and Air Cargo Road.	Proximity to the air cargo area makes this parcel ideal for freight and logistics related development and there is a potential to construct an Intermodal Logistics Center (ILC) for freight on the airport property. Buildings to be constructed in this area should not exceed a certain height to avoid encroachment of the transitional surface. To be developed as warranted by demand.
I	31	No	Commercial	Vehicle access could be provided from Capital Circle SW.	Site is ideal for hotel or other complementary commercial development. To be developed as warranted by demand. There are some soil contamination issues associated with this parcel.

Source: Michael Baker International, Inc., 2017.

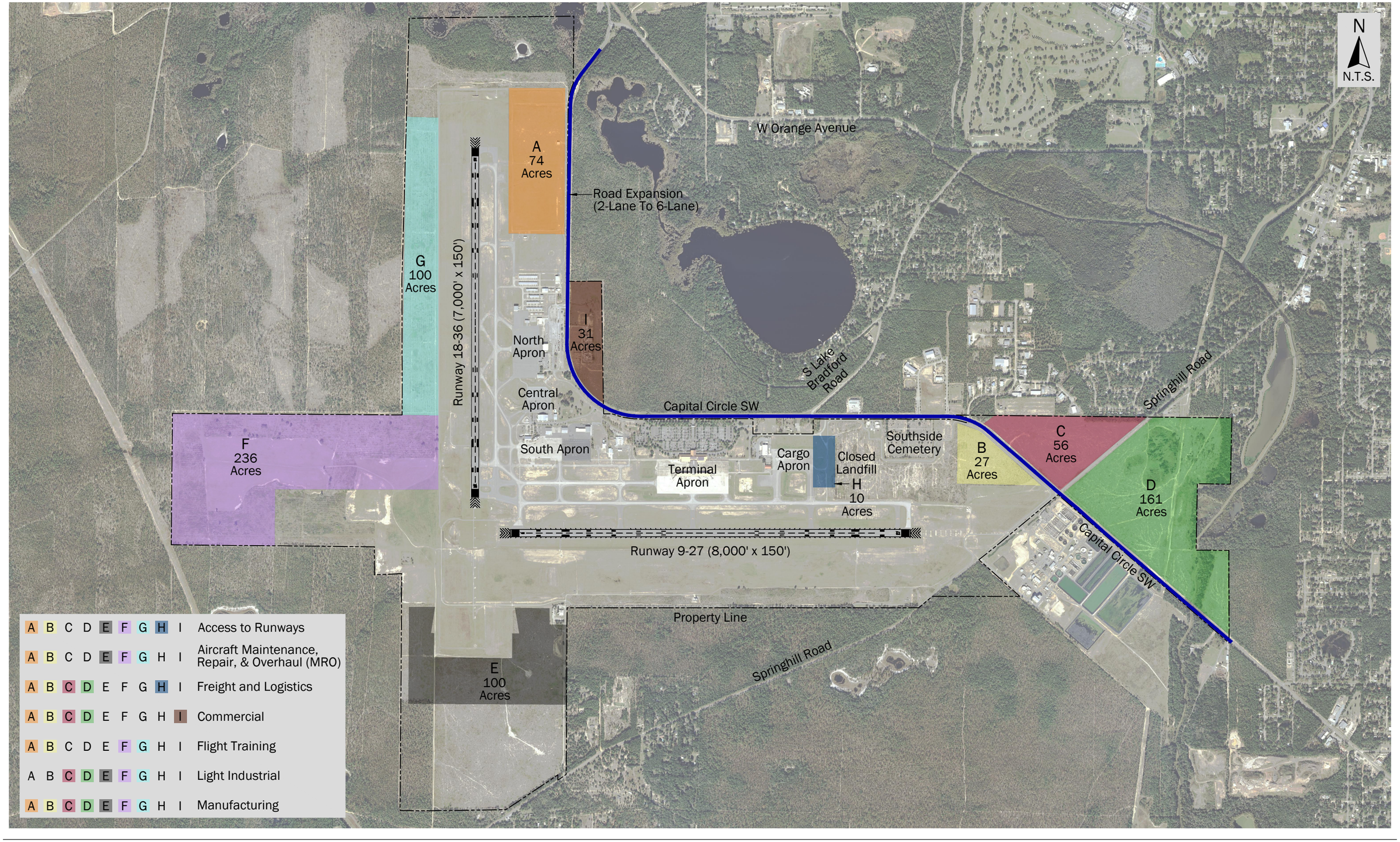

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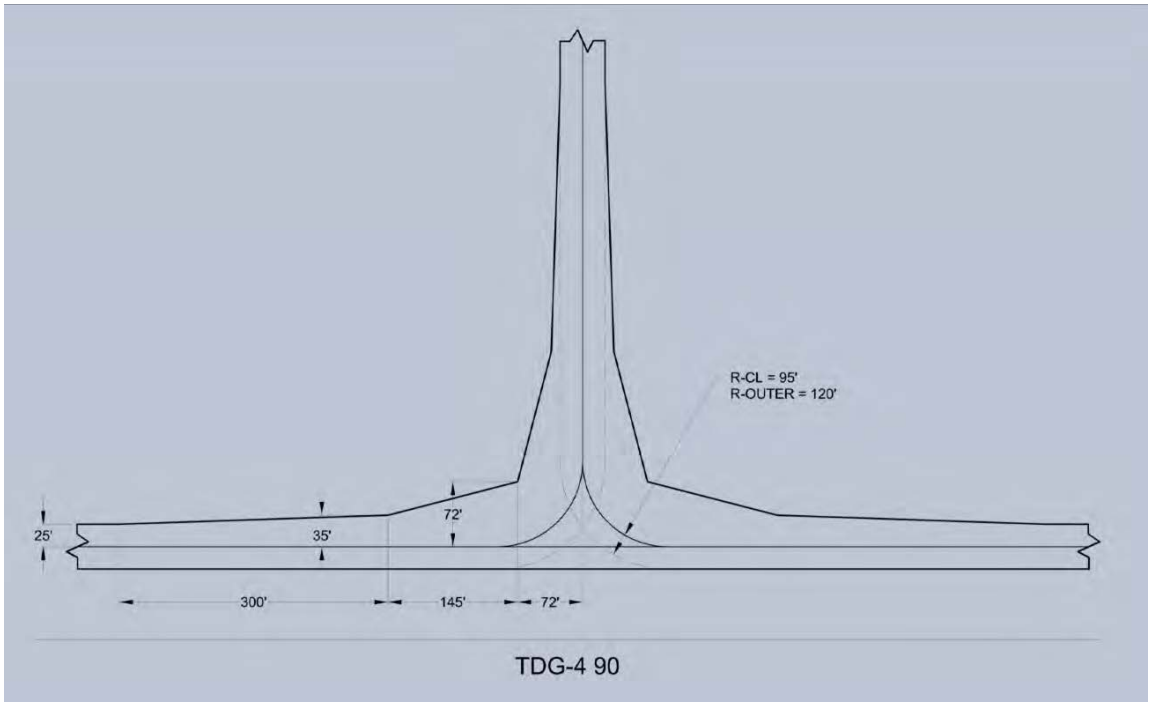
Figure 4-1 Land Use Analysis

4.3 Airfield Design Standards Alternatives

The purpose of the airfield design standards alternatives was to correct features of the airfield to conform to current FAA standards as outlined in Advisory Circular (AC) 150/5300-13A, Airport Design. This primarily included improvements at taxiway intersections to comply with revised fillet geometry standards. According to AC 150/5300-13A, "pavement fillets at taxiway intersections are designed for the entire selected Taxiway Design Group (TDG) and must accommodate all aircraft of all lesser TDGs." At TLH, the critical aircraft is the Boeing 757-200 freighter jet that falls into the TDG-4 category. The graphic below shows an illustration of the FAA's fillet geometry requirements for TDG-4 for a 90-degree intersection. While everything associated with parallel Taxiways A and B should be designed in accordance with TDG-4, as well as the connections to the Terminal Apron and Cargo Apron, many of the other taxiways that do not routinely accommodate 757-200 and larger aircraft may be designed to a lesser standard (e.g., many of the taxiways accessing the general aviation areas).



Other improvements were also identified to comply with the recommendations in FAA Engineering Brief No. 75 (EB-75), Incorporation of Runway Incursion Prevention into Taxiway and Apron Design, which are intended to improve situational awareness for pilots while taxiing around the airfield in an effort to prevent the chance of runway incursions. The FAA defines runway incursions as "any occurrence at an airport involving the incorrect presence of an aircraft, vehicle or person on the protected area of a surface designated for the landing and takeoff of aircraft." As mentioned in the requirements analysis, EB-75 identifies the following airfield design strategies that should be

considered to help prevent runway incursions, in addition to removing direct connections between runways and aircraft parking areas:

- Removal of excess pavement.
- Removal of direct connections from runways to aircraft parking areas.
- Correction of complex intersections and hot spots.
- Limit the number of aircraft crossing an active runway.
    - The preference is for aircraft to cross in the last third of the runway whenever possible, since within the middle third of the runway the arriving/departing aircraft is usually on the ground and traveling at a high rate of speed
- Optimize pilots' recognition of entry to the runway (increase situational awareness) through design of taxiway layout, for example:
    - Use a right angle for taxiway-runway intersections (except for high speed exits)
    - Limit the number of taxiways intersecting in one spot
    - Avoid wide expanses of pavement at runway entry
- Insure the taxiway layouts take operational requirements and realities into account to:
    - Safely and efficiently manage departure queues
    - Avoid using runways as taxiways
    - Use taxiway strategies to reduce the number of active runway crossings
    - Correct runway incursion "hot spots"

The requirements analysis also identified the need to provide bypass taxiways at each runway end in order to help improve capacity during peak times. According to AC 150/5300-13A, "Air Traffic Control (ATC) personnel at busy airports encounter occasional bottlenecks when moving aircraft ready for departure to the desired takeoff runway. Bottlenecks result when a preceding aircraft is not ready for takeoff and blocks the access taxiway. Bypass taxiways provide flexibility in runway use by permitting ground maneuvering of steady streams of departing aircraft."

Therefore, considering the factors mentioned above regarding taxiway fillet geometry, the recommendations of EB-75, and the need for bypass taxiways at TLH, **Figure 4-2** illustrates the airfield design standards analysis for Runway 9-27 and **Figure 4-3** illustrates the analysis for Runway 18-36. A summary of the recommended improvements is provided below. It is likely that any fillet improvements would be conducted as part of the next rehabilitation project for each respective taxiway, while many of the EB-75 recommendations could be conducted as funding becomes available. Cost estimates for conducting these improvements are presented in conjunction with the preferred alternative.

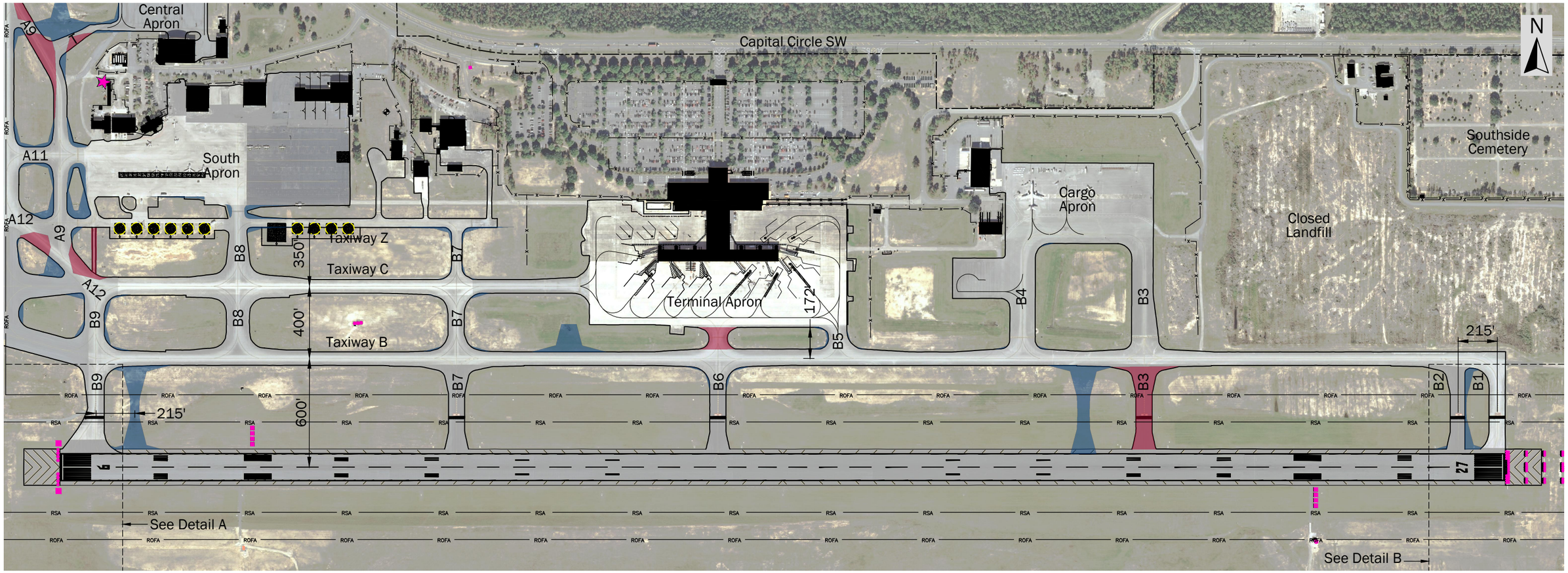
4.3.1 Runway 9-27 Airfield Design Standards Alternative (Figure 4-2)

1. Starting on the left side of the graphic (west side), fillet improvements may be conducted on Taxiway B9 (between Taxiways B and C).

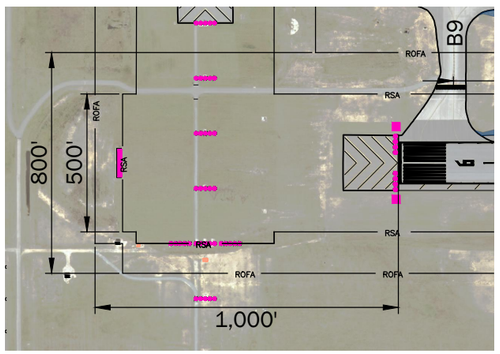
2. Runway 9 is the only runway end without a bypass taxiway. Therefore, the provision of a bypass taxiway at that runway end would help improve airfield traffic flows when conditions favor the use of Runway 9 for departures.
3. Other fillet improvements could be conducted on Taxiway B8 (at the intersection of Taxiway Z and at the entrance to the South Apron), Taxiway B7 (north of Taxiway B), and Taxiway B6 (at the intersection of Taxiway B).
4. The direct connection between Runway 9-27 and the Terminal Apron is not desirable (i.e., Taxiway B6). As a replacement, a new connection to Taxiway B is shown on the west end of the Terminal Apron.
5. The direct connection between Runway 9-27 and the Cargo Apron is not desirable (i.e., Taxiway B3). Because the Cargo Apron was built with the ability to expand and construct additional facilities along the perimeter, it was deemed more appropriate to show removal of Taxiway B3 south of Taxiway B and to provide a new connection between Runway 9-27 and Taxiway B at the midpoint between Taxiways B3 and B4.
6. The last recommendation on this graphic is the widening of Taxiway B2 to allow for bi-directional bypass operations if the need should arise to do that in the future.

4.3.2 Runway 18-36 Airfield Design Standards Alternative (Figure 4-3)

1. Starting on the left side of the graphic (north side), Taxiway A2 could be widened to allow for bi-directional bypass operations if the need should arise to do that in the future.
2. Fillet improvements could be conducted along Taxiway A3 (between Taxiway A and Runway 18-36).
3. This graphic shows removal of all taxiways that do not currently have 90-degree angles (including Taxiways A5, A6, A8, A9, and A10). Replacement taxiways were added to help improve situational awareness for pilots near the North Apron and between Taxiway A and Runway 18-36.
4. A straight connection between Taxiway A and the Central Apron was also added. To allow all general aviation aircraft to be able to access the Fixed Base Operator (FBO) facility on the South Apron without having to travel along parallel Taxiway A, a connection between the North Apron and Central Apron could be considered.
5. Various fillet improvements are shown to the west and south of the South Apron and the angled portion of Taxiway A12 is shown as replaced with 90-degree intersections.
6. The last recommendation on this graphic is the removal of Taxiway A12 (between Taxiway A and Runway 18-36) to eliminate the direct connection between Runway 18- 36 and the helicopter parking positions.



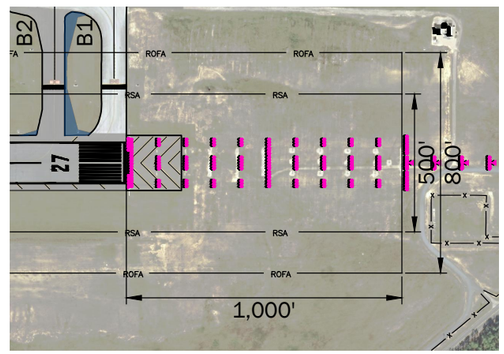
Plan View Runway 9-27 (8,000' x 150')



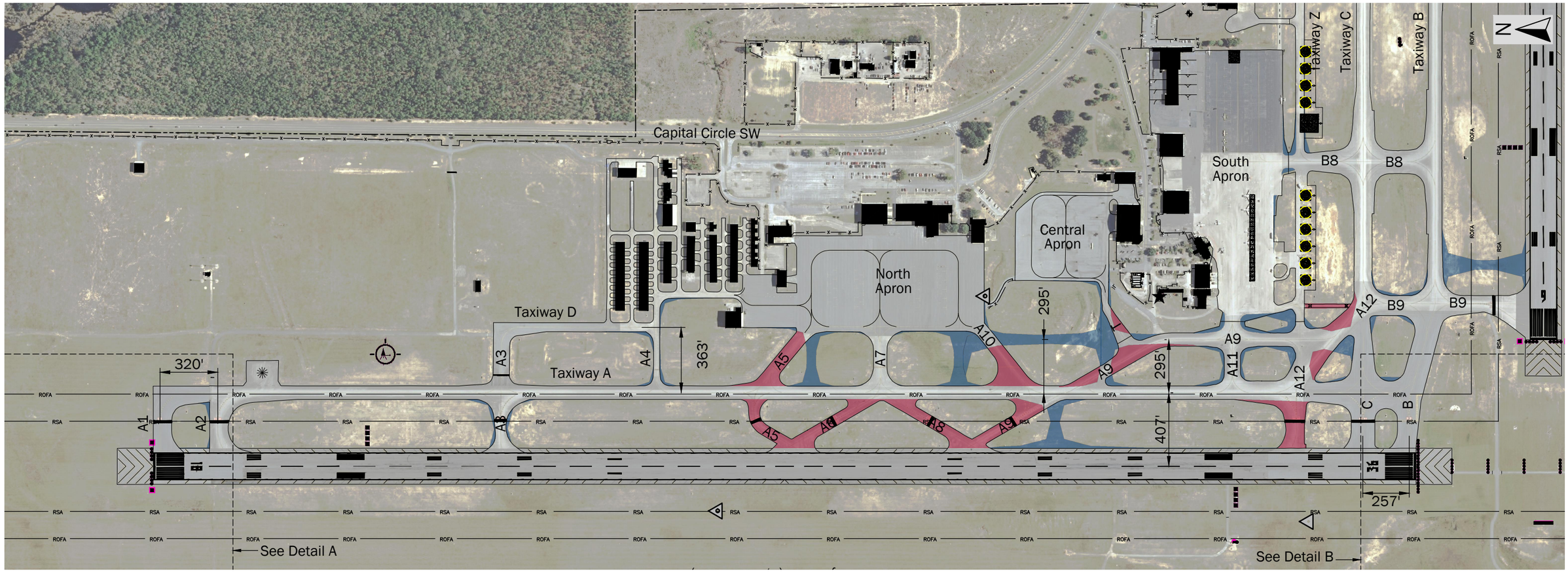
Detail A

Legend

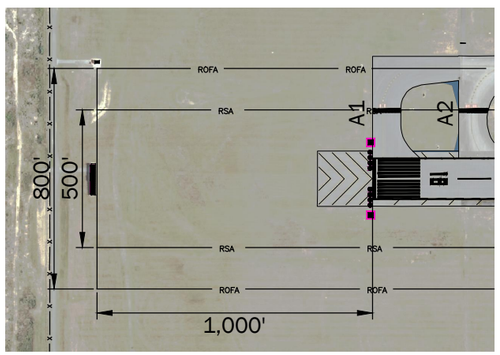
- Property Line
- Navigational Aids
- Buildings
- Potential Fillet Improvements
- Pavement Removal



Detail B



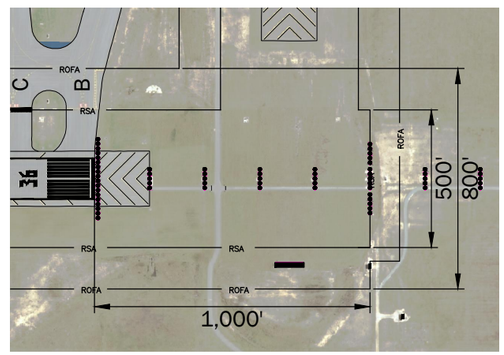
Plan View Runway 18-36 (7,000' x 150')



Detail A

Legend

- Property Line
- Navigational Aids
- Buildings
- Potential Fillet Improvements
- Pavement Removal



Detail B

4.4 Terminal Alternative

Previous terminal area planning efforts at TLH have analyzed the passenger terminal building in great detail. Within the terminal building, areas that were studied include ticketing, baggage claim, baggage screening, concessions, as well as passenger screening and holding areas. The overall plan for the passenger terminal includes the separation of outbound and inbound passengers and baggage, single passenger screening checkpoint, behind-the-scenes baggage screening, centralized concession locations, ease of future expansion, and simple circulation paths for travelers and airline employees. As a result of these previous planning initiatives, the airport is well into a Terminal Modernization Project that includes multiple improvements to accommodate short- and long-term passenger demands and meet modern spacing requirements. When completed, the project will include reconfiguring TLH's lobby up to the Transportation Safety Administration (TSA) security screening checkpoint, a new baggage claim system, ticket counters for airlines and rental car agencies, safety screening machines, a new TSA screening room, life and safety improvements, restroom renovations, and other aesthetic upgrades.

Building upon the Terminal Modernization Project, the proposed terminal development alternative calls for the expansion of the passenger terminal building to accommodate long-term baggage screening and baggage claim area needs, and an expanded concourse layout to provide additional gates and secure passenger holding area. In the near future, the airport will move forward with its plans to design and construct an International Passenger Processing Facility (IPPF) and Customs and Border Protection (CBP) facilities in support of its international airport status. The IPPF and CBP facilities will likely be constructed at ground level below Gate B5 with an alternate entry point for domestic and international flights. The IPPF will be designed to accommodate up to 400 peak hour passengers, but the facility will initially be staffed for 200 passengers.

With the expansion of the secure concourse to the east and west, approximately 162,187 SF of additional aircraft parking apron area will be constructed to accommodate the parking and flow of passenger aircraft. Terminal Apron improvements are currently slated for 2024 to fix cracks in the pavement. Additionally, a new location for connector Taxiway B6 is proposed to meet current FAA airfield design standards. These terminal area improvements are shown in **Figure 4-4**.

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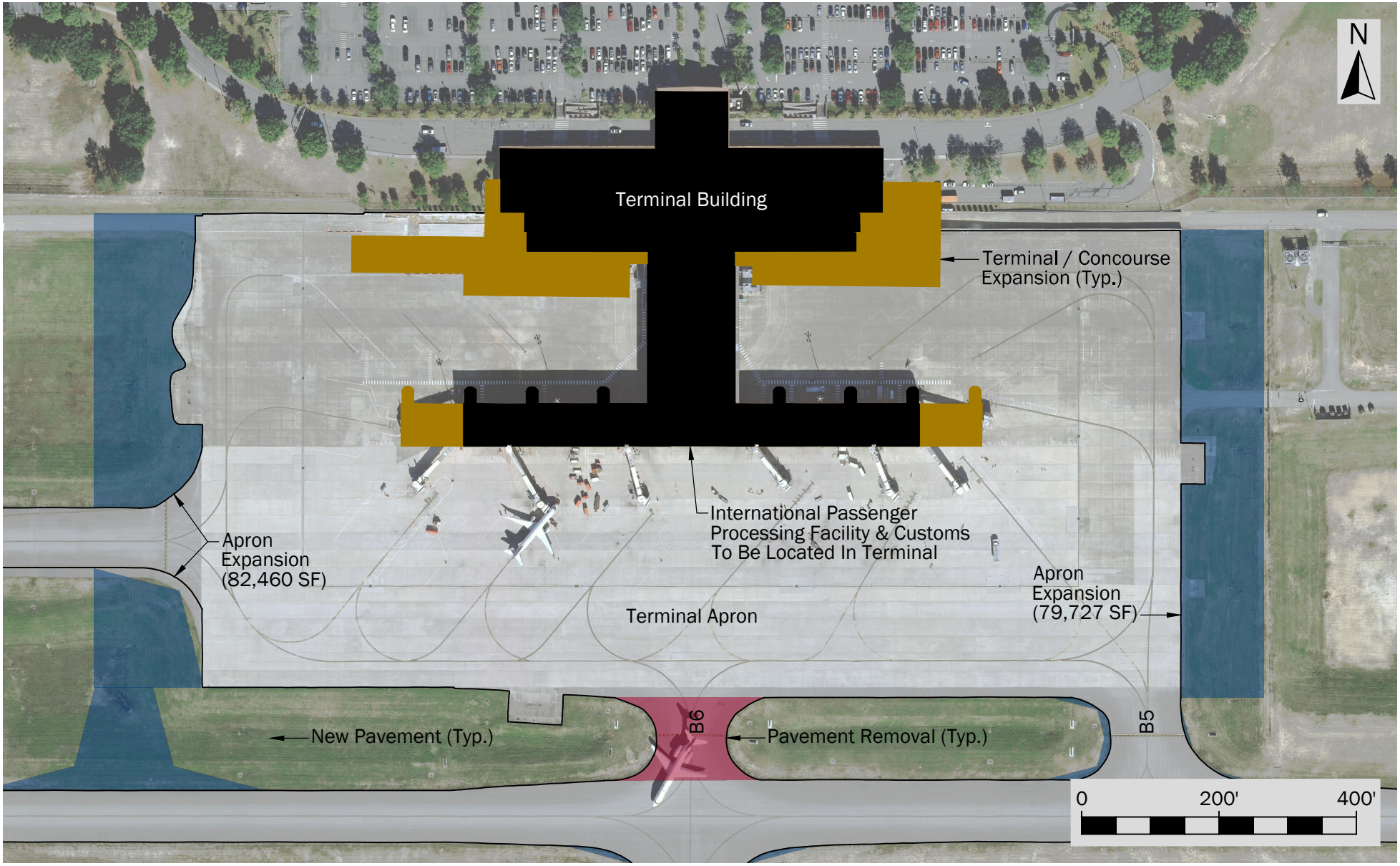

Figure 4-4 Terminal Alternative

4.5 Airport Access Alternatives

As part of the landside and terminal area development process, several options for airport access improvements were considered. At the beginning of the master planning process, the consultant team and airport staff met with representatives from the Florida Department of Transportation (FDOT) to discuss their proposed alignment associated with the widening of Capital Circle SW in the future. As part of the coordination process, it was determined that the FDOT design would provide a main entry point and a controlled exit point and that FDOT would need to purchase right-of-way from the airport. The two airport access alternatives discussed in this section are designed to improve the flow of vehicular traffic throughout the terminal area, facilitate the flow of traffic on-airport between the general aviation and cargo facilities, accommodate short-term, long-term, and employee parking needs, and support future rental car facility improvements.

4.5.1 Airport Access Alternative 1

As shown in **Figure 4-5**, Airport Access Alternative 1 provides an entry point and a controlled exit point aligned with the airport's existing entrance and exit. Although FDOT's proposed alignment provides for an exit at the existing parking plaza, there are future plans to relocate the parking plaza exit to the east side of the parking lot. Vehicles would exit onto the airport loop road and exit the airport at the main controlled exit. The relocation of the exit toll booth would also support future two-way access between existing general aviation and cargo facilities without having to pass in front of the terminal. This roadway also facilitates the flow of return traffic on the airport loop road. This road would also require an additional new roadway to the airport employee parking lot. The option for a secondary entrance is also provided.

Under this alternative, the recommendations are designed to improve the short-term and long-term parking configuration and flow of traffic. In addition, this concept includes the construction of a two-level parking structure in front of the terminal that would provide the additional short-term parking on level 2 and rental car ready/return capacity on level 1 that is needed in the future. The structure would allow passengers to walk across from the terminal to the parking structure at the same floor level. In an effort to consolidate and streamline the cleaning and maintenance activities of the rental car companies on airport, a future six-acre rental car Quick-Turnaround (QTA) service facility is proposed in the areas east of the airport loop road and the airport exit along Capital Circle SW. This location will eliminate runners for rental cars. Additional road improvements would also be necessary to support the flow of vehicles between the rental car QTA and the ready/return facilities and keep rental car activities from occurring in front of the terminal. This includes the relocation of the existing cell phone lot to a more efficient location on the west side of the airport loop road near the airport entrance.

In an effort to further evaluate this alternative, the following pros and cons were identified:

Pros

- Two-way access between the general aviation and cargo facilities without having to pass directly in front of the terminal.
- Dedicated access for the QTA service facility.
- Single entry for parking.
- Relocated exit plaza.
- Relocated cell phone lot.
- Dedicated controlled entrance and exit.

Cons

- Access road is in close proximity to the entry/exit points (crossing movements).
- QTA service facility will require storm water pond revision.

4.5.2 Airport Access Alternative 2

As shown in **Figure 4-6**, Airport Access Alternative 2 is similar to Alternative 1; however, it is designed to address some of the issues identified previously. This alternative preserves the area east of the airport loop road that is currently used for stormwater retention. As a result, the proposed six-acre rental car QTA service facility is situated entirely along Capital Circle SW on a longer and wider parcel. Compared to the previous alternative, this configuration would improve the overall flow of cleaning and maintenance activities for multiple rental car companies. Due to its proximity to the existing roadway network, Alternative 2 also results in less new roadway construction. The following pros and cons were identified:

Pros

- Two-way access between the general aviation and cargo facilities without having to pass directly in front of the terminal.
- Preserves storm water basin.
- Dedicated access for the QTA service facility.
- Allows for a more streamlined layout of QTA service facility.
- Results in less new road construction.
- Single entry for parking.
- Relocated exit plaza.
- Relocated cell phone lot.
- Dedicated controlled entrance and exit.

Cons

- Access road is in close proximity to the entry/exit points (crossing movements).

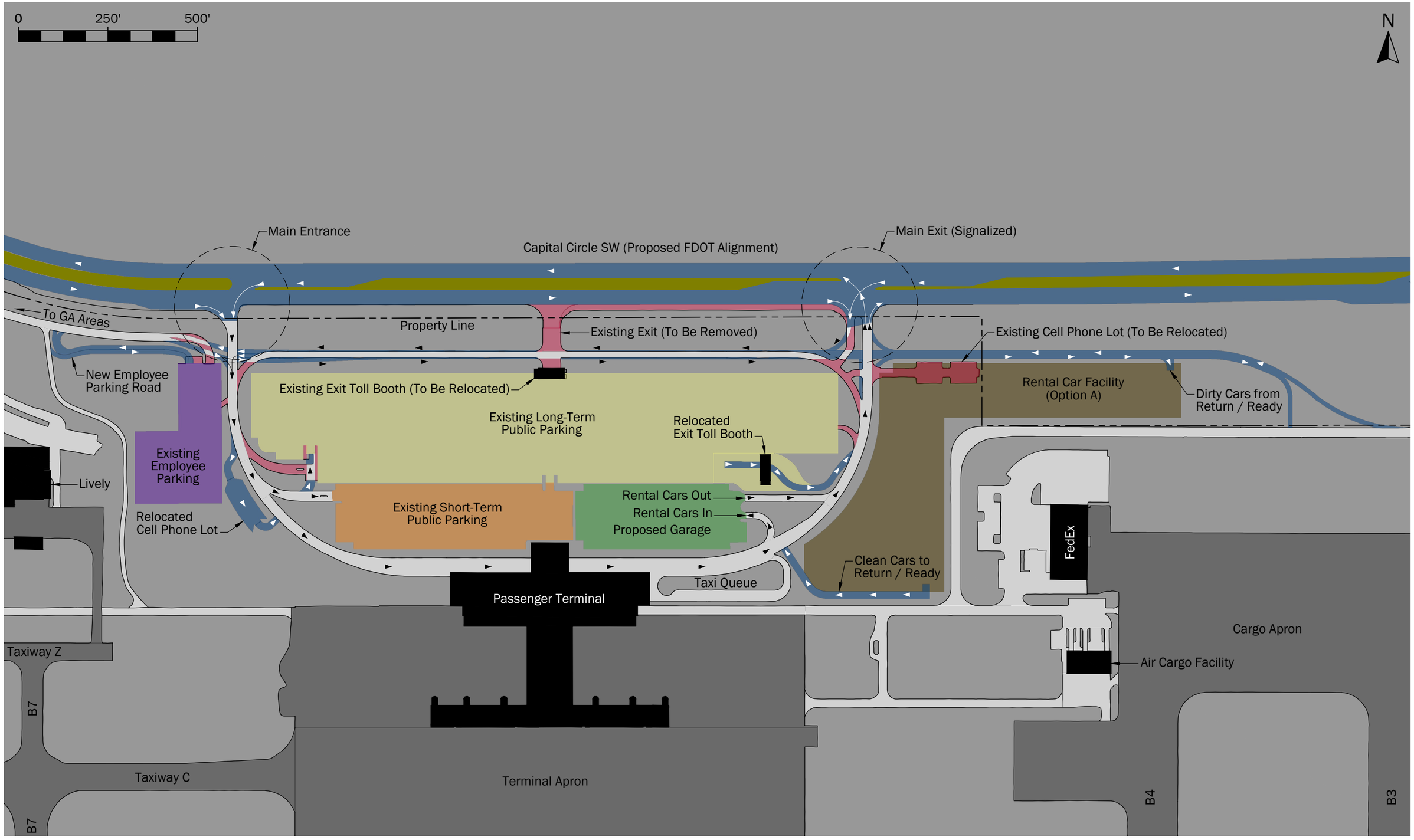

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Figure 4-5 Airport Access - Alternative 1

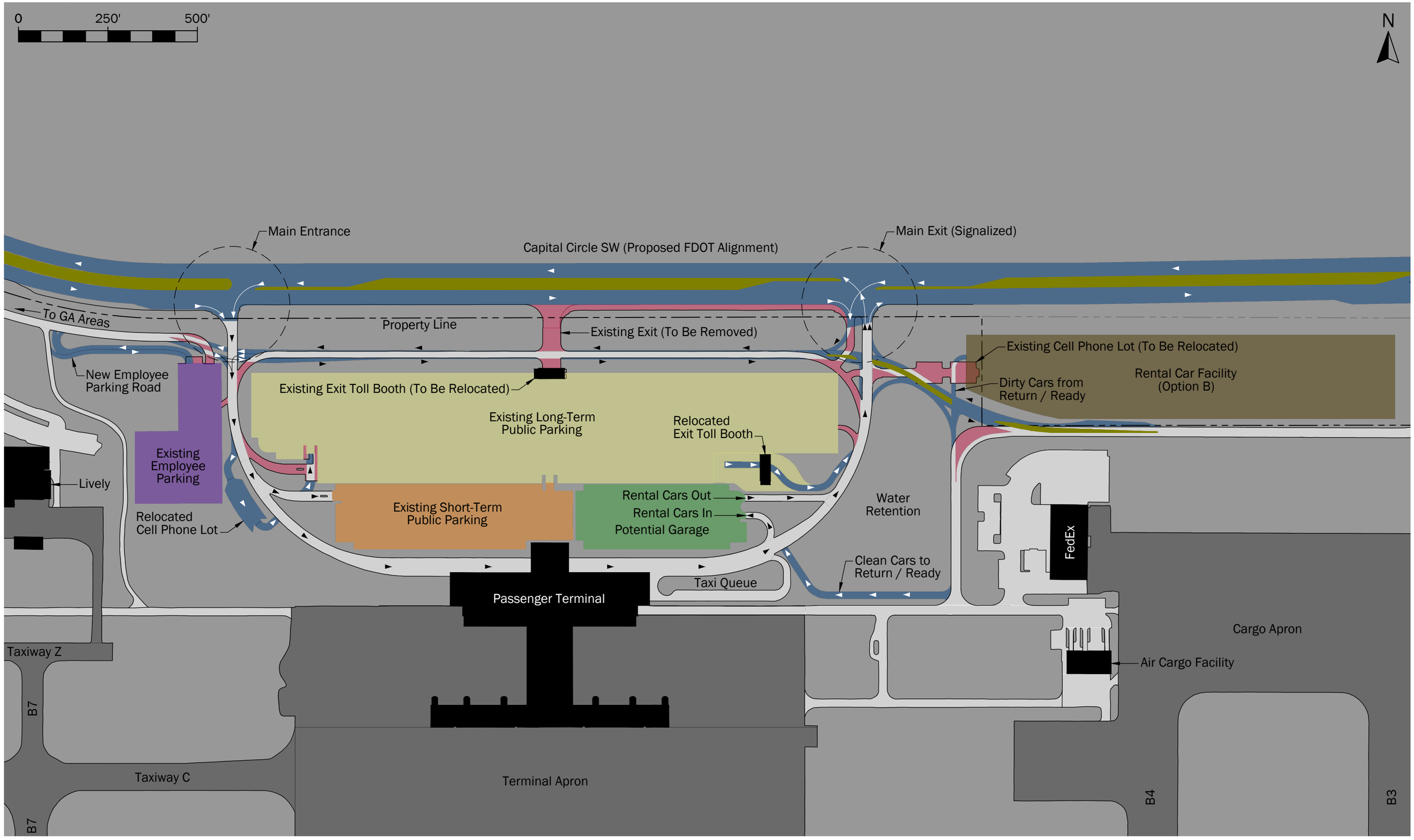

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Figure 4-6 Airport Access - Alternative 2

4.6 Air Cargo Alternative

Current tenants occupying cargo facilities at TLH include Delta, Dade GSE, DHL, FedEx, and USPS. The majority of the cargo activity is conducted by FedEx on regularly-scheduled flights between TLH and FedEx's hub at Memphis International Airport (MEM) using Boeing 757-200 freighter jets; however, FedEx also conducts feeder routes through airports like Orlando International Airport (MCO), Jacksonville International Airport (JAX), and Mobile Downtown Airport (BFM) using Cessna 208 Caravan turboprops. The Delta cargo activity generally consists of belly cargo on scheduled Delta flights.

Although an evaluation of air cargo facility requirements was not included in the scope of services for this Master Plan Update, alternatives for air cargo expansion were considered. In light of anticipated plans for the airport property that specifically focus on attracting new cargo and logistics tenants, the need to reserve space for expanded air cargo operations and related support facilities is evident. The air cargo alternative shown in **Figure 4-7** includes provisions for approximately 90,480 SF of cargo facilities and an expansion of the Cargo Apron of approximately 351,479 SF to accommodate additional cargo aircraft activities. Vehicle and truck traffic would continue to access the area via the current access road off Capital Circle SW. Truck docking and maneuvering areas would be located on the north side of the proposed cargo facilities and include space for the parking and storage of multiple semi-trailer trucks. In addition, this alternative includes the relocation of the portion of Taxiway B3 connecting Taxiway B to Runway 9-27 to meet current FAA airfield design standards.

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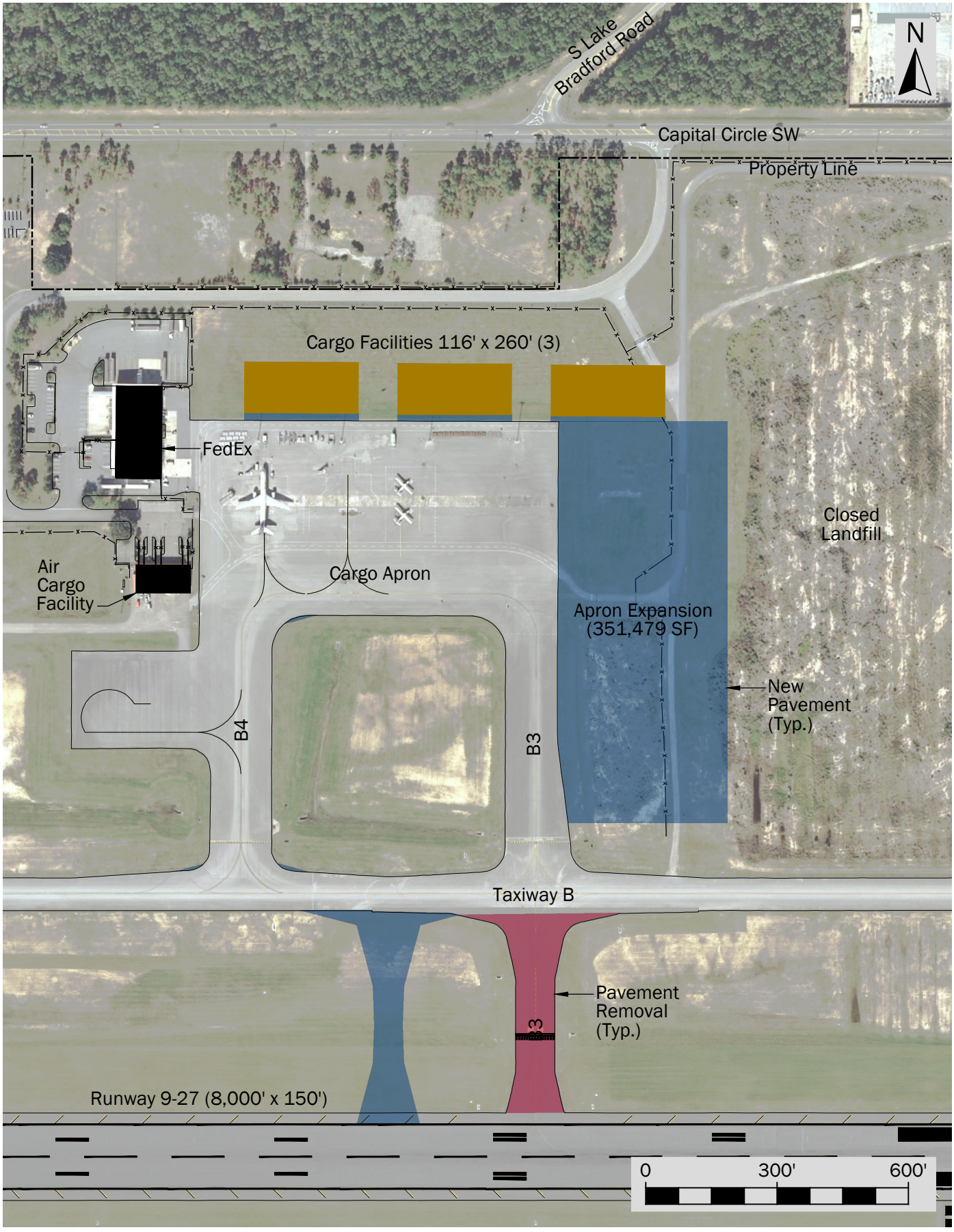

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Figure 4-7 Cargo Alternative

4.7 General Aviation Alternatives

The purpose of the general aviation alternatives is to illustrate examples of developments that could occur in the vicinity of the South, Central, and North Aprons at TLH, which are discussed in the sections below.

4.7.1 South Apron

The South Apron at TLH is located to the west of the Terminal Apron near the ends of Runways 9 and 36. The airport's Fixed Base Operator (FBO) is located on the South Apron and the apron is the most heavily utilized area for general aviation activity at TLH. The apron also routinely serves corporate, military, and commercial airline activity. The commercial airline activity is typically associated with athletic team transport for Florida State University (FSU) and visiting teams and the South Apron can be particularly busy during major football games at FSU. At the time of this writing, there was a project to rehabilitate the South Apron including the entire apron area in front of the FBO terminal, the tiedown area to the immediate east, the fuel truck parking area, and the helicopter parking positions. For that reason, it was important to evaluate the South Apron and to develop a plan that would conform to current standards while considering the needs of the multiple users of the area.

The initial area of attention for this effort was on the helicopter parking positions and to evaluate alternatives that attempted to conform to FAA AC 150/5390-2C, Heliport Design. The dimensions and markings on the existing helicopter parking positions do not reflect current standards as defined in AC 150/5390-2C. The first step was to identify the design helicopter, which is "a single or composite helicopter that represents the maximum weight, maximum contact load/minimum contact area, overall length, rotor diameter, rail rotor arc radius, undercarriage dimensions, and pilot's eye height of all helicopters expected to operate at the facility." The largest helicopters that currently operate at TLH are Boeing CH-47 Chinooks, which are very large military helicopters with two main rotors. Because of the large size of those helicopters and the limited frequency of their activity at TLH, the Sikorsky UH-60 Black Hawk was determined to be a more appropriate design helicopter, which has a main rotor diameter of 53.8 feet. AC 150/5390-2C identifies two different types of general aviation helicopter parking positions that may be considered. The first option is a turn-around position where the helicopter has room to fully turn around on the pad while landing or prior to departing. The second option is a taxi-through and back-out position where the helicopter does not have clearance to fully turn around; they must either have the clearance to taxi-through or must land and back-out in the same orientation (much like an automobile parking lot). The turn-around positions provide greater flexibility, but also require additional clearance to accommodate the swing maneuver of the tail rotor (and for the same reasons, can also require more pavement than the second option).

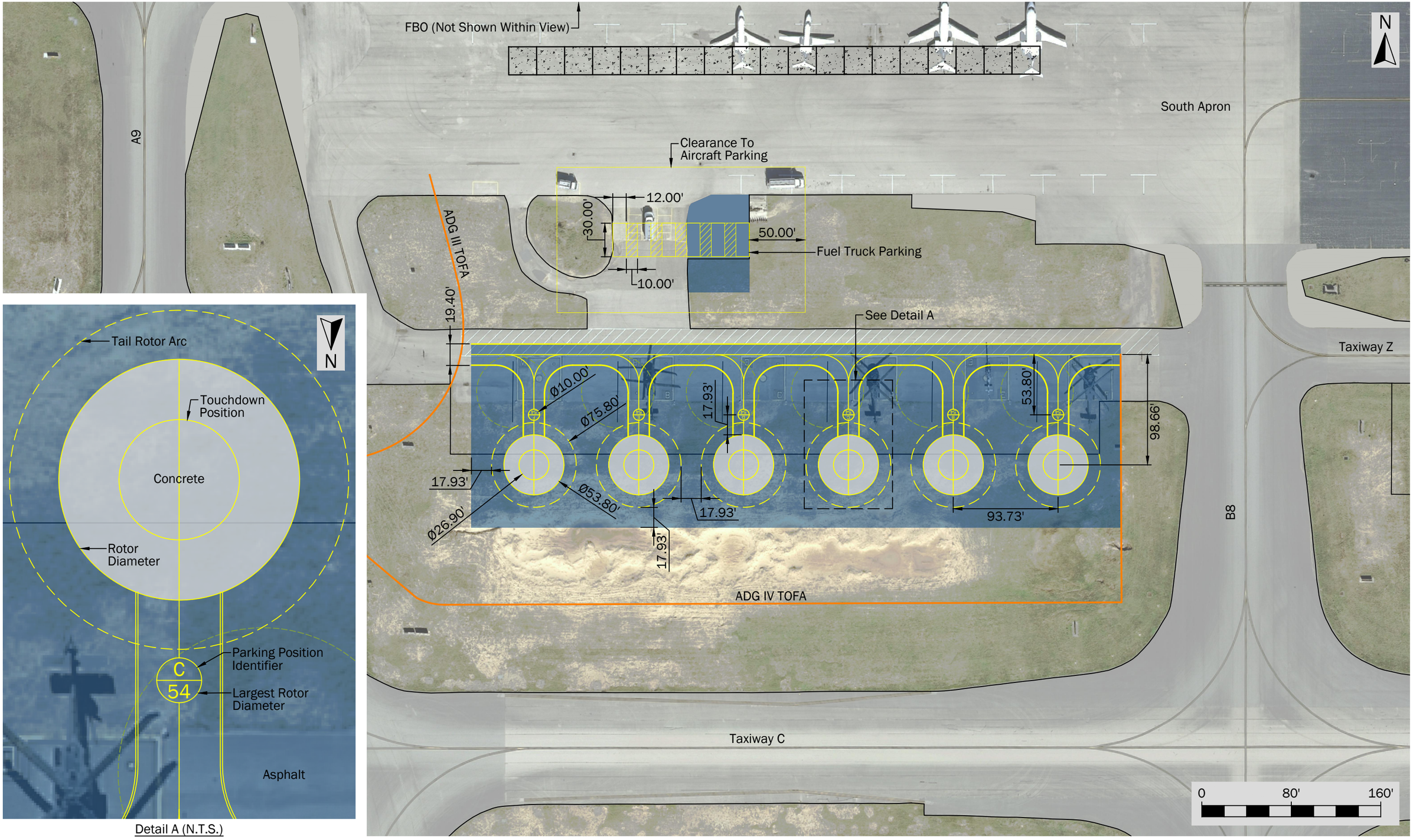
Two helicopter parking position alternatives were developed for TLH. As shown in **Figure 4-8**, Alternative 1 illustrates six helicopter turn-around positions in the same vicinity as the existing positions. Under this alternative, helicopters would taxi to the positions along the airport's existing taxi network and would have a dedicated helicopter taxi route to each position (A through F). It is likely that the pad where the helicopter sits would be constructed of concrete and the surrounding

areas would be asphalt. The positions are located to provide proper clearance from taxiing aircraft. Alternative 1 covers a total area of 95,280 square feet. An expanded fuel truck parking area is also shown on this graphic with the required safety buffers as defined in National Fire Protection Association (NFPA) 407, Standard for Aircraft Fuel Servicing. As shown in **Figure 4-9**, Alternative 2 is a scaled-down version of Alternative 1 and reverses the direction that helicopters would approach the positions. The ground where the stabilized turf is shown on the graphic has eroded from continued helicopter propeller wash. Alternative 2 assumes that the turf will be stabilized with either a natural or artificial turf product that will be able to withstand continued helicopter propeller wash without eroding. For example, there are products that may be viable options for an artificial turf application, which will be further investigated as part of the design process for the helicopter parking positions. Alternative 2 covers a total area of 64,795 square feet and is considered the preferred turn-around helicopter parking position alternative for TLH. If a back-out position is considered more appropriate, it will be investigated as part of the preferred alternative.

Figure 4-10 illustrates an overall development alternative for the South Apron with the turn-around helicopter parking positions, the fuel truck parking area, a concrete hot fueling pad, and a revised marking scheme. The concrete hot fueling pad would be intended to be used for helicopters to be fueled when the engines are running. It was sized to accommodate the Black Hawk helicopter and was located in an area that is infrequently used for aircraft parking. Therefore, when hot fueling activities are conducted, the remote area would allow for the helicopter operator and the fueling activities to meet required clearances. Two Boeing 767-300ER parking positions are also shown on the South Apron, which would typically be associated with athletic charters. In order to be able to get such large wide-body jets onto the apron, the aircraft have to enter via either Taxiway A11 or B8 and do a quick turnaround so they are facing forward (north). Some degree of tiedown removal in the eastern portion of the South Apron would be desirable to meet the clearance for a 767-300ER to be able to conduct that maneuver with a standard safety buffer area.

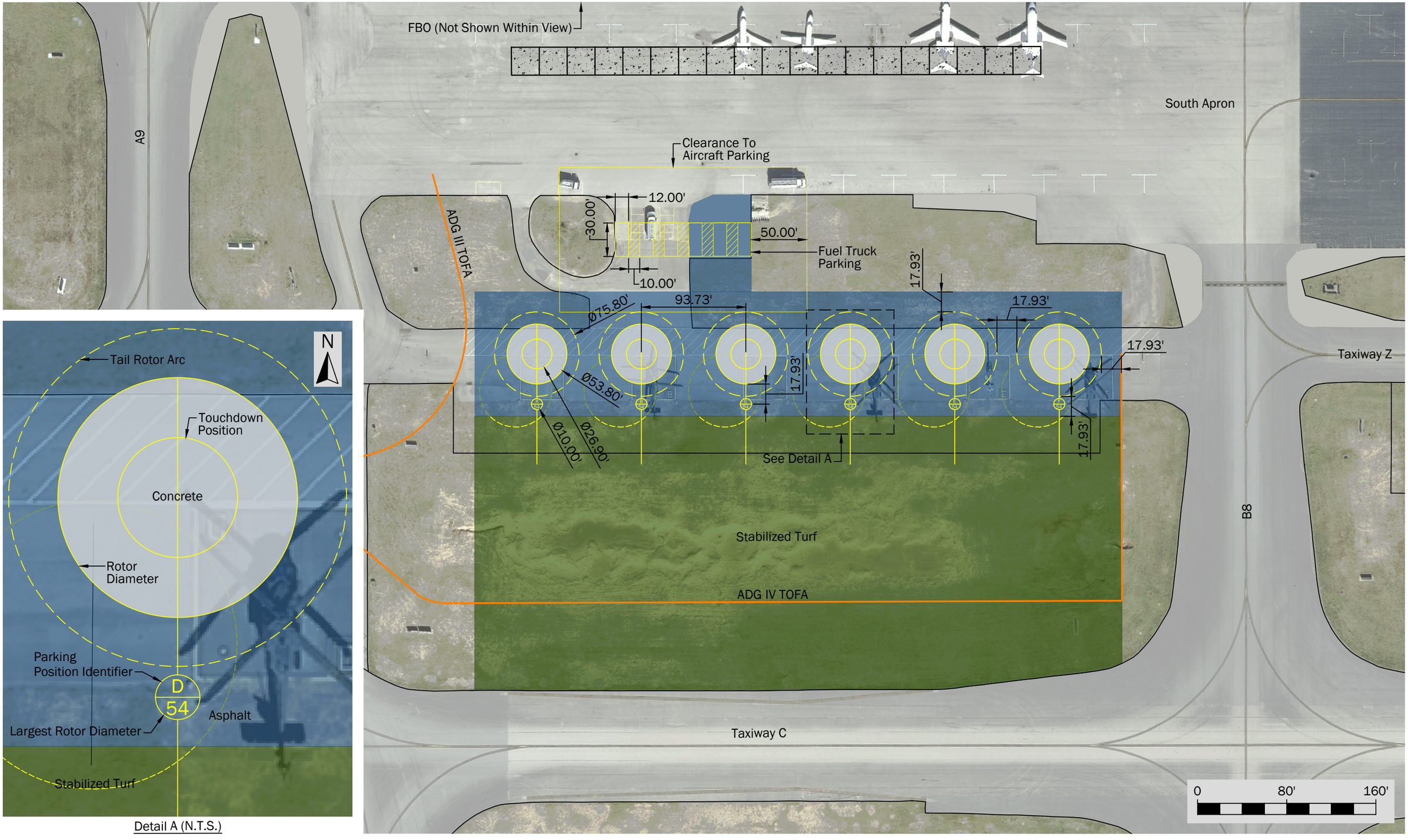
4.7.2 Central Apron and North Apron

Figure 4-11 illustrates development on the Central Apron with the addition of two 6,000-foot hangars. There could be some additional options for utilizing the Central Apron, but the grade change around it may make it costly to construct larger hangars in the vicinity. As mentioned earlier, a cleaner taxiway connection is also shown to the Central Apron. **Figure 4-11** also shows development around the North Apron including three 14,400 square foot hangars at the back of the apron, four smaller box hangars, and 16 T-hangar bays. Again, there are various options that could be explored for anyone looking to build a hangar or hangars around the North Apron, but this graphic provides a general idea of what the opportunities are. The area on the left of the graphic (north side) is identified as an approximately 13-acre general aviation expansion area where any number of development options could be explored. The parking lot that used to be for the previous passenger terminal is highlighted because this is an approximately 10-acre area where any number of options could also be explored for development (aviation or non-aviation). It is not a heavily utilized parking lot, with the exception of serving as an overflow area for rental cars.



Detail A (N.T.S.)

Figure 4-8 Helicopter Parking Positions - Alternative 1



Detail A (N.T.S.)

Figure 4-9 Helicopter Parking Positions - Alternative 2

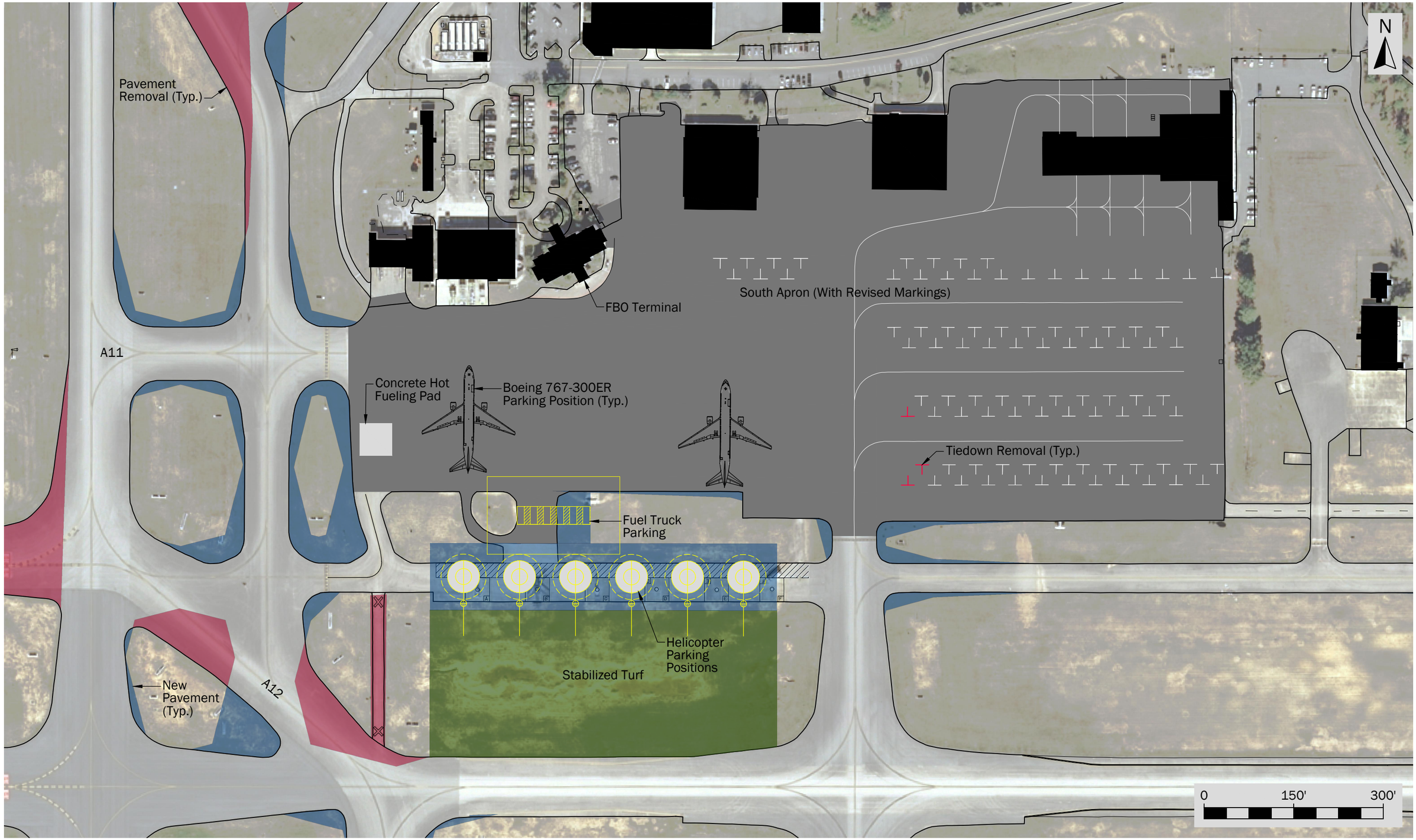


Figure 4-10 South Apron Alternative

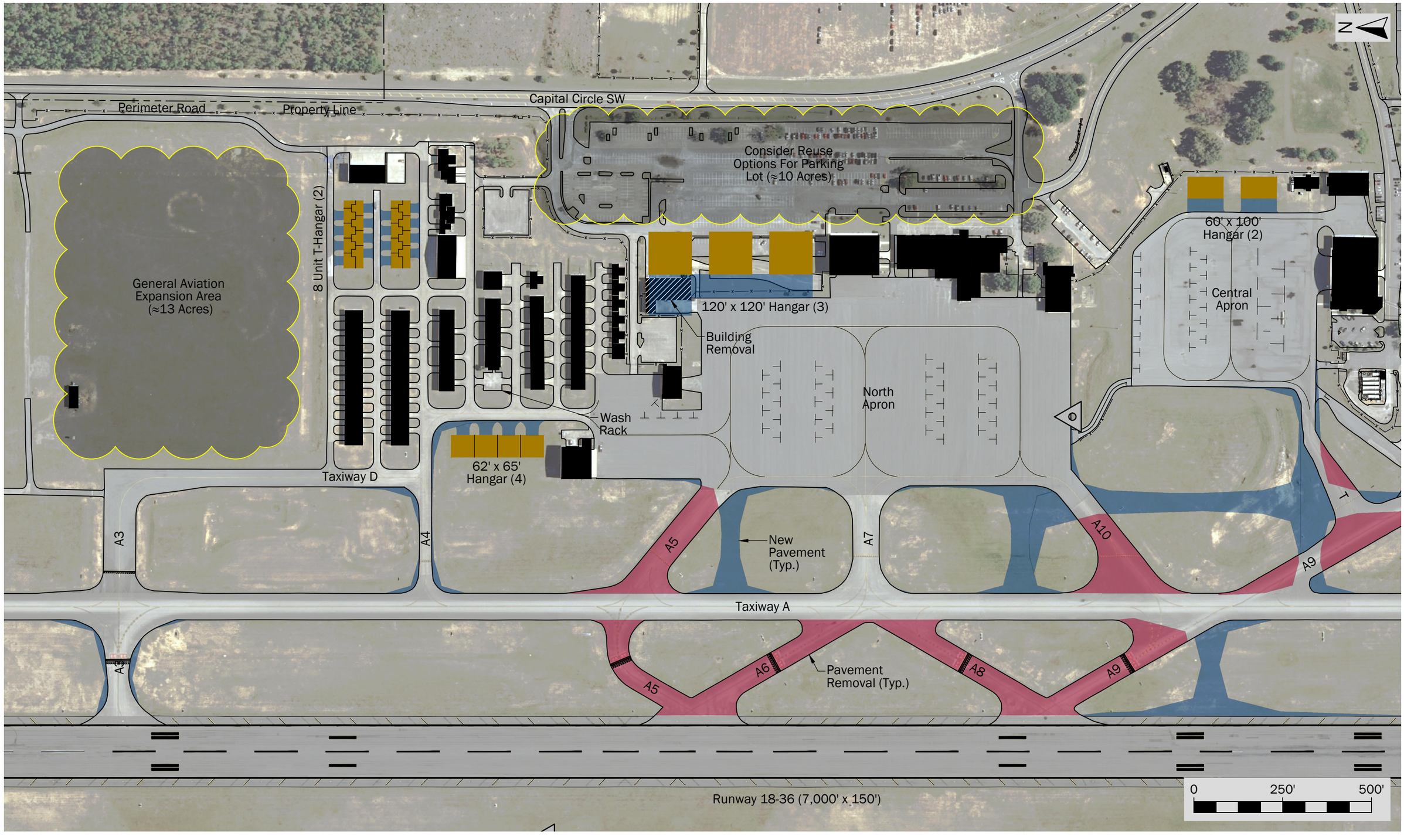


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Figure 4-11 North General Aviation Areas Alternative

Chapter 5

Alternatives Refinement

Master Plan Update

TALLAHASSEE
INTERNATIONAL AIRPORT

5.0 Alternatives Refinement

5.1 Review of Available Airport Development Areas

As previously discussed in Chapter 4, the vision for the on-going phased and balanced self-sustaining development of airport improvements will collectively serve to support the continued economic growth of the Florida Panhandle region and the City of Tallahassee. The primary and overriding intent of these recommended airport improvement projects is to leverage the airport's existing and proposed future aviation assets to facilitate the continued development of the airport and associated levels of commercial and general aviation services.

A total of nine on-airport land areas (referred to as parcels A through I) are located throughout the airport and each offers unique operational and facility development opportunities that are primarily based on their respective location, proximity to the airfield, and/or public adjacent roads. A brief description of each parcel and likely future land use considerations that guided the identification and selection of the preferred land use of each parcel is provided in the following subsections.

5.1.1 Parcel A

This parcel is approximately 62 acres in size and is situated east of the north end of Runway 18-36 and adjacent to and bordered by Capital Circle SW to the east. Through the development of one or more new taxiway connectors, this parcel could provide direct and unrestricted access to the airfield environment via Taxiway A.

Based upon its proximity to the runway environment and its contiguous size, the parcel would be best suited for aviation-related commercial development that would likely include, but would not be limited to:

- Aircraft Maintenance, Repair, and Overhaul (MRO),
- Air Cargo Freight and Logistics,
- Flight Training, and/or
- Manufacturing.

The extent of developable and leasable land was found to: 1) provide the necessary safety-related setbacks from Taxiway A to the west, 2) avoid environmental-sensitive wetland areas to the north, 3) preserve the capability to develop ADG IV apron area and apron-edge taxilanes, and 4) preserve the capability to develop general aviation areas immediately to the south to accommodate future infill of general aviation facilities as demand dictates along Taxiway A north of Taxiway Connector A4.

Vehicle access could be provided from Capital Circle SW or a future extension of the internal North Apron access road. The above ground height of temporary or permanent buildings and structures and allowable aircraft tail height locations would be limited by overlying protected navigable

airspace surfaces established along and beyond the north end of Runway 18-36 as defined by Title 14: Aeronautics and Space, CFR part 77, Safe, Efficient Use, and Preservation of the Navigable Airspace.

When this parcel is developed, the relocation of the Remote Transmitter/Receiver (RTR) facility will be required.

5.1.2 Parcel B

This parcel is approximately 27 acres in size and is situated north and east of Runway 9-27 and is bordered by Capital Circle SW to the northeast. Through the development of one or more new taxiway connectors, this parcel could provide direct and unrestricted access to the airfield environment via Taxiway B. Vehicle access could be provided from Capital Circle SW or Springhill Road.

Based upon its proximity to the runway environment and its contiguous size, the parcel would be best suited for aviation-related commercial development that would likely include, but would not be limited to:

- Commercial MRO,
- Air Cargo Freight and Logistics,
- Flight Training, and/or
- Manufacturing.

The above ground height of temporary or permanent buildings and structures and allowable aircraft tail height locations would be limited by overlying protected navigable airspace surfaces established beyond and along the east end of Runway 9-27 as defined by CFR part 77.

5.1.3 Parcel C

This parcel is approximately 56 acres in size and is situated outside of the Air Operations Area (AOA) north of Runway 9-27 and is bordered by Capital Circle SW and Springhill Road to the southwest and southeast respectively. Vehicle access could be provided from Capital Circle SW or Springhill Road. This parcel does not currently, nor will it in the future, provide access to the runway environment and will thus be limited to airport-compatible land uses that would likely include, but would not be limited to:

- Surface Freight Logistics,
- Light Industrial,
- Commercial Allied Aviation Services, and/or
- Manufacturing.

The above ground height of temporary or permanent buildings and structures and allowable aircraft tail height locations would be limited by overlying protected navigable airspace surfaces established beyond and along the east end of Runway 9-27 as defined by CFR part 77.

5.1.4 Parcel D

This parcel is approximately 161 acres in size and is situated east of and along the extended Runway 9-27 centerline, adjacent to and northeast of Capital Circle SW and adjacent to and southeast of Springhill Road. This parcel is bounded by Springhill Road to the northwest and Capital Circle SW to the southwest. Vehicle access could be provided from Capital Circle SW or Springhill Road. This parcel does not currently, nor will it in the future, provide access to the runway environment and will thus be limited to airport-compatible land uses that would likely include, but would not be limited to:

- Surface Freight Logistics,
- Light Industrial,
- Commercial Allied Aviation Services, and/or
- Manufacturing.

The above ground height of temporary or permanent buildings and structures and allowable aircraft tail height locations would be limited by overlying protected navigable airspace surfaces established along and beyond the east end of Runway 9-27 as defined by CFR part 77.

5.1.5 Parcel E

This parcel is approximately 96 acres in size and is situated south of Runway 9-27 and south of and along the extended runway centerline of Runway 18-36 adjacent to the Airport Traffic Control Tower (ATCT). Vehicle access could be provided from Springhill Road. Through the development of one or more new taxiway connectors, this parcel could provide direct and unrestricted access to the airfield environment.

Based upon its proximity to the runway environment and its contiguous size, the parcel would be best suited for commercial airport-compatible land uses that would likely include, but would not be limited to:

- Commercial Aircraft Maintenance, Repair, and Overhaul (MRO),
- Air Cargo Freight and Logistics,
- Flight Training,
- Light Industrial, and/or
- Manufacturing.

The above ground height of temporary or permanent buildings and structures and allowable aircraft tail height locations would be limited by overlying protected navigable airspace surfaces established beyond along and beyond the south end of Runway 18-36 as defined by CFR part 77.

5.1.6 Parcels F and G

These two adjacent parcels, F and G, are 206 and 112 acres in size respectively. Both parcels are located west of Runways 18-36 and 9-27. Vehicle access could be provided by new road

construction from Springhill Road. While neither parcel has direct taxiway/taxilane access to the runway environment, such connections to the airfield could be developed as demand dictates.

Based upon its proximity to the runway environment and its contiguous size, these parcels would best be suited for airport-compatible commercial or utility development that would likely include, but would not be limited to:

- Commercial Aircraft Maintenance, Repair, and Overhaul (MRO),
- Air Cargo Freight and Logistics,
- Flight Training,
- Light Industrial,
- Solar Power Generation, and/or
- Manufacturing.

Currently, the City is performing the required site development, environmental due diligence and required permitting actions to fully develop both parcels as Solar Farm 2, the second of two dedicated on-airport Solar Farms. The above ground height of temporary or permanent buildings and structures with each of the parcels would be limited by overlying protected navigable airspace surfaces established west of and parallel to Runway 18-36, and west of and along the extended runway centerline of Runway 9-27 as defined by CFR part 77.

5.1.7 Parcel H

This parcel is approximately 40 acres in size and is situated north of and parallel to Runway 9-27. The western-most extent of this parcel begins at the east and north edges of the current air cargo apron, extends to the east encompassing a capped and closed landfill and terminates at the southwest corner of Parcel B. The north, west, and east extent of the parcel is based on the need to provide sufficient setback distances from existing roadways and Taxiway B to protect future potential taxi operations by aircraft having ADG IV dimensional characteristics.

Vehicle access could be provided from Capital Circle SW and Air Cargo Road. Through the development of one or more new taxiway connectors, this parcel could provide direct and unrestricted access to the airfield environment via Taxiway B. Any development of Parcel H would need to give consideration for the unique demands of building over a capped landfill; however, the prime location adjacent to Taxiway B may make such efforts worthwhile.

Based upon its proximity to the runway environment and its contiguous size, the parcel would be best suited for aviation-related commercial development that would likely include, but would not be limited to:

- Commercial Aircraft Maintenance, Repair, and Overhaul (MRO),
- Air Cargo Freight and Logistics, and/or
- Intermodal Logistics Center (ILC).

The above ground height of temporary or permanent buildings and structures and allowable aircraft tail height locations would be limited by overlying protected navigable airspace surfaces established along and parallel to the north side of Runway 9-27 as defined by CFR part 77.

5.1.8 Parcel I

This parcel is approximately 31 acres in size and is situated adjacent to and east of Capital Circle SW. Vehicle access could be provided via Capital Circle SW. The parcel is currently occupied by a Rental Car facility, but these will be vacated when the new rental car garage is built adjacent to the passenger terminal. This parcel does not currently, nor will it have in the future, taxiway/taxilane access to the airfield environment.

Based upon its proximity to the runway environment and its contiguous size, the parcel would be best suited for non-aviation-related commercial retail development that would include but would not be limited to:

- Hotel
- Hospitality
- Restaurant
- Travel Plaza, and/or
- Other airport-compatible development.

The above ground height of temporary or permanent buildings and structures would be limited by overlying protected navigable airspace surfaces established along and east of Runway 18-36 as defined by CFR part 77.

5.2 Preferred Alternatives

Based on input received from the City, TLH management/staff, Technical Advisory Committee (TAC) members, and the public, airport facility development alternatives were recommended as part of this update of the Airport Master Plan. The process involved the examination and refinement of individual or combined facility development alternatives that were deemed to be ripe for implementation throughout the Master Plan's 20-year planning period. These preferred alternatives collectively serve to satisfy the City's airport development goals and to provide airport facility improvement concepts to accommodate future anticipated demand for airfield, air cargo, terminal, landside, and support facilities. The preferred alternatives will be utilized as the foundation for development of the Airport Layout Plan Drawing Set.

In addition, this section also includes a high-level discussion of potential airport improvement-generated environmental impacts, regulatory requirements, and mitigation measures.

A graphical overview of the nine on-airport land use parcels and the Airport Master Plan's recommended (i.e., "preferred") airport development alternatives are described in the following sections and are shown in **Figure 5-1.**

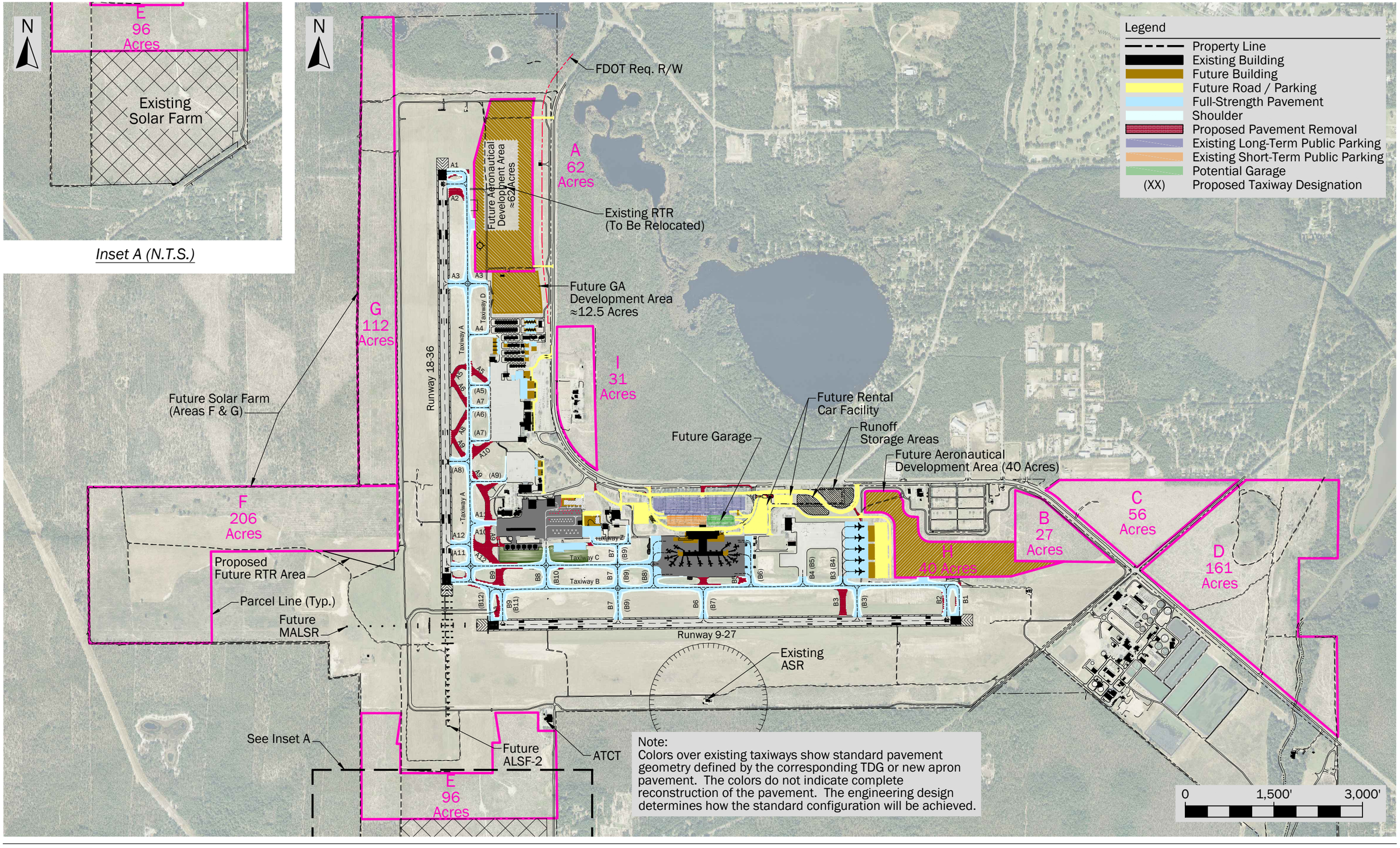

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Figure 5-1 Preferred Development

5.3 Airport Access

During the development of preliminary airport access alternatives, the consultant team and airport staff met with representatives from the Florida Department of Transportation (FDOT) to discuss FDOT's proposed alignment associated with the widening of Capital Circle SW in the future. As part of the coordination process, it was determined that the FDOT design would provide several entry and exit points and that FDOT would need to purchase right-of-way from the airport. The two airport access alternatives discussed in the previous chapter improve the flow of vehicular traffic throughout the terminal area, facilitate the flow of traffic on-airport between the general aviation and cargo facilities, accommodate short-term, long-term, and employee parking needs, and support future rental car facility improvements. However, further discussion with airport staff indicated a strong desire to develop an on-airport access solution that improves connectivity between the general aviation, terminal and air cargo areas on airport property.

Currently, there are no signalized intersections serving the airport. The nearest signalized intersections are located at W. Orange Avenue to the west, and Springhill Road to the east. There is approximately 3.4 miles between the two existing signalized intersections. As part of the alternatives refinement process, airport staff requested that the consultant team further investigate the opportunity of developing a hybrid airport access alternative that establishes an on-airport access solution including a signalized main entrance at the intersection of Air Cargo Road and Capital Circle SW. In the future, there are plans to realign S. Lake Bradford Road with this intersection.

The proposed on-airport alignment is intended to provide improved accessibility, flexibility and mobility. The four-lane divided airport loop road would provide access to various aviation facilities and the terminal area on airport property. The preferred access alternative consolidates multiple access points to the airport. By reducing points of access, this refined alternative provides better access control and improves the safety of traffic entering and exiting the airport. It is recommended that the City petition FDOT to put infrastructure in place to easily add signals in the future.

New airport employee parking lot improvements are also included. This preferred development concept relocates the parking plaza exit to the east side of the parking lot. Vehicles would exit onto the airport road and exit the airport at the existing general aviation exit or the proposed main controlled exit. The relocation of the exit toll booth would also support future two-way access between existing general aviation and cargo facilities without having to pass in front of the terminal. This roadway also facilitates the flow of return traffic on the airport loop road.

Recommendations are designed to improve the short-term and long-term parking configuration and flow of traffic. In addition, this concept includes the construction of a two-level parking structure in front of the terminal that may provide a mix of additional short-term parking and rental car ready/return capacity on level 1 that is needed in the future. The structure would allow passengers to walk across from the terminal to the parking structure at the same floor level. To consolidate and streamline the cleaning and maintenance activities of the rental car companies

on airport, a future rental car Quick-Turnaround (QTA) service facility is proposed in the area situated entirely along the east side of the airport loop road on a longer and wider parcel. The preferred configuration would improve the overall flow of cleaning and maintenance activities for multiple rental car companies.

This location will cut the distance required for running rental cars. Additional road improvements would also be necessary to support the flow of vehicles between the rental car QTA and the ready/return facilities and keep rental car activities from occurring in front of the terminal. This includes the relocation of the existing cell phone lot to a more efficient location on the west side of the airport loop road. The preferred Airport Access and Circulation alternative is shown in Figure 5-2.

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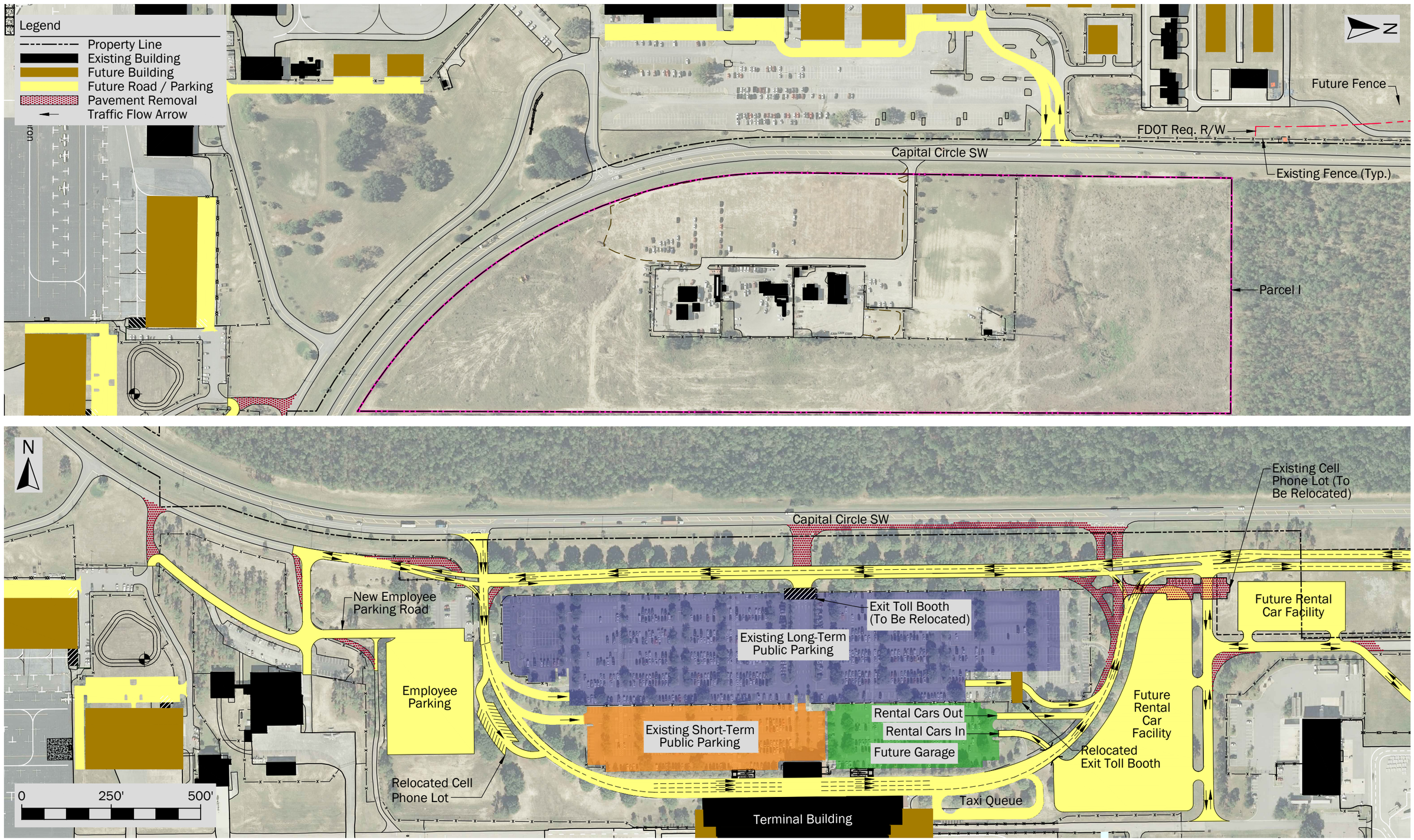

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Figure 5-2 Preferred Airport Access and Circulation Alternative

5.4 Taxiway Improvements

5.4.1 Current Taxiway System

The airport's current system of taxiways and taxiway connectors provide a safe and efficient network within which aircraft maneuver safely and efficiently throughout the airfield. Many of the current taxiways and taxiway connectors were constructed in the early 1960s and reflect previous (then current) FAA airport design standards. The geometric layout and design considerations for taxiways and taxiway connectors as recommended in this Airport Master Plan Update fully adhere to current FAA taxiway design standards and include, but are not limited to:

- Use of right-angled taxiway-to-runway connector intersections,
- Optimization of taxiway layouts and aircraft taxi paths to provide enhanced operational awareness for pilots entering and exiting the runway environment,
- Limiting the number of taxiways intersections while also reducing the possible choices for change of taxiway direction,
- Use of a "three-node concept" to provide pilots with no more than three choices at an intersection, ideally, left, right or straight ahead,
- Use of bypass taxiways at each runway end,
- Use of appropriate taxiway pavement widths,
- Use of Taxiway Design Group fillet design, and
- Use of FAA-mandated taxiway shoulder pavements.

Prior to the FAA's September 2012 update of Advisory Circular (AC) 150/5300-13, Airport Design, taxiway design standards were based on a FAA-prescribed Airplane Design Group (ADG) that referenced aircraft wingspans and/or tail heights, but not the dimension or location of an aircraft's undercarriage. The FAA's update of that same AC (150/5300-13A, Change 1) prescribes minimum taxiway pavement widths, centerline radii, and associated fillet geometries based upon a Taxiway Design Group (TDG) referencing an aircraft's undercarriage Main Gear Width (MGW) and Cockpit to Main Gear (CMG) distance, or an aircraft's wheel base when considering small aircraft. The TDG also includes the Taxiway Edge Safety Margin (TESM) establishing the minimum safe distance between the outer edge of the airplane's landing gear and the edge of the full-strength taxiway pavement while the aircraft's nose gear travels along the taxiway centerline.

Accordingly, the Airport Master Plan's recommendation regarding the modification or removal of existing taxiway pavements, or the planned construction of new taxiway connectors were based upon current FAA taxiway design planning standards that included, but were not limited to:

- Taxiway Design Groups (TDG) 2 and 4 based upon the respective MGWs and CMGs for the:
    - Boeing 757-200 Freighter having ADG C-IV operational and physical characteristics, and
    - Beechcraft King Air having ADG B-II operational and physical characteristics
- A maximum aircraft nose gear steering angle of 50 degrees,

- Pilot cockpit-over-centerline taxi path operations, and
- Avoidance of exit taxiway connectors located within the middle third of any runway where pilots would likely have the least control of maneuverability to avoid high energy collisions with other aircraft.

When reviewing the airport's current airfield taxiway layouts and geometric design, it was recognized that airfield taxiway geometries do not fully meet current FAA taxiway design standards for sustained use by ADG II or ADG IV aircraft. In most cases, the current taxiways or taxiway connectors were found to have layouts, centerline intersections, pavement widths, fillet tapers and centerline radii based on previous FAA taxiway design standards that have subsequently been updated and modified by the FAA for safety-enhancing purposes. For presenting recommended Airport Master Plan Update, taxiway and taxiway connector improvements, current FAA-prescribed TDG 4 and TDG 2 taxiway design standards were used to fully accommodate the unrestricted and sustained taxi movement of general aviation ADG II aircraft and larger commercial ADG IV aircraft requiring minimum taxiway pavement widths of 35 feet and 50 feet and shoulder widths of 20 feet and 15 feet respectively.

It should be noted that current TDG 4 taxiway design standards required to support sustained taxi operations by the Boeing 757-200 require narrower taxiway pavement widths, different fillet geometries and centerline radii. While previous FAA taxiway design standards prescribed a minimum taxiway pavement width of 75 feet for that aircraft, current taxiway design standards require a minimum taxiway width of 50 feet. The airport's current taxiways and associated taxiway connectors that accommodate ADG IV aircraft taxi movements do not have edge shoulders that serve to provide resistance to blast erosion and to accommodate the passage of emergency and maintenance equipment and the occasional passage of aircraft when veering from the runway. The FAA currently mandates paved shoulders for taxiways accommodating aircraft having ADG IV and higher wingspans. Taxiway edge shoulders are recommended but are not required for taxiways accommodating sustained taxi operations by aircraft having ADG III or lower design characteristics.

While existing taxiway and/or taxiway connector pavement designs are, in some cases, wider than required to support TDG 2 and 4 taxiway design standards, the development of taxiway edge shoulders could conceivably include portions of taxiways and taxiway connectors that offer pavement widths greater than 35 or 50 feet. The use of these wider-than-needed taxiway pavements for use as designated taxiway edge shoulders, or with the addition of any additional new taxiway edge pavements will, where applicable and prudent, require the new pavement marking and the inward relocation of taxiway edge lights and signs.

Where "legacy-designed" taxiway layouts and/or associated intersections were found or considered to be redundant or did not fully satisfying current FAA taxiway design standards, certain taxiway connectors were recommended for removal (partially, or in their entirety). When appropriate, the construction of new taxiway exits and/or taxiway connectors was recommended as a measure to reduce the number of possible aircraft pilot choices for change of taxiway direction. These recommended taxiway intersection improvements serve to enhance the safe and

efficient taxiing by aircraft. Careful consideration was also given, to the extent practicable, to minimizing the removal of, or addition of new airfield pavement.

Where the intersection of one or more taxiways was considered to represent a "complex intersection" offering more than three possible taxiway paths, the removal or realignment of intersecting taxiways was recommended. Where considered practicable, the use of the three-node concept was recommended to reduce, preclude or eliminate the potential for pilot confusion.

Also, where appropriate or needed, the addition of new or the modification of existing bypass taxiways were recommended having the minimum ADG IV standard taxiway-to-taxiway centerline separation distance to enhance pilot and aircraft operational safety and efficiency when entering the end of the runway for take-off operations. Right-angle taxiways are the recommended standard for all runway/taxiway intersections.

5.4.2 Preferred Development of Taxiway System Improvements

The following describes the planned modification, removal of existing taxiways and the planned future construction of new taxiway connectors to fully satisfy current FAA TDG 4 and TDG 2 taxiway design standards. It is anticipated that taxiway connector improvement or construction projects located between parallel Taxiway A and Runway 18-36 will likely occur at such time the runway is rehabilitated and reconstructed. Taxiway connectors east of parallel Taxiway A would be undertaken as general aviation facilities are developed and related taxiway/taxilane improvements are needed to support the continued growth or in-fill development of general aviation facilities in the North and Central General Aviation Apron areas. Likewise, recommended improvements to exit and connector taxiways serving Runway 9-27 would likely occur when improvements are made to either the Cargo Apron and/or Terminal Apron.

The recommended modifications of the layout, design and/or the addition or removal of taxiway connectors were based on the goal of fully satisfying FAA taxiway design standards and to enhance the safe and efficient operation of aircraft while operating within and throughout the entire system of runways and taxiways. In keeping with current FAA guidance prescribed in FAA AC 150/5340-18F, Standards for Airport Sign Systems, the re-designation of certain exit or connector taxiways is recommended at such time that removal of older, or construction of new exit or connector taxiways occurs.

Figure 5-3 graphically illustrates the application of recommended ADG II and ADG IV taxiway, taxiway connector, and taxiway shoulder pavements as superimposed over the airport's current system of taxiway pavements. This illustration serves to demonstrate the required width and geometry of each respective FAA-prescribed taxiway pavement design. The application and development of TDG 2 taxiway shoulders could be accomplished using existing outer-most portions of legacy-designed full-strength taxiway widths, and/or the use of stabilized soils and turf. Descriptions and explanation of these preferred taxiway system improvements are listed in Table 5-1.

The future application and full adherence to the TDG taxiway and taxiway connector design standards will require coordination with the FAA regarding the need and timing for these types of Airport Master Plan-recommended improvements. Accordingly, the prioritization, and execution of the recommended modification of the current taxiway system discussed in the following sections will be primarily based on pavement condition, pavement rehabilitation and/or reconstruction projects, FAA concurrence and availability of funding for such construction activities. As part of the modernization and related enhancement of airfield taxiways and taxiway connector pavement (including the addition of taxiway edge shoulders to accommodate operations by ADG IV aircraft), an additional 9 acres of pavement will be constructed and 15 acres of pavement will be removed resulting in a net reduction of 6 acres of taxiway pavement.

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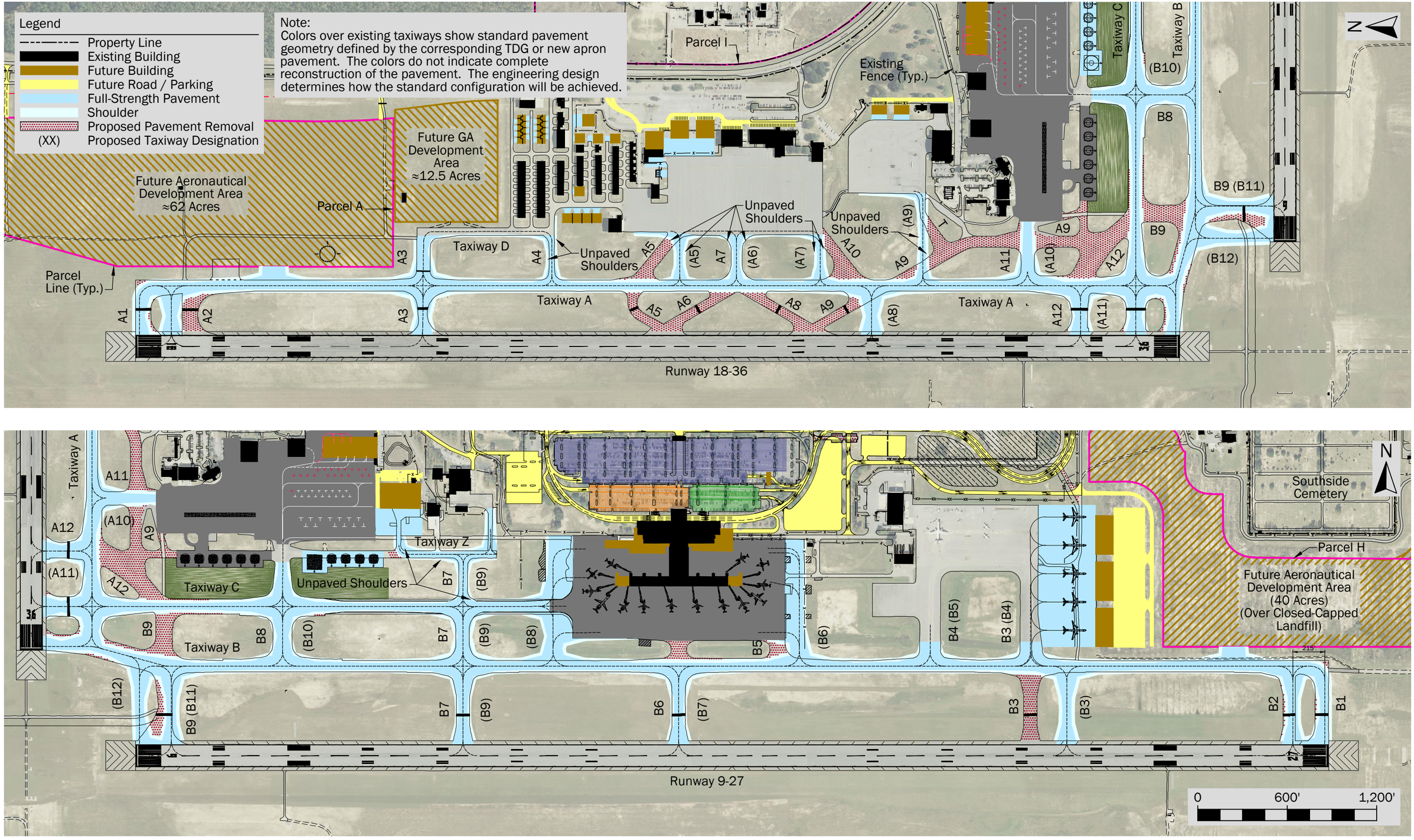

Figure 5-3 Preferred Taxiway System Alternative

Table 5-1
Summary of Preferred Taxiway Improvements

Current Taxiway Designation	Proposed Future Taxiway Designation	Taxiway Type	Critical Aircraft Airplane Design Group (ADG)	Required Taxiway Design Group (TDG)	Required Taxiway Edge Safety Margin (TESM)	Required Full-Strength Pavement Width	Required Shoulder Width (X2)	Total Required Pavement Width	Existing Pavement Width	Required Additional Shoulder Pavement	Shoulder Marking of Excess Pavement	Explanatory Notes	Reason for Needed Actions
A	A	Full-length Parallel	IV	4	10'	50'	20'	90'	75'	15'	Yes	Note 1	Shoulders Needed to Satisfy Design Standards
A1	A1	Entrance/Exit 90°	IV	4	10'	50'	20'	90'	75'	15'	Yes	Note 1	Shoulders Needed to Satisfy Design Standards
A2	A2	Bypass/Exit 90°	IV	4	10'	50'	20'	90'	75'	15'	Yes	Note 1	Shoulders Needed to Satisfy Design Standards
A3 West	A3	Exit 90°	IV	4	10'	50'	20'	90'	60'	30'	Yes	Note 1	Shoulders Needed to Satisfy Design Standards
A3 East	A3	Connector 90°	IV	4	10'	50'	20'	90'	90'	0'	Yes	Note 1	Shoulders Needed to Satisfy Design Standards
A4	A4	Connector 90°	II	2	7.5'	35'	15'	65'	50'	15'	Yes	Note 2	Shoulders Needed to Satisfy Design Standards
A5 West	Remove	Exit 30° Angled	IV	4	10'	50'	N/A	N/A	60'	N/A	N/A	Remove When Rehabilitating Runway 18-36	Angled Taxiway Exit / Middle Third of Runway
A5 East	Remove	Connector 30° Angled	IV	4	10'	50'	N/A	N/A	75'	N/A	N/A	Remove When Rehabilitating Runway 18-36	Angled Taxiway Exit / Middle Third of Runway
N/A	New A5	Connector 90°	II	2	7.5'	35'	15'	65'	N/A	N/A	N/A	Construct When Removing A5, Note 2	Replacement for A5
A6	Remove	Exit 30° Angled	IV	4	10'	50'	N/A	N/A	60'	N/A	N/A	Remove When Rehabilitating Runway 18-36	Angled Taxiway Exit / Middle Third of Runway
A7	A6	Connector	II	2	7.5'	35'	15'	65'	75'	15'	Yes	Note 2	Shoulders Needed to Satisfy Design Standards
A8	Remove	Exit 30° Angled	IV	4	10'	50'	N/A	N/A	60'	N/A	N/A	Remove When Rehabilitating Runway 18-36	Angled Taxiway Exit / Middle Third of Runway
N/A	New A8	Exit 90°	IV	4	10'	50'	20'	90'	N/A	N/A	N/A	Construct When Removing Angled A9	Replacement For A(x) Series of Exit/Connector Taxiways
A9 West	Remove	Exit (30° Angled)	IV	4	10'	50'	N/A	N/A	60'	N/A	N/A	Remove When Rehabilitating Runway 18-36	Angled Taxiway Exit / Middle Third of Runway
A9 East	Remove	Connector 30° Angled / Partial Parallel	IV	4	10'	50'	N/A	N/A	60'	N/A	N/A	Remove When Rehabilitating Runway 18-36	Redundant / Angled Taxiway Connector
N/A	New A9	Connector 90°	II	2	7.5'	35'	15'	65'	N/A	N/A	N/A	Construct When Removing Angled A9, Note 2	Replacement For A(x) Series of Exit/Connector Taxiways
A10	Remove	Connector 30° Angled	IV	4	10'	50'	N/A	N/A	75'	N/A	N/A	Remove When Removing A9	Redundant / Angled Taxiway Connector
N/A	New A7	Connector 90°	II	2	7.5'	35'	15'	0	N/A	N/A	N/A	Construct When Removing Angled A10	Replacement For A(x) Series of Exit/Connector Taxiways
A11	A10	Connector 90°	IV	4	10'	50'	20'	90'	90'	0'	Yes	Note 1	Shoulders Needed to Satisfy Design Standards
A12 West	A11	Exit 90°	IV	4	10'	50'	20'	90'	90'	0'	Yes	Note 1	Shoulders Needed to Satisfy Design Standards
A12 East	Remove	Connector 30° Angled	IV	4	10'	50'	N/A	N/A	90'	N/A	N/A	Remove When Removing A9	Redundant Angled Connector
B	B	Full-length Parallel	IV	4	10'	50'	20'	90'	75'	15'	Yes	Note 1	Shoulders Needed to Satisfy Design Standards
B	B	Exit 90° (RWY 18-36)	IV	4	10'	50'	20'	90'	75'	15'	Yes	Note 1	Shoulders Needed to Satisfy Design Standards
B1	B1	Entrance/Exit 90°	IV	4	10'	50'	20'	90'	75'	15'	Yes	Note 1	Shoulders Needed to Satisfy Design Standards
B2	B2	Bypass/Exit 90°	IV	4	10'	50'	20'	90'	75'	15'	Yes	Note 1	Shoulders Needed to Satisfy Design Standards
B3 South	B4	Exit 90°	IV	4	10'	50'	20'	90'	75'	15'	Yes	Note 1	Shoulders Needed to Satisfy Design Standards
B3 North	Remove	Connector 90°	IV	4	10'	50'	N/A	N/A	N/A	N/A	N/A	Remove When Expanding Air Cargo Apron	Direct Connection Between the Air Cargo Apron and Runway 9-27
N/A	New B3	Exit 90°	IV	4	10'	50'	20'	90'	N/A	N/A	N/A	Construct When Removing B3 South	Replacement for B3 South

Table 5-1
Summary of Preferred Taxiway Improvements

Current Taxiway Designation	Proposed Future Taxiway Designation	Taxiway Type	Critical Aircraft Airplane Design Group (ADG)	Required Taxiway Design Group (TDG)	Required Taxiway Edge Safety Margin (TESM)	Required Full-Strength Pavement Width	Required Shoulder Width (X2)	Total Required Pavement Width	Existing Pavement Width	Required Additional Shoulder Pavement	Shoulder Marking of Excess Pavement	Explanatory Notes	Reason for Needed Actions
B4	B5	Connector 90°	IV	4	10'	50'	20'	90'	75'	15'	Yes	Note 1	Shoulders Needed to Satisfy Design Standards
B5	B6	Connector 90°	IV	4	10'	50'	20'	90'	75'	15'	Yes	Note 1	Shoulders Needed to Satisfy Design Standards
B6 South	Remove	Connector 90°	IV	4	10'	50'	N/A	90'	105'	N/A	N/A	Remove When Constructing New B8	Direct Connection Between the Terminal Apron and Runway 9-27
B6 North	B7	Exit 90°	IV	4	10'	50'	20'	90'	75'	15'	Yes	Note 1	Shoulders Needed to Satisfy Design Standards
N/A	New B8	Connector 90°	IV	4	10'	50'	20'	90'	N/A	N/A	N/A	Construct When Removing B6 North	Replacement for B6 North
B7 South	B9 South	Exit 90°	IV	4	10'	50'	20'	90'	90'	0'	Yes	Note 1	Shoulders Needed to Satisfy Design Standards
B7 Mid	B9 Mid	Connector 90°	IV	4	10'	50'	20'	90'	90'	0'	Yes	Note 1	Shoulders Needed to Satisfy Design Standards
B7 North	B9 North	Connector 90°	II	2	10'	35'	15'	65'	75'	0'	Yes	Note 2	Shoulders Needed to Satisfy Design Standards
B8 South	B10	Connector 90°	IV	4	10'	50'	20'	90'	125'	0'	Yes	Note 1	Shoulders Needed to Satisfy Design Standards
B8 North	B10	Connector 90°	IV	4	10'	50'	20'	90'	100'	0'	Yes	Note 1	Shoulders Needed to Satisfy Design Standards
N/A	New B11	Bypass/Exit 90°	IV	4	10'	50'	20'	90'	N/A	N/A	N/A	Construct When Removing B9 North and South	Replacement for B9 North and South
B9 South	Remove	Entrance/Exit 90°	IV	4	10'	50'	N/A	N/A	90'	N/A	N/A	Remove When Reconstructing B9 (Future B11 and B12)	Not Located at End of Runway
B9 North	Remove	Connector 90°	IV	4	10'	50'	N/A	N/A	90'	N/A	N/A	Remove When Reconstructing B9 (Future B11 and B12)	Not Located at End of Runway
C	C	Partial Parallel	IV	4	10'	50'	20'	90'	75'	15'	Yes	Note 1	Shoulders Needed to Satisfy Design Standards
C	C	Exit 90° (RWY 18-36)	IV	4	10'	50'	20'	90'	75'	15'	Yes	Note 1	Shoulders Needed to Satisfy Design Standards
D	D	Partial Parallel	II	2	7.5'	35'	15'	65'	60'	30'	Yes	Note 1	Shoulders Needed to Satisfy Design Standards
T	Remove	Connector 30° Angled	II	2	7.5'	35'	15'	N/A	75'	N/A	N/A	Remove When Removing A9	Angled Connector
Z	Partial Removal	Partial Parallel	II	2	7.5'	35'	15'	65'	50'	15'	N/A	Remove When Removing A9, Note 3	Remove West Portion for Helipads

Source: Michael Baker International, Inc., 2018
Notes:
Note 1: Add Shoulder Pavement/Mark/ Relocate Edge Lights
Note 2: Add Stabilized Turf Shoulders
Note 3: Add Stabilized Turf Shoulders (Remaining TDG 2 Partial Length Parallel Taxiway)

5.5 Air Cargo Facility Expansion and Redevelopment of Closed Landfill (Parcel H)

The preferred expansion of the air cargo facilities includes the eastward expansion of the current Air Cargo Apron (approximately 363,348 SF, or 8.3 acres), development of three additional air cargo handling/processing facilities (approximately 30,200 SF, or 2.2 acres) along the east side of the expanded apron and associated private vehicle/truck parking and access (approximately 268,150 SF, or 6.2 acres). The Cargo Apron expansion would accommodate a variety of large and mid-sized aircraft potentially having up to ADG IV wingspans. The removal and eastward relocation of exit taxiway connector B3 is also recommended to satisfy current FAA airport design standards and to eliminate the existing direct connection between the Air Cargo Apron and Runway 9-27.

The 43-acre area adjacent to and east of the expanded Air Cargo Apron is reserved for the future development of aviation-related commercial development and facilities that could possibly include, but would not be limited to Maintenance, Repair, and Overhaul Facilities.

The western-most extent of Parcel H begins at the east and north edges of the current Air Cargo Apron, extends to the east encompassing a closed and capped landfill and terminates at the southwest corner of Parcel B. The extents of the parcel are based on the need to provide sufficient setback distances from existing roadways and Taxiway B to protect the potential for future airplane taxi operations and parking by airplanes having ADG IV dimensional characteristics (e.g., Boeing 757F Freighter/Cargo Jet having a 44.5-foot tail height). The east extent of the parcel terminates at the west and south edges of Parcel B based on proximity to Runway 9-27 and Taxiway B.

Aircraft access to this parcel would be via Taxiway B and taxiway connectors as needed. The likely western- and southern-most extent of this parcel will be based upon the need to preserve and protect future ADG IV apron-edge taxi operations along the east side of the expanded Air Cargo Apron as well as similar ADG IV aircraft taxi movements along Taxiway B. Vehicle access to this parcel would be via Capital Circle SW and Air Cargo Road.

The above ground height of temporary or permanent buildings and structures and allowable aircraft tail height locations would be limited by overlying protected navigable airspace surfaces established along and beyond the north end of the runway as defined by Title 14: Aeronautics and Space, CFR part 77 and Runway 9 TERPS Departure Surface.

The location and preferred extent of Parcel H is shown in **Figure 5-4.**

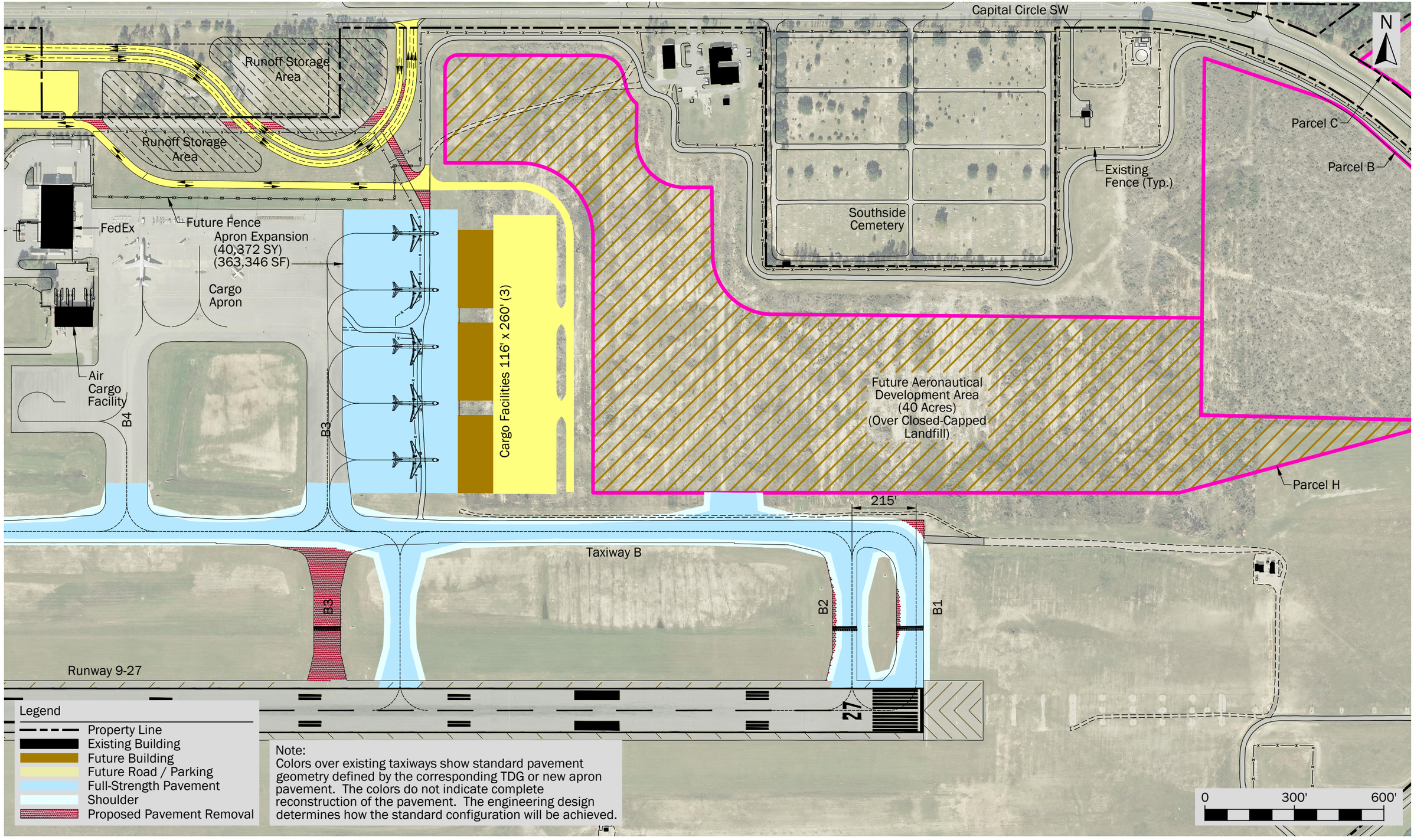

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Figure 5-4 Preferred Air Cargo Expansion / Aeronautical Development Area (Parcel H)

5.6 Passenger Terminal Facilities

Currently, the City and airport management are undertaking a phased Passenger Terminal Modernization Program that includes multiple improvements to address short- and long-term passenger demands and meet modern spacing requirements. The Terminal Modernization Project is designed to enhance the customer experience for travelers by providing convenience and efficiency. The project has included reconfiguring TLH's lobby up to the Transportation Safety Administration (TSA) checkpoint, a new baggage claim system, ticket counters for airlines and rental car agencies, safety screening machines, a new TSA screening room, and other aesthetic upgrades.

The airport is currently moving forward with its plans to design and construct an International Passenger Processing Facility (IPPF) and Customs and Border Protection (CBP) facilities in support of its international airport status. The IPPF and CBP facilities will likely be constructed within the Central Concourse at ground level below Gates A1 and B1 with an alternate entry point for domestic and international flights. The IPPF will be designed to accommodate up to 200 peak hour passengers, but could be expanded later to serve higher demand.

In addition to the Terminal Modernization Project, the previous 2006 Master Plan's terminal planning efforts for TLH document and recommend the expansion of the existing ticketing and bag claim functions to the west and east in their respective directions. Additional area is also added to the south to gain critical depth in these spaces. The future expansion of the secure passenger holding concourse to the east and west would provide the ability to park all aircraft along the airside of the concourse.

The proposed expansion of the secure concourse will require the widening of the Terminal Apron to the east and the west necessitating the relocation and reconstruction of Taxiway Connector B5 to align with the new east apron-edge taxilane, the construction of a new additional taxiway connector (future B8) to align with the new west side apron-edge taxilane, and the removal of taxiway connector B6 (approximately 18,558 SF, or 0.43 acres) to eliminate the direct and unrestricted access between the Terminal Apron, Taxiway B and Runway 9-27. Construction of the new expanded Terminal Apron and taxiway connectors will represent approximately 230,760 SF or 5.3 acres of new pavement.

The preferred Passenger Terminal Area Development alternative is shown in **Figure 5-5.**

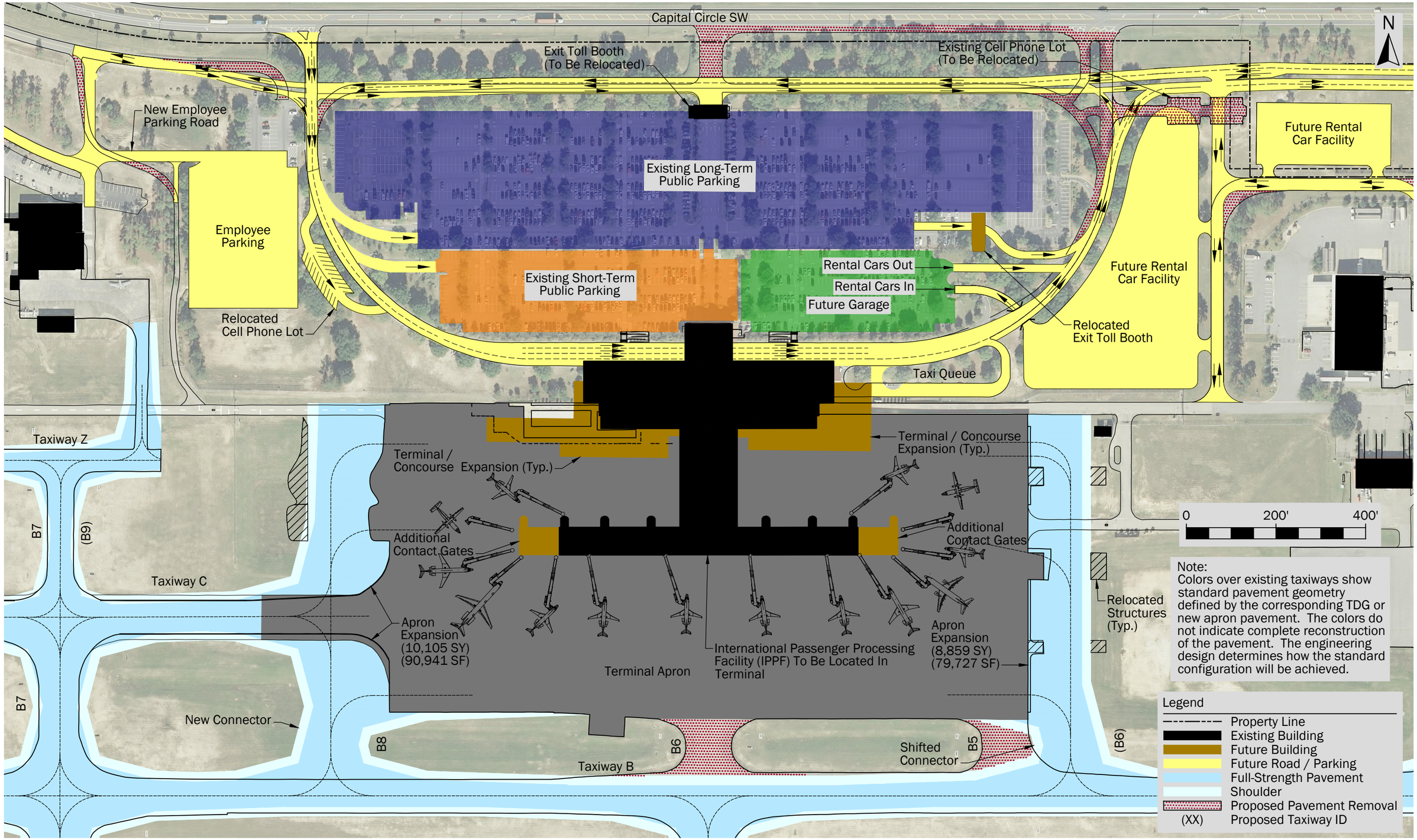

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Figure 5-5 Preferred Terminal Alternative

5.7 North Aeronautical Development Area

The cleared, graded and maintained land area situated within the northern-most portion of the airport east of Runway 18-36, and adjacent to and bordered by Capital Circle SW (previously described in Chapter 4 as Parcel A) offers direct and unrestricted access to the airfield environment via Taxiway A. As part of this Airport Master Plan's goal to achieve the highest and best aviation-related commercial use of this parcel, the preferred alternative is to preserve this area for future Aircraft Maintenance, Repair, and Overhaul (MRO), Air Cargo Freight and Logistics, Flight Training, or Manufacturing.

The preferred north aeronautical development area is shown in **Figure 5-6**.

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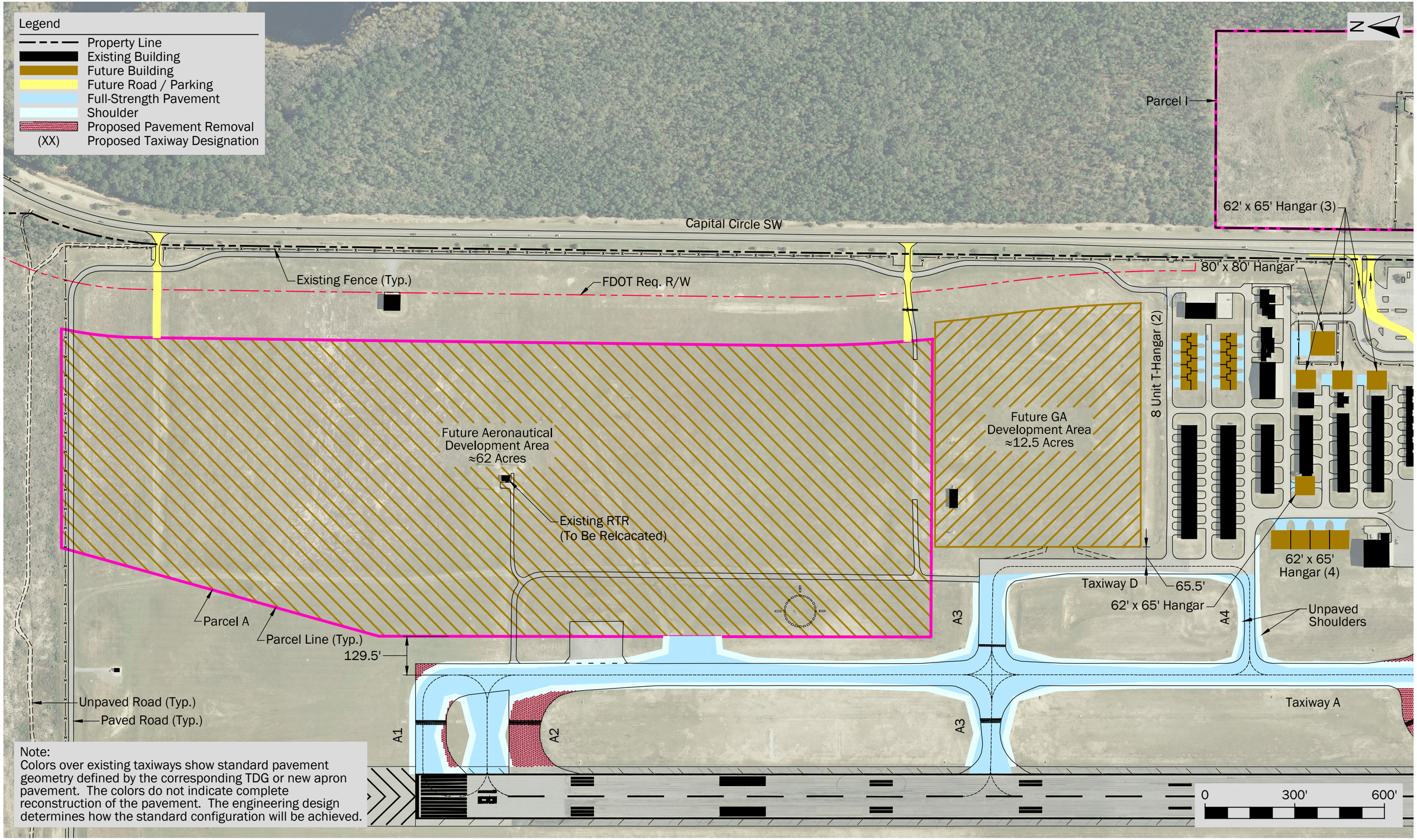

Note:
Colors over existing taxiways show standard pavement geometry defined by the corresponding TDG or new apron pavement. The colors do not indicate complete reconstruction of the pavement. The engineering design determines how the standard configuration will be achieved.

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Figure 5-6 Preferred North Aeronautical Development Area Alternative

5.8 Future General Aviation Development Area

The cleared, graded and maintained land area (approximately 12.5 acres) situated adjacent to and north of the North Apron and east of Runway 18-36 offers direct and unrestricted access to the airfield environment via Taxiway A. As part of this Airport Master Plan's goal to achieve the highest and best aviation-related use of this area, it is recommended that this area be preserved for the continued future demand-driven phased in-fill development of general aviation facilities that will most likely include, but would not be limited to T-hangars, box hangars and aircraft parking aprons.

The western-most limit of leasable land within which to develop a new general aviation apron and facilities would begin at the eastern-most limit of the Taxiway A Object Free Area (TOFA). The above ground height of temporary or permanent buildings and structures and allowable aircraft tail height locations would be limited by overlying protected navigable airspace surfaces established along and beyond the north end of the runway as defined by CFR part 77.

5.9 North and Central Aprons

The recommended preferred future development of the North Apron includes the continued in-fill development of hangar facilities that are envisioned to include, but would not be limited to: 16 T-hangars, eight 60' X 60' box hangars, three 120' X 120' box hangars, one 80' X 80' box hangar and a multi-tank/multi-product above ground fuel facility and apron area for airport fueler and aircraft pilot self-serve fueling operations. Improvements to the current apron area access roadway will be required to accommodate fuel tanker access and movement. Taxiway improvements are recommended to accommodate TDG 2 aircraft movement and eliminate confusing taxiway geometry (Taxiways A5 and A10).

The Central Apron is located between the North and South Aprons. The preferred future development of the Central Apron includes the development of two additional 100' X 60' multi-tenant box-type hangars, vehicular access and parking improvements, and the construction of a new taxiway connector (future A9).

Collectively, the total area of new impervious pavement of surfaces for both the North and Central Aprons is approximately 10 acres.

The preferred future development of the Central Apron alternative is shown in **Figure 5-7**.

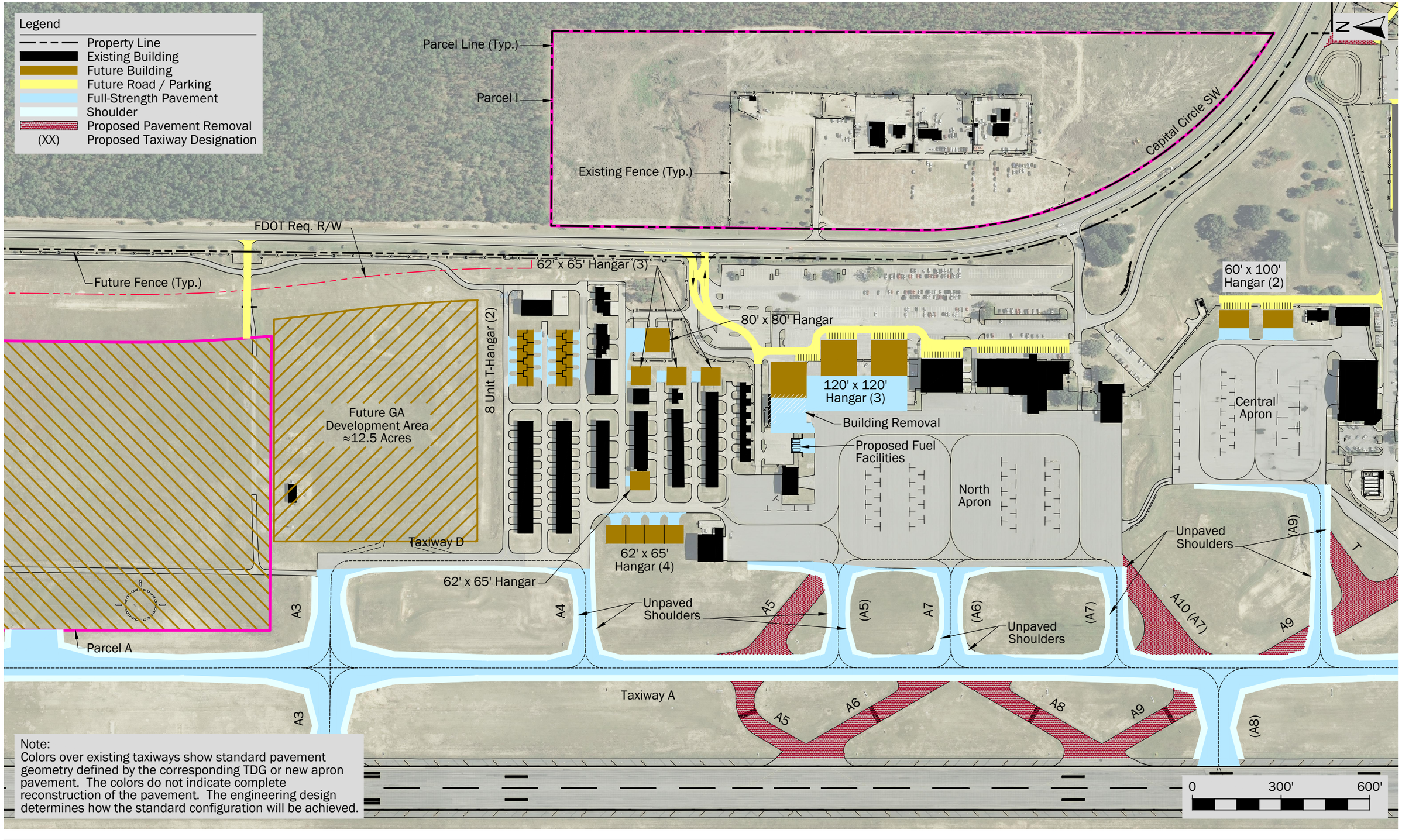

Figure 5-7 Preferred North and Central Apron Development Alternative

5.10 South Apron Area

The preferred and recent development of the South Apron included the remarking of the apron area tie-down area, TDG 4 fillet geometry design improvements for taxiway connectors A11 and B8, construction of concrete hardstands to accommodate the access and parking demand needs of larger itinerant commercial charter aircraft (e.g., 767-300ER), and the redevelopment of existing and creation of additional helicopter parking positions to the east and west of taxiway connector B8 along what is now the western-most portion of Taxiway Z. The designation and preservation of an airport service road to facilitate the movement of airport and emergency vehicles through the area is also recommended.

Other preferred improvements to the east side of the South Apron include the potential future development of two separate multi-tenant bulk hangar facilities for civilian and/or State Aviation Agency use. The potential development of one hangar could occur at what is now the site of the William D. Martin Hangar facility formerly occupied and used by the Florida Bureau of Aircraft. Based on available South Apron area, ADG II taxilane requirements and adjacencies, a single 50,400 SF rectangular bulk-type hangar (approximately 140' X 360') with adjacent automobile access and parking could be developed.

Another similar type bulk-hangar hangar facility could be developed within the area directly east and adjacent to the North Apron area that was formerly occupied and used by the Florida Forest Service for storage of aviation aircraft and assets. Based on available developable space, existing taxiway connector, roadway and adjacencies, a single 45,900 SF rectangular bulk-type hangar (approximately 170' X 270') with adjacent automobile access and parking could be developed to replace the existing 27-year old 10,000 SF hangar. Approximately 56,700 SF, or 1.3 acres of adjacent apron area to tie in to the existing taxilane connecting to Taxiway Z is available for future development.

Collectively all preferred facility and pavement development would generate and encompass approximately 409,464 SF, or 9.4 additional acres of impervious areas or surfaces.

The preferred future development of the South Apron is shown in **Figure 5-8**.

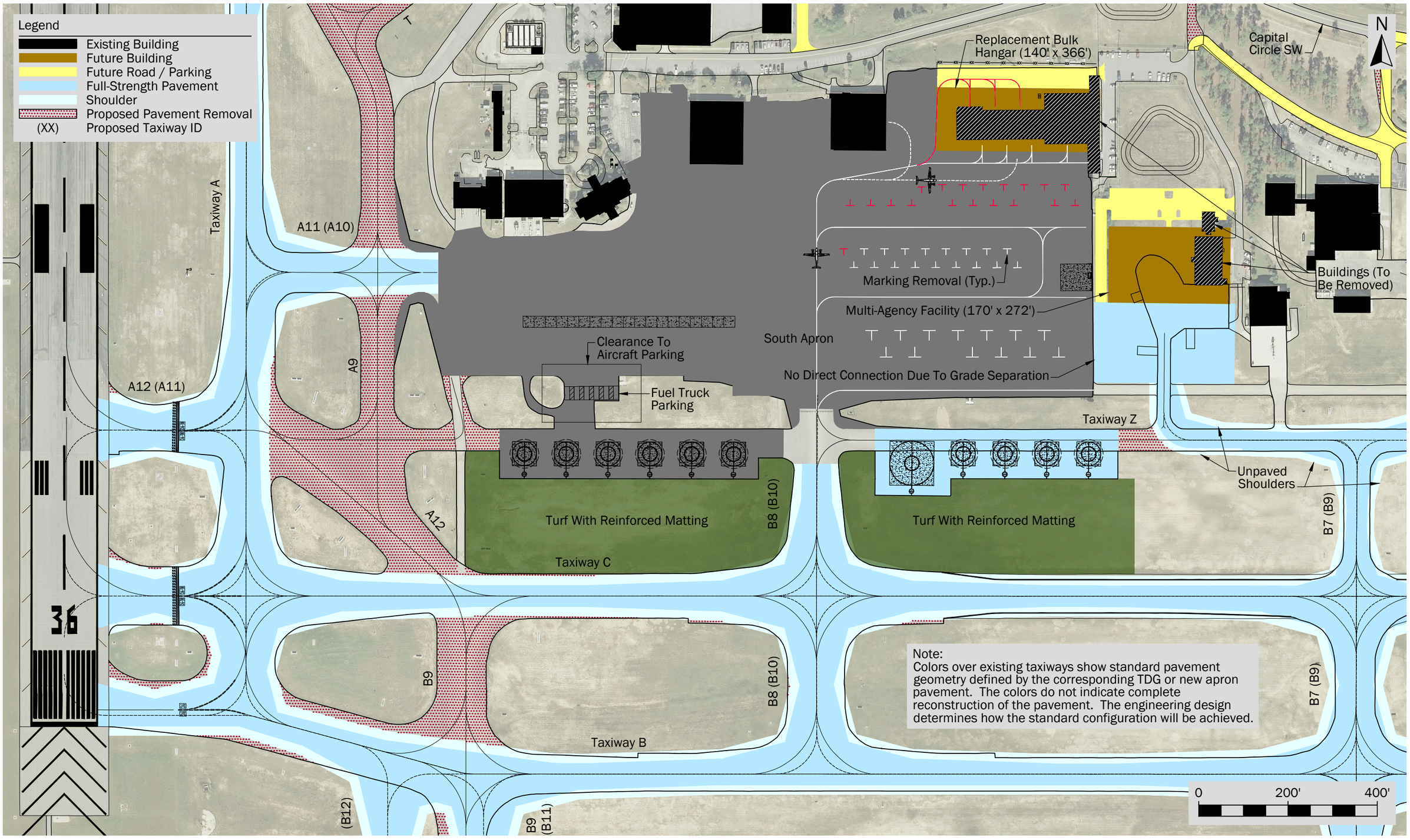

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Figure 5-8 Preferred South Apron Development Alternative

5.11 Support Facilities

5.11.1 Remote Transmitter/Receiver

As noted in the land use discussion of Chapter 4, the relocation of the Remote Transmitter/Receiver facility (RTR) will be required to support future aeronautical development north of the existing general aviation facilities (i.e., within Parcel A). During the 2006 Master Plan, the RTR was proposed approximately 785 feet west of Runway 36. However, this area (Parcel F) was determined to have a higher and better use as part of this Airport Master Plan Update.

It will be the sole responsibility of the FAA to site, relocate and commission the RTR facility. It is envisioned that the relocation of this facility will:

- occur on airport property,
- would have a maximum Above Ground Level (AGL) height of no more than 55 feet,
- be below overlying CFR part 77 Civil Airport Imaginary surfaces, TERPS Approach and Departure surfaces,
- provide unobscured line of sight between the ATCT and Runways 9-27 and 18-36, and
- be outside of dimensional limits of the Approach and Departure Runway Protection Zones serving Runways 36 and 18 respectively.

Based upon the five siting assumptions, a triangular-shaped 4.5-acre area of land having an east/west orientation located 885 feet west of the Runway 18-36 centerline was identified as being suitable for the in-kind replacement of the four Remote Communication Facility antennas, their support towers and ancillary stand-alone buildings. The area would be immediately south of and adjacent to the proposed future development of Solar Farm 2.

5.11.2 Upgrade of Precision Instrument Approach Capability Serving Runway 36

In 2016, the FAA requested the City's response regarding its interest to participate in the FAA's *Enhanced Low Visibility Operations (ELVO)* program. The ELVO program was developed to safely achieve the lowest possible weather minimums for all operators in the National Airspace System by leveraging new and existing aircraft technologies combined with any necessary improvements to the existing ground structure. In response to the FAA's inquiry, the City submitted a Letter of Support for FAA's implementation and development of the ELVO program at TLH stating that Airport Management is inclined to take additional measures to ensure that the airport is equipped and prepared to meet the FAA's future NextGen demands.

If implemented at TLH, the ELVO would: 1) provide enhanced published instrument approach procedure minimums, 2) enhance airport operational capability and safety and, 3) increase the capability to accept and accommodate air carrier diversion activities during periods of local low visibility conditions.

It is envisioned that the City could leverage its existing Medium Approach Light System with Runway Alignment Indicator Lights (MALSR) and Runway Visibility Range (RVR) facilities to provide

enhanced (i.e., lower) cloud ceiling base and visibility minimums supporting Special Authorization (SA) Category I/II Precision Instrument Approach Operations to Runway 36.

As part of the ELVO program, enhancements of existing, and development of new on-airport NAVAIDS that currently support Category-I Precision Instrument Approach capabilities to Runway 36 would be required as prescribe in FAA Order 8400.13D, Procedures for the Evaluation and Approval of Facilities for Special Authorization Category I Operations and All Category II and III Operations. To facilitate the TLH-specific ELVO program, it is envisioned that on-airport facility improvements will likely be limited to the additional of a Mid-point RVR sensor and the enhancement of pavement markings, signage, electrical power back-up and remote NAVAID monitoring capabilities.

5.11.3 Approach Lighting System to Runway 9

Based upon discussions with airport operations and airport traffic control tower staff, a Medium Intensity Approach Lighting System with Runway Alignment Indicator Lights (MALSR) is proposed for Runway 9. This system is recommended to enhance runway instrument approach visibility issues historically experienced by pilots during nighttime or low visibility conditions primarily caused by the proximity of the vast open and undeveloped land west of the airport. This proposed approach lighting improvement will potentially serve to enhance the existing Runway 9 RNAV (GPS) non-precision instrument approach procedure with Localizer Performance with Vertical Guidance (LPV) offering cloud base ceiling and visibility minimums as low as 200 feet and ½ mile respectively. These minimums would be similar to that typically offered by Category-I Instrument Landing Systems.

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5.12 Noise Contours and Land Use Compatibility

The FAA's Aviation Environmental Design Tool (AEDT, Version 2d) computer program is used to generate airport noise contours and to evaluate incompatible noise exposure to sensitive land uses such as residential properties, schools, places of worship, and hospitals. The noise contours illustrate the Day-Night Average Sound Level (DNL) that occurs during an average day and are generated by inputting various airport-specific factors into INM (aircraft activity and fleet mix, flight tracks, runway utilization, day and night activity, etc.). According to the FAA's Environmental Desk Reference for Airport Actions, DNL is the 24-hour average sound level in decibels (dB). This average is derived from all aircraft operations during a 24-hour period that represents an airport's average annual operational day. DNL adds a 10 dB noise penalty to each aircraft operation occurring during nighttime hours (10 p.m. to 7 a.m.). The 10 dB penalty is intended to compensate for people's heightened sensitivity to noise during the night period. The FAA identifies DNL levels of 65 dB and higher as incompatible with noise sensitive land uses.

Using the AEDT, DNL noise exposure contours were generated for the following two scenarios at TLH: 1) existing 2015 activity levels, fleet mix, and runway configuration, and 2) forecast 2035 activity levels, fleet mix, and runway configuration. The AEDT inputs included in this section were derived from the fleet mix forecasts presented in the forecast chapter of this Airport Master Plan Update, and by reviewing historical flight records to identify aircraft models that commonly operate at TLH. The DNL 65 dB contours for the existing and future conditions are shown in **Figure 5-9**. The 2015 and 2035 DNL 65 dB contours do not encompass any sensitive land uses, and therefore, the preferred airfield development should not result in any significant noise impacts.

The contours presented in this section will be incorporated into the Land Use Plan Drawing of the Airport Layout Plan set associated with this Airport Master Plan Update.

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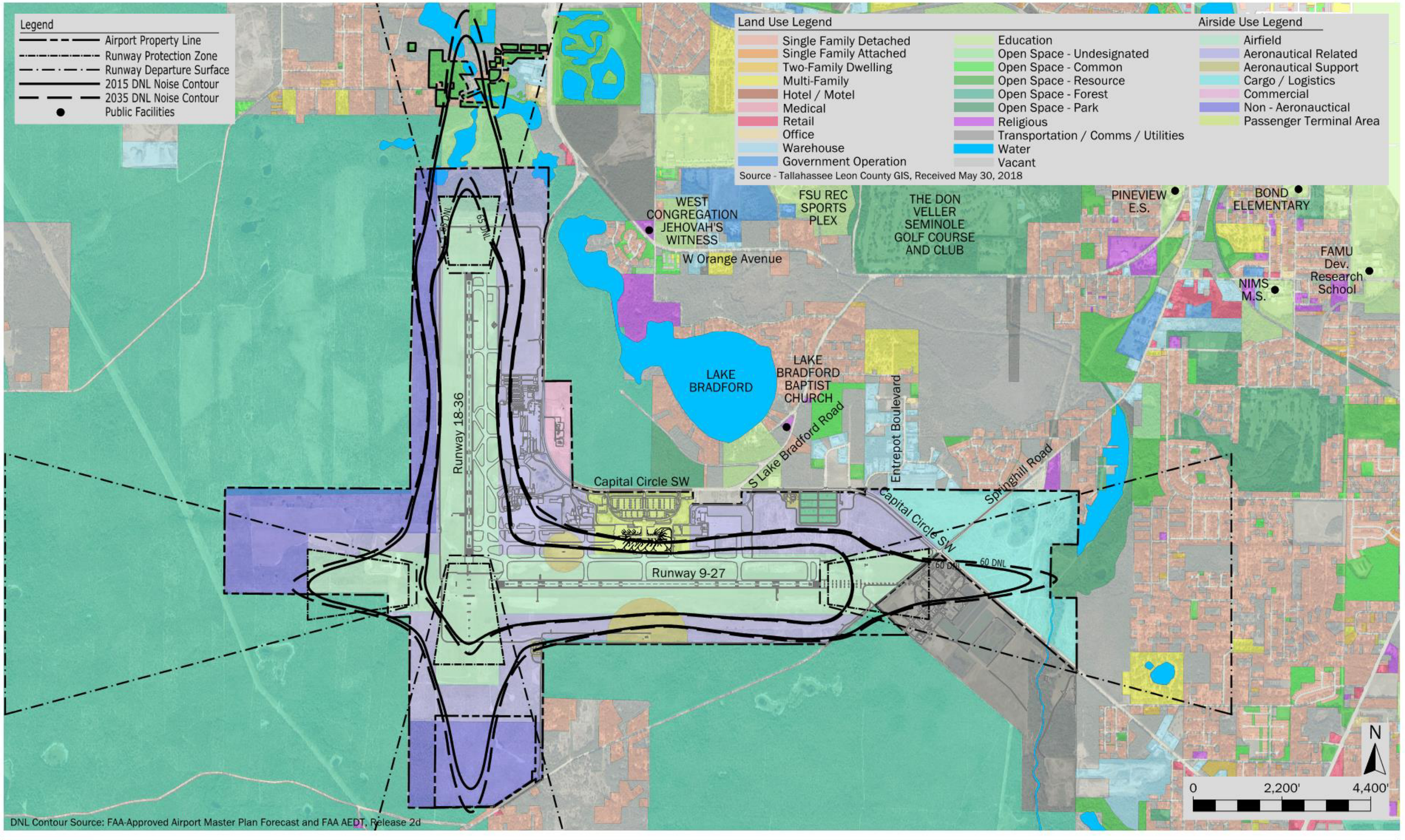

Figure 5-9 DNL Noise Exposure Map

The civil aircraft fleet mix shown in **Table 5-2** was estimated based on the analysis of historical flight activity for year 2015 retrieved from Flightwise (an online flight tracking service). It was assumed that the aircraft proportions in the civil aircraft fleet mix remain constant from 2015 to 2035. The number of aircraft operations in the sample were scaled to match the total operations (excluding military operations) for 2015 and 2035 as presented in the forecast chapter.

The day/night and arrival/departure splits were also determined based on the analysis of the Flightwise data. The civil helicopter fleet mix, shown in **Table 5-3**, was estimated based on an analysis of the FAA Traffic Flow Management System Counts (TFMSC).

Table 5-2
Civil Aircraft Fleet Mix

AEDT Aircraft	Description	Engine Type	Operations	
			2015	2035
1900D	Beech 1900D / PT6A67	Turboprop	3	4
717200	Boeing 717-200 / BR 715	Jet	1,375	1,661
737400	Boeing 737-400 / CFM56-3C-1	Jet	42	50
737700	Boeing 737-700 / CFM56-7B24	Jet	490	592
737800	Boeing 737-800 / CFM56-7B26	Jet	48	58
737N17	Boeing 737-200 / JT8D-17 Nordam B737 LGW Hushkit	Jet	8	10
757PW	Boeing 757-200 / PW2037	Jet	974	1,177
A300-622R	Airbus A300-622R / PW4158	Jet	3	4
A319-131	Airbus A319-131 / V2522-A5	Jet	472	570
A320-211	Airbus A320-211 / CFM56-5A1	Jet	13	15
BEC58P	Raytheon BARON 58P / TS10-520-L	Piston	2,038	2,462
CIT3	Cessna Citation III / TFE731-3-100S	Jet	192	232
CL600	Canadair CL-600 / ALF502L	Jet	610	737
CL601	Canadair CL-601 / CF34-3A	Jet	4,269	5,157
CNA172	Cessna 172R / Lycoming IO-360-L2A	Piston	1,238	1,496
CNA182	Cessna 182H / Continental O-470-R	Piston	544	657
CNA206	Cessna 206H / Lycoming IO-540-AC	Piston	502	606
CNA208	Cessna 208 / PT6A-114	Turboprop	3,126	3,777
CNA441	Cessna CONQUEST II / TPE331-8	Turboprop	1,746	2,109
CNA500	Cessna Citation II / JT15D-4	Jet	658	794
CNA55B	Cessna 550 Citation Bravo / PW530A	Jet	1,069	1,291
CNA680	Cessna Citation Sovereign 680 / PW306C	Jet	120	145
CNA750	Cessna Citation X / Rolls Royce Allison AE3007C	Jet	152	184
CRJ9-ER	Bombardier CL-600-2D15 / CL-600-2D24 / CF34-8C5	Jet	1,463	1,767
CRJ9-LR	Bombardier CL-600-2D15 / CL-600-2D24 / CF34-8C5	Jet	1,290	1,558
DC3	Douglas DC-3 / R1820-86	Piston	2	2
DC910	McDonnell Douglas DC-9-10 / JT8D-7	Jet	5	6
DHC6	De Havilland DASH 6 / PT6A-27	Turboprop	149	180
DHC8	Bombardier de Havilland DASH 8-100 / PW121	Turboprop	53	64
DO228	Dornier 228-202 / TPE 311-5	Turboprop	66	79
ECLIPSE500	Eclipse 500 / PW610F	Jet	237	286
EMB145	Embraer 145 ER / Allison AE3007	Jet	3,694	4,463
EMB14L	Embraer 145 LR / Allison AE3007A1	Jet	3	4
EMB170	Embraer ERJ170-100	Jet	1,786	2,158
EMB190	Embraer ERJ190-100	Jet	3	4
F10062	Fokker 100 / TAY 620-15	Jet	203	246
GASEPF	1985 1-ENG FP PROP	Piston	454	548

Table 5-2
Civil Aircraft Fleet Mix

AEDT Aircraft	Description	Engine Type	Operations	
			2015	2035
GASEPV	1985 1-ENG VP PROP	Piston	5,125	6,192
GIIB	Gulfstream GIIB / GIII - SPEY 511-8	Jet	3	4
GIV	Gulfstream GIV-SP / TAY 611-8	Jet	91	110
GV	Gulfstream GV / BR 710	Jet	19	23
IA1125	IAI-1125 ASTRA / TFE731-3A	Jet	27	33
LEAR25	Learjet 25 / CJ610-8	Jet	37	45
LEAR35	Learjet 36 / TFE731-2	Jet	786	949
MD82	McDonnell Douglas MD-82 / JT8D-217A	Jet	18	21
MD83	McDonnell Douglas MD-83 / JT8D-219	Jet	1,213	1,466
MD9028	McDonnell Douglas MD-90 / V2528-D5	Jet	336	406
MU3001	Mitsubishi MU300-10 Diamond II / JT15D-5	Jet	1,026	1,239
PA28	Piper Warrior PA-28-161 / O-320-D3G	Piston	878	1,060
PA30	Piper Twin Comanche PA-30 / IO-320-B1A	Piston	5	6
PA31	Piper Navajo Chieftain PA-31-350 / TIO-5	Piston	336	406
SD330	Short SD3-30 / PT6A-45AR	Turboprop	21	25
SF340	Saab SF340B / CT7-9B	Turboprop	3,821	4,616
		Total	42,842	51,756

Source: Michael Baker International, Inc., 2018
Note: Numbers may not add up due to rounding

Table 5-3
Civil Helicopter Fleet Mix

AEDT Aircraft	Description	Engine Type	Operations	
			2015	2035
B407	Bell 407	Turboshaft	34	56
B212	Bell 412	Turboshaft	649	1,063
B429	Bell 429	Turboshaft	69	111
EC130	Airbus & Eurocopter Helicopters	Turboshaft	1,058	1,734
CH47D	Large helicopter Substitution	Turboshaft	68	111
S70	Sikorsky Black Hawk	Turboshaft	34	56
R44	Robinson R-44 Raven	Piston	102	168
		Total	2,014	3,301

Source: Michael Baker International, Inc., 2018
Note: Numbers may not add up due to rounding

As shown in in **Table 5-4**, the military fleet mix was estimated based on an analysis of the FAA TFMSC. It was assumed that the aircraft proportions in the fleet mix remain constant from 2015 to 2035. The number of aircraft operations in the selected sample were scaled to match the total military operations for 2015 and 2035 as presented in Chapter 2, Aviation Activity Forecasts. **Table 5-5** shows the military helicopter feet mix. Based on discussions with the TLH ATC Tower Manager, the number of military helicopters was estimated to be approximately 15% of the total military aircraft operations.

Table 5-4
Military Fleet Mix

Aircraft Type Designator	AEDT Aircraft	Description	Engine Type	Operations	
				2015	2035
A10C	A10A	Fairchild A-10A Thunderbolt II	Jet	50	50
C130	C130HP	Lockheed C-130 Hercules	Turboprop	162	162
C17	C17	Boeing Globemaster 3	Jet	10	10
F18	F18EF	Boeing FA-18 Hornet	Jet	91	91
F5	F5E	Northrop F-5 Freedom Fighter	Jet	101	101
P8	737800	Boeing P-8 Poseidon	Jet	547	547
SBR1	T39A	North American Rockwell Sabre 40/60	Jet	111	111
T6/T-34C	T34	Beechcraft T-6 Texan II / Turbo Mentor	Turboprop	9,757	9,757
T38C	T-38A	Northrop T-38 Talon	Turboprop	374	374
			Total	11,105	11,105

Source: Michael Baker International, Inc., 2018
Note: Numbers may not add up due to rounding

Table 5-5
Military Helicopter Fleet Mix

AEDT Aircraft	Description	Engine Type	Operations	
			2015	2035
CH47D	Bell-Boeing V22-Osprey Boeing CH-46 Sea Knight	Turboshaft	541	541
S70	Sikorsky Black Hawk	Turboshaft	744	744
S61	Sikorsky S-61	Turboshaft	135	135
S76	Sikorsky S-76	Turboshaft	270	270
B212	Bell 204	Turboshaft	270	270
		Total	1,960	1,960

Source: Michael Baker International, Inc., 2018
Note: Numbers may not add up due to rounding

Table 5-6 provides the approximate percentages of runway utilization. These percentages were applied to the total number of civil and military fixed wing operations. It was assumed that the utilization would remain constant over the 20-year planning period.

Table 5-6
Runway Utilization

Runway	Runway Utilization
9	19%
27	27%
18	28%
36	26%

Source: Michael Baker International, Inc., 2018.

5.13 Summary of Potential NEPA Documentation and Anticipated Environmental Permits

The following subsections describe the level of documentation, in accordance with the National Environmental Policy Act (NEPA), that would be associated with undertaking the preferred alternative projects. These subsections also discuss potential environmental impacts that would be expected from project implementation in addition to state and federal permits that would be necessary.

5.13.1 Potential NEPA Documentation

FAA Order 1050.1F, Environmental Impacts: Policies and Procedures, provides the FAA policy and procedures to ensure compliance with the requirements of NEPA for FAA-funded projects or projects requiring FAA ALP approval and lists the type of NEPA documentation required for each project type. Chapter 5 of FAA Order 1050.1F contains descriptions of types of actions that, in the absence of extraordinary circumstances, are normally categorically excluded. Categorically excluded projects and actions are those that meet the description contained in 40 CFR 1508.4, Categorical exclusion and represent actions that do not normally require an Environmental Assessment (EA) or Environmental Impact Statement (EIS) and do not individually or cumulatively have a significant effect on the environment. Chapter 3 of FAA Order 1050.1F provides a summary of requirements for environmental assessments [a summary of Findings of No Significant Impact (FONSI) is provided in Chapter 6 of that document], and lists examples of actions or projects that normally require an EA, which include but are not limited to the following:

- Actions that are not normally categorically excluded, and
- Actions that are normally categorically excluded but involve at least one extraordinary circumstance that may have significant environmental impact.

The more detailed written analysis in an EIS is required when one or more environmental impacts are significant and cannot be mitigated so that the net impacts are less than significant. Significance thresholds for the various environmental impact categories considered under NEPA are defined in 1050.1F, Exhibit 4-1. Some actions that normally require an EIS include:

- Location of a new commercial service airport in a Metropolitan Statistical Area (MSA),
- A new runway to accommodate air carrier aircraft at a commercial service airport in an MSA, and
- Major runway extension.

None of the proposed projects included in the preferred alternative are anticipated to require an EIS to meet NEPA requirements.

5.13.2 Potential Regulatory Permits

Permitting requirements for each project type are based upon current federal, state, and local environmental regulations. The following criteria were used to determine the potential environmental permits that would be required for each project:

1. Environmental Resource Permit (ERP)

An ERP is required if the project meets one or more of the following thresholds:

a. The project proposes work in, on, or over wetlands or surface waters.
b. The project proposes to construct more than 4,000 SF of impervious or semi-pervious surface subject to vehicular traffic.
c. The project proposes to construct a total of more than 9,000 SF of impervious or semi-pervious surface.
d. The project proposed has an area that is greater than 1 acre.
e. The project proposed is capable of impounding greater than 40-acre feet of water.
f. The project includes a dam that is greater than 10 feet in height.
g. The project is part of a larger development plan that in total meets or exceeds one of the above thresholds.
h. The project is a modification of an existing ERP.

The ERP program regulates both construction and removal of impervious surfaces and semi-pervious surfaces. For projects that are located at the airport, the Northwest Florida Water Management District (NWFWMD) is the agency that has jurisdiction and is responsible for reviewing and issuing ERP permits.

To expedite the review and issuance of ERP permits for the projects in the Preferred Alternative of this Master Plan, it is recommended that the airport consider applying for a Conceptual Permit with NWFWMD. The conceptual permit requires the development of an airport-wide Stormwater Master Plan and development of stormwater treatment facilities with capacity for treating stormwater runoff for future development. The NWFWMD would review the proposed stormwater treatment facilities for all proposed projects in the preferred alternative and issue a Conceptual Permit. An ERP application would be submitted as each project is constructed and since the water quality aspect of the project has already been reviewed, the permits are issued promptly.

2. National Pollutant Discharge Elimination System (NPDES) Construction Generic Permit

An NPDES Construction Generic Permit is required if a project includes land disturbance of an area greater than or equal to one acre in size. These permits are issued by the Florida Department of Environmental Protection (FDEP). The NPDES Construction Generic Permit for large construction activity is required if the project disturbs five acres or greater. For projects that disturb areas less than five acres in size but equal to or greater than one acre in size, an NPDES Construction Generic Permit for small construction activity is required.

3. Gopher Tortoise Conservation Permit

For projects that are to be constructed in uplands that are undeveloped or only partially paved, gopher tortoises may be present in the project area. A survey to determine the presence or absence of gopher burrows is required. If gopher tortoise burrows are present and will be impacted

by the project, a Gopher Tortoise Conservation Permit from the Florida Fish and Wildlife Conservation Commission and relocation of tortoises from impacted burrows are required.

4. FDEP Industrial Wastewater Permit

This permit may be required if a project has the potential to contaminate groundwater.

5. Section 404 Permit or U.S. Army Corps of Engineers (USACE) Dredge and Fill Permit

A Section 404 Permit is required if a project proposes to fill or dredge wetlands or other waters of the United States that are subject to USACE jurisdiction. Potential presence of wetlands and other waters of the U.S. was evaluated using Florida Land Use, Cover and Forms Classification System (FLUCFCS) mapping from the NWFWMD.

6. Underground and Above Ground Storage Tanks

The Florida Department of Environmental Protection (FDEP) regulates, inspects, and issues certifications for both underground and above ground petroleum storage tanks.

7. City of Tallahassee, Growth Management Department Review

In addition to state and federal permitting requirements, new development within the limits of the City of Tallahassee is subject to review by the City of Tallahassee Growth Management Department. The first step in the process is to apply for Land Use Compliance Certificate (LUCC) to determine where the proposed project and use of the site is permitted under current City regulations. The second step is the development of a Natural Features Inventory that identifies significant natural features from each of several categories such as wetlands, endangered species, trees, floodplain, special development zone, and karst features on the project site. The third step is to develop the site plan and request Type A or Type B Site Plan and Concurrency review. The Concurrency Review will determine if there is adequate available capacity to accommodate the impact of the proposed project at or above the Level of Service. Dependent on the type of project proposed, the Concurrency Review may require a transportation or traffic analysis and/or a stormwater analysis. After the site plan and concurrency review are completed, an Environmental Impact Assessment is developed that describes and quantifies environmental impacts and describes the measures taken to mitigate those impacts. Following approval of the Environmental Impact Assessment, an application for an Environmental Management Permit is submitted. The plans, copies of the Site Plan and Environmental Impact Assessment approval letters, and the stormwater management design report are submitted with the Environmental Management Permit Application.

5.13.3 Preferred Alternative Projects

The projects proposed for the preferred alternative were overlaid on FLUCFCS mapping and the most recent aerial photography to determine if the proposed project would potentially impact

previously developed areas, wetlands, non-forested uplands, or forested uplands. Table 5-7 identifies the potential environmental impacts associated with the preferred alternative, the anticipated level of NEPA documentation for each project such as a Categorical Exclusion (CE) or Environmental Assessment (EA), and regulatory permits that may be needed for each project. Based on review of the characteristics of the projects associated with the preferred alternative and the project sites, potential for environmental impacts from the projects associated with the preferred alternative is low for most of the projects. However, some of the projects have the potential to impact wetlands or protected species.

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Table 5-7
Potential Environmental and Regulatory Considerations of the Preferred Alternative

Figure Reference	Preferred Alternative	Proposed Actions	Affected Previously Disturbed Land Area (Acres)	Affected Previously Paved Areas (Acres)	Potential Impact (Y or N)				Potential NEPA Document	FAA Order 1050.1F Reference	Potential City Permit	Potential State Permit	Potential Federal Permit
					Noise[a]	Air Quality	Water of U.S.	Protected Species					
5-1	Land Use Parcels and Preferred Alternatives	Summary Exhibit	N/A										
	Parcel B		27		N	N	N	Y	EA[c]	3-1.2.a.(1)	LUCC, SP, CM, NFI. EIA. EMP	GT, NPDES, ERP	
	Parcel C		56		N	N	N	Y	EA[c]	3-1.2.a.(1)	LUCC, SP, CM, NFI. EIA. EMP	GT, NPDES, ERP	
	Parcel D		161		N	N	Y	Y	EA[c]	3-1.2.a.(1)	LUCC, SP, CM, NFI. EIA. EMP	GT, NPDES, ERP	404
	Parcel E		107		N	N	N	Y	EA[c]	3-1.2.a.(1)	LUCC, SP, CM, NFI. EIA. EMP	GT, NPDES, ERP	
	Parcel F	Solar Farm 2	206		N	N	N	Y	EA	3-1.2.a.(1)	LUCC, SP, CM, NFI. EIA. EMP	GT, NPDES, ERP	
	Parcel G	Solar Farm 2	112		N	N	N[b]	Y	EA	3-1.2.a.(1)	LUCC, SP, CM, NFI. EIA. EMP	GT, NPDES ERP	
	Parcel I		31		N	N	N	P	EA[c]	3-1.2.a.(1)	LUCC, SP, CM, NFI. EIA. EMP	UST, GT, NPDES, ERP	
5-2	Preferred Airport Access and Circulation Alternative	Airport Roadway Access and Circulation Improvements	17		N	N	N	P	CE	5-6.4a	LUCC, SP, CM, NFI. EIA. EMP	GT, NPDES, ERP	
		Construction of Multi-Level Garage		19	N	N	N	N	CE	5-6.4h	LUCC, SP, CM, NFI. EIA. EMP	NPDES, ERP	
		Construction of Employee and Cell Phone Parking Lots		2	N	N	N	P	CE	5-6.4h	LUCC, SP, CM, NFI. EIA. EMP	GT, NPDES, ERP	
		Development of Rental Car QTA Facility		6	N	N	N	Y	CE	5-6.4h	LUCC, SP, CM, NFI. EIA. EMP	GT, NPDES, ERP	
		Removal of Existing Pavements	2		N	N	N	N	CE	5-6.4a		NPDES, EV	
5-3	Preferred Taxiway System Alternative	Rehabilitation / Reconstruction of Runway 18-36	24		N	N	N	N	CE	5-6.4e		NPDES, EV	
		Removal of Taxiway A Connectors	-9		N	N	N	N	CE	5-6.4e		NPDES, EV	
		Construction of New Taxiway A Connectors and Shoulders	6		N	N	N	P	CE	5-6.4e	LUCC, SP, CM, NFI. EIA. EMP	GT, NPDES, ERP	
		Removal of Taxiway B Connectors	-6		N	N	N	N	CE	5-6.4e		NPDES, EV	
		Construction of New Taxiway B Connectors and Shoulders	3		N	N	N	P	CE	5-6.4e	LUCC, SP, CM, NFI. EIA. EMP	GT, NPDES, ERP	
5-4	Preferred Air Cargo Apron Expansion/Connector and Three Cargo Handling Facilities (Parcel H)	Eastward Expansion of Air Cargo Apron	8		N	N	N	P	CE	5-6.4e	LUCC, SP, CM, NFI. EIA. EMP	GT, NPDES, ERP	
		Construction of Three Air Cargo Facilities and Access Road	8		N	N	N	Y	CE	5-6.4a & f	LUCC, SP, CM, NFI. EIA. EMP	GT, NPDES, ERP	
5-4	Preferred East Aeronautical and Freight Logistics Development Area Alternative (Parcel H – Utilizing Portion of Closed Landfill)	Future Remediation and Redevelopment of Closed Landfill	38		N	N	N	Y	EA[c]	3-1.2.a.(1)	LUCC, SP, CM, NFI. EIA. EMP	GT, NPDES, ERP	
5-5	Preferred Terminal Alternative	Expansion of Terminal Concourse	1		N	N	N	N	CE	5-6.4h	LUCC, SP, CM, NFI. EIA. EMP	ERP, NPDES	
		Addition of Terminal Contact Gates	<1		N	N	N	N	CE	5-6.4h		ERP	
		East / West Expansion of Passenger Terminal Apron	5		N	N	N	P	CE	5-6.4e	LUCC, SP, CM, NFI. EIA. EMP	GT, NPDES, ERP	
5-6	Preferred North Aeronautical Development Area Alternative (Parcel A)	Development of Cleared/Graded Land for Commercial Aeronautical and General Aviation Facilities	66		N	N	N	Y	EA[c]	3-1.2.a.(1)	LUCC, SP, CM, NFI. EIA. EMP	GT, NPDES, ERP	

Table 5-7
Potential Environmental and Regulatory Considerations of the Preferred Alternative

Figure Reference	Preferred Alternative	Proposed Actions	Affected Previously Disturbed Land Area (Acres)	Affected Previously Paved Areas (Acres)	Potential Impact (Y or N)				Potential NEPA Document	FAA Order 1050.1F Reference	Potential City Permit	Potential State Permit	Potential Federal Permit
					Noise[a]	Air Quality	Water of U.S.	Protected Species					
5-7	Preferred North and Central Apron Development Alternative	Continued In-fill Development of General Aviation Facilities at North and Central Aprons	10		N	N	N	P	CE	5-6.4f	LUCC, SP, CM, NFI. EIA. EMP	GT, NPDES[d], ERP	
5-8	Preferred South Apron Development Alternative	Continued In-fill Development of General Aviation Facilities at South Apron	9		N	N	N	P	CE	5-6.4f	LUCC, SP, CM, NFI. EIA. EMP	GT, NPDES[d], ERP	

Source: Michael Baker International, Inc., 2018

Notes:

- Y = Impacts likely, N = No likely impact, P = Possible impacts; TBD = Insufficient information is available about planned development to determine if NEPA documentation will be required, and, if so, what level of NEPA document will be required; CE = Categorical Exclusion; EA = Environmental Assessment; NPDES = National Pollutant Discharge Elimination System Permit; UST/AST = State certifications for closure and or operations of underground or above ground storage tanks. In some cases, remediation for cleanup of contaminated soils is also necessary; GT = Florida Fish and Wildlife Conservation Commission Gopher Tortoise Conservation Permit; ERP = Northwest Florida Water Management District (NWFWMD) Environmental Resource Permit; EV = Request for verification of de minimis exemption from NWFWMD ERP; ITP = Project would have to be evaluated to determine if protected species are present. May require U.S. Fish and Wildlife Service Incidental Take Permit; 404 = U.S. Army Corps of Engineers Section 404 Permit
- CM = Concurrency Management; EIA = Environmental Impact Analysis; EMP = Environmental Management Plan; LUCC = Land Use Compliance Certificate; NFI = Natural Features Inventory; SP = Site Plan
- [a] None of the evaluated improvements would be anticipated to change the critical aircraft or significantly expand the 65 DNL noise contour.
- [b] Based on the limits for the current concept for Solar Farm 2, the wetlands at the north end of Parcel G will not be impacted. If the limits were extended to the northern limit of TLH property in Parcel G, wetland impact would occur.
- [c] Insufficient details are available at this time to determine the level of NEPA documentation required. Due to the relatively large amount of acreage, unless additional information becomes available so that it can be clearly demonstrated that the project qualifies for a CE, assume that an EA will be required.
- [d] If infill development is broken up and constructed as small individual projects, then those disturbing less than one acre of land may not require an NPDES permit.

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Categorically Excluded Projects

As depicted in **Table 5-7**, several of the projects identified as part of the preferred alternative would be documented as CEs. These include projects to construct facilities such as taxiways, hangars, apron areas, improvements to the terminal that are not intended to increase capacity, parking lots, parking garages, and access roads that will not negatively affect the level of service of the existing road network adjoining TLH.

Projects Potentially Requiring Preparation of an Environmental Assessment

For parcels that are larger in size and for which insufficient details concerning future development are currently available, it is difficult to determine the level of NEPA documentation that would be required to develop the parcel. In these cases, such as for development of Parcels A, B, C, D, E, H, and I, it is recommended that it be assumed at this time that an EA would be required to satisfy NEPA documentation requirements. Additionally, for Parcels F and G, for which construction of a solar farm is planned, an EA will be required because the solar farm will be larger than three acres in size and therefore does not meet the requirements for the FAA's CE for solar farm projects.

Projects Requiring an NPDES Permit

All the projects that would result in greater than one acre of ground disturbance will require an NPDES permit. The only permit that will not require an NPDES permit based on available information is the project to add terminal contact gates as identified in **Table 5-7.**

Projects Requiring an ERP

All but four of the proposed projects would require an ERP. In most of these cases the ERP is required so that the NWFWMD can review the stormwater management aspects of the project because the project exceeds one or more of the thresholds described above. The development of Parcel D also has the potential to impact wetlands and surface waters subject to the jurisdiction and regulatory authority of the NWFWMD. If impacts to these wetlands or surface waters are proposed, issuance of the ERP would likely include a condition that wetland mitigation be provided to compensate for impacts to these jurisdictional wetlands.

Removal of impervious surfaces and reconstruction of existing pavements are also actions that are regulated by the NWFWMD. However, in most cases, projects such as these are considered to have negligible or no impact. Therefore, for the projects involving the removal of existing roadway pavements, removal of connector taxiways, and rehabilitation/reconstruction of Runway 18-36, a request for verification of exemption from ERP requirements would be submitted to the NWFWMD. It is anticipated that these projects would be verified as de minimis exemptions from ERP requirements.

Projects Potentially Requiring a USACE Section 404 Permit

As described above the development of Parcel D has the potential to result in impact to wetlands and Waters of the U.S. If such impacts are proposed a Section 404 permit from the USACE would

be required and wetland mitigation would likely be required as a condition for the issuance of the permit. If an Individual Section 404 permit is required by the USACE then an EA would have to be developed to meet NEPA requirements.

Projects with Potential for Protected Species Impacts

Almost all the projects will have to be surveyed to determine whether gopher tortoise burrows and/or bent golden aster are present on the project site. For some of the projects the potential for gopher tortoises is low due to existing development in the project vicinity. However, gopher tortoises will occasionally use habitats in proximity to existing development, so their presence cannot be ruled out without reviewing the site in the field. Bent golden aster prefers areas adjacent to roads or the edges of upland forested habitat. For the development of Solar Farm 2 on Parcels F and G, it has already been determined that gopher tortoise and bent golden aster are present. Permitting for both will be required. For projects that will take place in areas that are currently completely paved, it can be concluded that no gopher tortoise permitting will be required.

Some of the projects would also be constructed in areas that could be utilized by the eastern indigo snake, a species that is listed as threatened under the Endangered Species Act. For projects that will occur in areas that are not currently paved, the construction contractor should be required to follow the United States Fish and Wildlife Service (USFWS) Standard Protection Measures for the Eastern Indigo Snake. In most cases doing so will support a finding by the USFWS that the project is not likely to adversely affect the eastern indigo snake.

Closure of Existing USTs

For the development of Parcel I, the removal of the existing underground storage tanks at the three rental car facilities will be required. If it is determined that one or more of the tanks has leaked, cleanup of contaminated soils may also be required. Due to the history of significant material use and storage at these sites, additional investigation to determine whether other contamination requiring remediation exists at the rental car facilities may also be warranted prior to redevelopment of Parcel I.

Development of the Old City of Tallahassee Landfill Site within Parcel H

Parcel H overlies a portion of the Old City of Tallahassee Landfill which was in operation from 1959 through 1976. Any proposed development on this site would have to be carefully coordinated with FDEP. It is likely that development of this site would require an assessment of existing contamination at the site. Development options should address the potential for capping landfill material as well as an excavation and disposal plan that would detail the methods proposed for the excavation of the buried solid waste at the site, the disposal of the recovered waste at another approved offsite solid waste landfill, and the protection of groundwater and surface water during the development of the site.

City of Tallahassee Growth Management Department Review

In addition to the permits and reviews described above, each of the components of the preferred alternative will be subject to the review of the City of Tallahassee Growth Management Department as described in 5.13.2 above. An LUCC, Site Plan A or Site Plan B review and Concurrency review are required. However, in cases where it can be demonstrated that a project site contains no resources eligible for conservation or preservation, is less than five acres in size (not including existing impervious surfaces), contains less than two acres of forested area, and has been issued a clearance letter from the Florida Department of State, Division of Historical Resources, the project may be exempt from Natural Features Inventory requirements. In such cases an Environmental Impact Analysis is also not required because the project contains no preservation or conservation areas.

Application for an Environmental Management Permit will be required for each project, including those projects that are determined to be exempt from Natural Features Inventory and Environmental Impact Analysis requirements.

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Chapter 6

Implementation Plan

Master Plan Update

TALLAHASSEE
INTERNATIONAL AIRPORT

6.0 Implementation Plan

6.1 Overview

The objective of this chapter is to set forth a strategic financial plan (Financial Plan) which provides for the financial implementation of the recommended improvements identified in this Study over a 20-year planning period.

Included as part of the Financial Plan is an overview of the capital improvements proposed for Tallahassee International Airport (TLH) over a 20-year planning period (Development Period), with an emphasis on the Five-Year Development Period (2018-2023). Analyses assessing the financial implications of the City of Tallahassee (City) undertaking the Proposed Projects and the airport's ability to generate future revenues sufficient to exceed projected operating and capital expenses during the Five-Year Development Period are examined. The following summarizes the components of the Financial Plan:

- A detailed breakdown of each funding type available to Tallahassee International Airport;
- A detailed funding plan for the Proposed Projects was prepared with an emphasis on the Five-Year Development Period. Recommended projects were evaluated to determine eligibility for funding by the Federal Aviation Administration (FAA) Airport Improvement Program (AIP), Florida Department of Transportation (FDOT), other funding sources, and Third Party/Tenant Financing. The local funding requirement was identified;
- A compilation and review of TLH's historical revenues and expenses for the past two years to identify historical trends;
- A detailed description of the Tallahassee International Airport Financial Structure including an order of magnitude estimate of airport revenues that would be generated by the traffic forecasted in Chapter 2, Forecasts of Aviation Demand;
- A historical cash flow analysis detailing both operating income and historical outside funding levels; and
- A section detailing opportunities for Revenue Enhancement.

6.2 Proposed Projects Summary

Based on the projected facility requirements identified in Chapter 3, Facility Requirements, a list of preferred airport development alternatives was developed as part of Chapter 4, Preliminary Alternatives, and Chapter 5, Alternatives Refinement. The cost estimates associated with the recommended proposed projects in this Study are intended to be order of magnitude presented in 2018 dollars and include estimated engineering fees and contingencies. Although the costs for construction projects are highly variable due to the fluctuating costs of materials (e.g. asphalt, steel, and energy production), costs shown later in the funding plan section of this chapter are escalated by the appropriate Consumer Price Index (CPI) inflation factor of 3.0% based upon the proposed phasing of the projects.

In order to provide realistic assumptions regarding the availability of funding for the proposed projects, it is necessary to estimate the phasing requirements of each project based on the need for enhanced safety, security and/or demand for the facilities during the Development Period.

For the purpose of this Financial Plan, each project was placed into one of three general project phasing periods based on an estimate of each project's estimated implementation. Below are the project phasing periods used for this purpose.

- Short-Term Development Period – Projects anticipated to be implemented within 0 to 5 years following the Study. To maintain consistency with the original planning horizons established for this Study, the short-term projects identified in this section are shown over a period of two years.
- Mid-Term Development Period – Projects anticipated to be implemented between 6 to 10 years following the Study.
- Long-Term Development Period – Projects anticipated to be implemented between 11 to 20 years following the Study.

6.3 Capital Improvement Program

The Capital Improvement Program (CIP) includes cost estimates and development phasing for the various projects identified in **Figure 6-1.** The proposed development is also identified within the Airport Layout Plan (ALP) drawing found in Chapter 7, Airport Layout Plan. A subsequent section of this chapter will address the financial feasibility of the Five-Year Development Period (2018-2023). Cost projections are based on 2018 dollars and include estimated engineering fees and contingencies. The projections should be used for planning purposes only and do not imply that funding will be available. Each year indicates the initiation of design and/or environmental efforts and it is assumed that construction would be undertaken either in that same year or the following year.

The CIP projects shown in **Table 6-1** have been segregated into Short-Term Development Period (2018-2019), Mid-Term Development Period (2020-2024) and Long-Term Development Period (2025-2035).

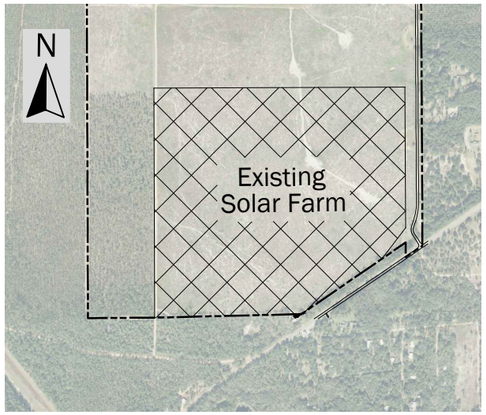

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Figure 6-1 Capital Improvement Plan (CIP)

Table 6-1 Schedule of Project Costs and Phasing – Capital Improvement Program (CIP)						
Number	**Project**	**Start Year**	**Short-Term (0-5 years)**	**Mid-Term (6-10 years)**	**Long-Term (11-20 years)**	**Total**
Short-Term Development Period (2018-2019)						
1	Rehabilitate South Apron	2018	$7,942,269			$7,942,269
2	Terminal Modernization (2018)	2018	$1,699,998			$1,699,998
3	Airfield Preservation	2018	$200,000			$200,000
4	Rehabilitate / Reconstruct Runway 18-36	2019	$10,270,000			$10,270,000
5	International Passenger Processing Facility	2019	$32,710,000			$32,710,000
6	Fence and Gate Rehabilitation, Updates and Improvements	2019	$200,000			$200,000
7	Air Traffic Control Tower Improvements	2019	$1,250,000			$1,250,000
8	ARFF Station Improvements	2019	$900,000			$900,000
9	Terminal Modernization (2019)	2019	$1,000,000			$1,000,000
Subtotal of Short-Term Projects			**$56,172,267**			**$56,172,267**
Mid-Term Development Period (2020-2024)						
10	Terminal PLB Acquisition / Installation - Phase 1	2020		$5,450,000		$5,450,000
11	Access and Roadway Realignment / QTA Service Facility and Parking Garage	2020		$32,780,000		$32,780,000
12	Terminal Modernization (2020)	2020		$2,540,000		$2,540,000
13	Taxiway A Rehabilitation	2021		$13,930,000		$13,930,000
14	Emergency Power Improvements	2022		$840,000		$840,000
15	Rehabilitate Facilities Building	2022		$510,000		$510,000
16	Renovate / Upgrade Operations Center	2022		$450,000		$450,000
17	Air Cargo Development - Phase 1	2022		$12,130,000		$12,130,000
18	Terminal PLB Acquisition / Installation - Phase 2	2023		$1,146,754		$1,146,754
19	Large Corporate Hangar - Phase 1	2023		$3,560,000		$3,560,000
20	Multimodal Transportation Center	2023		$3,480,000		$3,480,000
21	Terminal Modernization (2024)	2024		$1,790,000		$1,790,000
22	Terminal Apron Improvements	2024		$610,000		$610,000
23	Rehabilitate and Widen Taxiway B	2024		$11,280,000		$11,280,000
24	Corporate Hangars - Phase 1	2024		$4,290,000		$4,290,000
25	Reconstruct / Expand State of Florida Hangar	2024		$10,960,000		$10,960,000
26	Rehabilitate and Widen North T-Hangar Taxilanes	2024		$1,480,000		$1,480,000
27	T-Hangars - Phase 1	2024		$1,990,000		$1,990,000
Subtotal of Mid-Term Projects				**$109,216,754**		**$109,216,754**

Table 6-1 Schedule of Project Costs and Phasing – Capital Improvement Program (CIP)						
Number	**Project**	**Start Year**	**Short-Term (0-5 years)**	**Mid-Term (6-10 years)**	**Long-Term (11-20 years)**	**Total**
Long-Term Development Period (2025-2035)						
28	Rehabilitate Taxiways C and Z and Related Work	2025			$7,530,000	$7,530,000
29	Air Cargo Development - Phase 2	2026			$12,930,000	$12,930,000
30	Large Corporate Hangar - Phase 2	2026			$3,890,000	$3,890,000
31	Runway 18 ALSF-2	2027			$3,560,000	$3,560,000
32	Southeastern Hangar Development	2028			$14,580,000	$14,580,000
33	Terminal Apron Expansion	2029			$7,670,000	$7,670,000
34	Corporate Hangars - Phase 2	2031			$4,450,000	$4,450,000
35	Runway 9 MALSR	2032			$2,100,000	$2,100,000
36	T-Hangars - Phase 2	2032			$2,530,000	$2,530,000
37	Rehabilitate Central Apron	2033			$2,240,000	$2,240,000
38	Central Apron Corporate Hangars	2033			$4,320,000	$4,320,000
39	Air Cargo Development - Phase 3	2034			$16,510,000	$16,510,000
40	Large Corporate Hangar - Phase 3	2034			$4,540,000	$4,540,000
41	Terminal Concourse Expansions	2035			$29,830,000	$29,830,000
42	Terminal Baggage Claim Expansion	2035			$13,930,000	$13,930,000
43	Terminal Ticket Lobby Expansion	2035			$11,800,000	$11,800,000
Subtotal of Long-Term Projects					**$142,410,000**	**$142,410,000**
Total of Projects			**$56,172,267**	**$109,216,754**	**$142,410,000**	**$307,799,021**

Sources:
1 - Capital Improvement Program (CIP) provided by the City of Tallahassee.
2 - Master Plan by Michael Baker International, Inc.
3 - Construction pricing available. Detailed conceptual estimate based on current construction contract.

6.4 Financial Analysis

As mentioned in the beginning of this section, the Financial Plan includes an overview of the capital improvements recommended for the airport over a 20-year planning period, with emphasis on the Five-Year Development Period. This analysis will assess the financial ability or implications of the City of Tallahassee (City), undertaking the proposed projects. Further, the airport's ability to generate future revenues sufficient to exceed projected airport operating and capital expenses will be examined. The following summarizes the components of the Financial Plan:

- Eligibility for funding by the Federal Aviation Administration (FAA), Transportation Security Administration, Florida Department of Transportation's Aviation and Spaceports Office (FDOT) and local sources (which are identified further in this section);
- A review of existing tenant leases, agreements and contracts;
- A compilation and review of TLH's historical airport revenue and expenses; and
- An estimate of airport revenue and expenses and a *pro forma* cash flow analysis to estimate future revenue and expenses.

6.4.1 The Airport

The airport is owned and operated by the City of Tallahassee, a municipal corporation of the State of Florida, incorporated in 1824. The City is governed by a mayor and four commissioners, elected at large. The commission enacts all general and technical ordinances, including budgetary appropriations and construction and zoning ordinances, approves contracts and originates general management policies. The Commission employs a City Manager who directs the daily operations of the City through department heads appointed by the City Manager. Management of the airport is vested by the City in the Director of Aviation who reports to one of three Assistant City Managers.

A more thorough discussion on the airport can be found in Chapter 1, Inventory of Existing Conditions.

6.4.2 Financial Framework

The City's financial operations are accounted for on a fiscal year ("FY") basis, ending September 30th each year. As the owner and operator of the airport, the City has the right to enter into agreements, leases and contracts with tenants and to grant rights, privileges and services related to the use of the airport. In exchange, tenants compensate the City for occupancy of airport facilities and utilization of services.

The majority of airport revenue is generated by three sources: the commercial passenger airlines, public parking, and rental car companies. Other tenants and services also contribute revenue, although to a lesser degree. The following provides a brief summary of key provisions from certain agreements, contracts or leases with these tenants.

6.4.3 Commercial Passenger Airline Agreement

The airport is currently served by three airlines providing scheduled commercial air service. American Airlines provides daily service to Charlotte (Charlotte Douglas International Airport), Dallas/Fort Worth (Dallas/Fort Worth International Airport), Miami (Miami International Airport), and Washington, D.C. (Ronald Reagan Washington National Airport). Delta Air Lines provides daily service to Atlanta (Hartsfield-Jackson Atlanta International Airport) and Silver Airways provides service to Tampa (Tampa International Airport) and Fort Lauderdale (Ft. Lauderdale International Airport). Two of these airlines operate at the airport under the terms of a Signatory Airline-Airport Use and Lease Agreement (Agreement). The current Agreement became effective October 1, 2016 and will remain in effect until September 30, 2021. Under certain conditions, the Agreement will automatically renew for one additional term of five years.

All airlines that are signatory to the Agreement have agreed to pay all rates, fees and charges applicable under the Agreement. These include, but may not be limited to, the following:

Airline Rates, Fees and Charges

Landing Fee Per 1,000 Pound Units
Average Terminal Rental Rate Per Square Foot
Passenger Security Fee Per Enplanement
Passenger Boarding Bridge, Per Year
Baggage Handling System Fee Per Enplanement

Historical Passenger Airline Revenue is set out below:

Historical Passenger Airline Revenue

FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017
$4,311,084	$3,782,502	$3,448,276	$3,601,515	$3,650,725	$4,542,840

The airport calculates its rates, fees and charges annually to coincide with its fiscal year. In FY 2018, passenger airlines operating at the airport paid the City $4,791,372[11].

6.4.4 Public Automobile Parking

Public parking at the airport is operated by Republic Parking Solutions at the direction of the City under a management agreement. Under this scenario, the City pays all operating expenses and keeps all revenue generated by public parking, less an annual management fee. The management agreement is for a period of five years and expires June 30, 2021, with one additional five-year term at the option of the City.

[11] Source: FAA Form 127

The City maintains two public parking lots at the airport: one short-term lot and one long term lot. The short-term lot is located north of the terminal building directly across the terminal access road adjacent to the rental car ready/return lot. This lot contains 307 surface parking spots. The long-term parking lot is located within the terminal access loop road north of the terminal building. This lot contains 1,330 surface parking spots. The City provides valet parking at the terminal curbside. Valeted vehicles are parked in either the short-term lot or long-term lot. In addition to these public parking lots, the airport has a 30-space cellphone parking lot and a 210-space employee parking lot.

Table 6-2
Existing Public Parking

Location`	Spaces	Rate
Valet	0	$16.00
Short Term	307	$13.00
Long Term	1,330	$11.00
Cell Phone Parking	30	$0.00
Source: Tallahassee International Airport, 2018		

Public parking generated $2,860,818 in FY 2018.

6.4.5 Rental Car Concession Agreement

There are eight on-airport rental car brands available at the airport operating under five Vehicle Rental Concession Agreements ("Concession Agreement") and include Avis Budget Car Rental, LLC (d/b/a Avis Rent A Car System, LLC and Budget Rent A Car, System, Inc.), Enterprise Leasing Company – South Central, LLC (d/b/a Enterprise-Rent-A- Car), The Hertz Corporation, DTG Operations, Inc. (d/b/a Dollar Rent A Car and Thrifty Car Rental) and Enterprise Leasing Company - South Central, LLC (d/b/a Alamo Rent a Car and National Car Rental) ("RAC Concessionaires"). These agreements were entered into February 1, 2017 and will expire on January 31, 2022.

The RAC Concessionaires pay monthly the greater of 1/12th of its minimum annual guarantee or 10% of Gross Receipts, whichever is greater. In addition to this, the RAC Concessionaires pay the following annual rates, fees and charges:

<u>RAC Rates, Fees and Charges</u>

Terminal Rental Car Counter/Office Space
Ready/Return Parking Spaces
Premium Ready/Return Parking Spaces
Long-Term Parking Spaces
RAC Service Facility Space
RAC Service Facility Parking Spaces (Improved)
RAC Service Facility Parking Spaces (Unimproved)

Historical Rental Car revenue is set out in **Table 6-3**.

Table 6-3
Historical Rental Car Revenue

FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	CAGR
$1,836,026	$1,890,698	$1,948,054	$1,972,191	$1,975,812	1,946,568	1.18%
Compiled by Newton & Associates, Inc.						

The RAC operators paid the City approximately $2,032,285 FY 2018.

6.4.6 Additional City Leases or Agreements

The City also has agreements and/or leases with numerous other tenants at the airport as shown on **Table 6-4**. This list is not intended to be exhaustive but rather, illustrative of the type of business that may operate at the airport.

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Table 6-4
Additional Agreements & Leases

Tenant	Type	Expiration[1]
Tallahassee Aviation Partners d/b/a Million Air	Fixed Base Operation/Fuel	September 31, 2039
Flightline Group	Land Lease T-Hangar Complex	January 8, 2031
Dade GSE, Inc. (Effective July 1, 2017)	GSE Maintenance Lease	June 30, 2019
Lyft, Inc.	Ground Transportation	September 11, 2018
Rasier, LLC (Uber)	Ground Transportation	September 7, 2018
Tailwinds TLH, LLC	Retail/Food & Beverage Concession	February 26, 2025
In-Ter-Space Services, Inc. d/b/a Clear Channel	Advertising	July 31, 2024
DOT/FAA	Hangar Lease	September 30, 2021
Flightline Group/Enterprise Leasing Company-South Central LLC	Space Rental (Old Terminal)	August 31, 2020
Enterprise Leasing Company-South Central LLC	Parking Lot	August 31, 2025
Federal Aviation Administration	ATCT & TRACON	September 30, 2034
Florida Agricultural & Mechanical University ("FAMU")	Airport Welcome/Business Center	September 30, 2023
Florida Department of Agriculture and Consumer Services	State of Florida Motor Pool Maintenance Facility	December 31, 2024
Flightline Development Corporation, Inc.	Land/Building Lease: Specialized Air Service Operation and Bulk Aircraft Storage	September 30, 2047
Flightline Development Corporation, Inc.	Storage Facility	Month-to-Month
Flightline Development Corporation, Inc.	Building Lease	December 31, 2018
Flightline Development Corporation, Inc.	Terminal/Hangar/Maintenance Facility	March 31, 2048
Florida Wing, Civil Air Patrol	Hangar Lease	December 31, 2020
General Services Administration (TSA)	Office Lease	September 31, 2024
Moneytree ATM Services, LC	ATM Machines	September 30, 2019
Roadie, Inc.	Baggage Delivery Service	May 8, 2020
TAC Tallahassee, LLC	"New" Cargo Facility	March 31, 2028
United States of America	Weather Service Radar (NEXRAD)	September 30, 2025

[1] Includes Renewal Options, If Any

Source: Tallahassee International Airport
Compiled by: Newton & Associates, Inc.

In FY 2018 Non-Passenger Aeronautical Revenue was $832,738 and Non-Airline Operating Revenue was $6,116,508 (see **Table 6-14** below).

6.4.7 Recommended Alternatives Projects Summary

For the purpose of this Financial Plan, airport improvements discussed in Section 6.3, Capital Improvement Program, are included in one of three general project phasing periods based on an estimate of each project's estimated implementation need. Following are the project phasing periods used for this purpose:

- Short-Term Development Period – Projects anticipated to be implemented from 2018 through 2019. The Financial Plan will focus on the projects occurring in this period.
- Mid-Term Development Period – Projects anticipated to be implemented from 2020 through 2024.
- Long-Term Development Period – Projects anticipated to be implemented from 2025 through 2035.

The projects associated with the Implementation Plan are summarized on **Table 6-1** above by their phasing period.

It is important to point out that one of the elements of this Master Plan is to determine if, or to what extent, the City and airport can fund the 5-Year Development Period. The official Short-Term Development Period (2015 to 2019) has collapsed to the years 2018 and 2019. Therefore, to meet the objective of measuring financial viability for five years, the *Financial Analysis* will be for the period 2018 to 2023 and includes the projects set out in **Table 6-5** below.

Table 6-5
Recommended Capital Improvements 2018-2023

Project Year	Project Description	Estimated Project Cost
2018	Rehabilitate South Apron	$7,942,269
2018	Terminal Modernization (2018)	$1,699,998
2018	Airfield Preservation	$200,000
2019	Rehabilitate / Reconstruct Runway 18-36	$10,270,000
2019	International Passenger Processing Facility	$32,710,000
2019	Fence and Gate Rehabilitation, Updates and Improvements	$200,000
2019	Air Traffic Control Tower Improvements	$1,250,000
2019	ARFF Station Improvements	$900,000
2019	Terminal Modernization (2019)	$1,000,000
2020	Terminal PLB Acquisition / Installation - Phase 1	$5,450,000
2020	Access and Roadway Realignment / QTA Service Facility and Parking Garage	$32,780,000
2020	Terminal Modernization (2020)	$2,540,000
2021	Taxiway A Rehabilitation	$13,930,000
2022	Emergency Power Improvements	$840,000
2022	Rehabilitate Facilities Building	$510,000
2022	Renovate / Upgrade Operations Center	$450,000
2022	Air Cargo Development - Phase 1	$12,130,000
2023	Terminal PLB Acquisition / Installation - Phase 2	$1,146,754
2023	Large Corporate Hangar - Phase 1	$3,560,000
2023	Multimodal Transportation Center	$3,480,000
	TOTAL	$132,989,021

Source: Michael Baker International

6.4.8 Sources of Funding

Large-scale development projects at an airport are typically beyond the normal annual budget capacity and cannot be supported solely with self-generated funds. In these situations, it is not uncommon for an airport to seek funding from outside sources. These sources can either provide

funding for projects outright or be combined with one another to reach the necessary funding level.

In some cases, funding sources are capped on an annual or lifetime basis, such as with FAA entitlement. On an annual cap basis, it is not uncommon for airports to phase projects on an annual basis and apply for grants to collect the funding necessary. Most sources do not guarantee funding and applicable projects must compete against one another.

Funding sources for this Financial Plan were analyzed and summarized from various governing bodies, including: the Federal Government, State Government, the City of Tallahassee, and through activity at TLH. These potential funding sources include:

- Federal Government:
  - FAA Airport Improvement Program
  - Economic Development Administration Programs
- State Government:
  - Florida Department of Transportation Aviation and Spaceports Office
  - Florida Department of Transportation Strategic Intermodal System (SIS)
  - Florida Department of Economic Opportunity
- Local Government
  - City of Tallahassee
  - General Airport Revenue Bonds
- Tallahassee International Airport
  - Passenger Facility Charge
  - Customer Facility Charge
  - TLH Capital Reserves
  - Public Private Partnerships / Third Party Development
  - Other Funding

As an airport, TLH is in a unique position to take advantage of funding sources from governmental agencies and even negotiate with tenants to fund projects that will directly benefit their operations. The identified possible funding sources listed are not all encompassing, as grants programs tend to open and close due to government funding availability. It is recommended that, when the airport is prepared to begin the initial planning for any project listed, it should be coordinated internally for any intended grants to discuss the project's justification and benefits.

Federal Aviation Administration - Aviation Trust Fund

To promote the development of a system of airports to meet the nation's needs, the federal government embarked on a grants-in-aid program to units of state and local governments shortly after the end of World War II. The early program, the Federal-Aid Airport Program (FAAP) was authorized by the Federal Airport Act of 1946 and drew its funding from the general fund of the U.S. Treasury.

In 1970, a more comprehensive program was established with the passage of the Airport and Airway Development Act of 1970. This Act provided grants for airport planning under the Planning Grant Program (PGP) and for airport development under the Airport Development Aid Program (ADAP). These programs were funded from a newly established Airport and Airway Trust Fund, into which were deposited revenue from several aviation-user taxes on such items as airline fares, air freight, and aviation fuel. The authority to issue grants under these two programs expired on September 30, 1981. During this 11-year period, 8,809 grants totaling $4.5 billion were approved.

The current program, known as the Airport Improvement Program (AIP), was established by the Airport and Airway Improvement Act of 1982-Public Law 97-248 (the "1982 Act"). Since then, the AIP has been amended several times, most recently with the passage of the FAA Modernization and Reform Act of 2012. Funds obligated for the AIP are drawn from the Airport and Airway Trust Fund, which is supported by user fees, fuel taxes, and other similar revenue sources, such as:

- 7.5% ticket tax
- $4.10 flight segment tax
- 6.25% tax on domestic cargo/mail
- $0.043 per gallon commercial aviation fuel tax
- $0.193 per gallon on general aviation gasoline
- $0.218 per gallon on general aviation jet fuel
- $18 international departure tax per passenger
- $18 for international arrival tax per passenger
- 7.5% frequent flyer award tax
- 7.5% ticket tax at rural airports

Congress amends the 1982 Act from time to time as required to authorize funding levels on an annual or multi-year basis. Because the demand for AIP funds exceeds the availability, FAA bases distribution of these funds on present national priorities and objectives. AIP funds are typically first apportioned into major entitlement categories such as primary, cargo, and general aviation. Remaining funds are distributed to a discretionary fund. Set-aside projects (airport noise and the Military Airport Program) receive first attention from this discretionary distribution. The remaining funds are true discretionary funds that are distributed according to a national prioritization formula.

AIP eligible projects include (i) airport planning; (ii) airport development; (iii) noise compatibility programs; (iv) land acquisition and (v) terminal development at all airports except large hubs.

The FAA uses two primary methods to distribute AIP grants to airports: entitlement grants and discretionary grants. Entitlement grants are apportioned to airports according to a formula largely tied to the amount of passenger traffic at the airport. Discretionary grants are awarded by the FAA in the FAA's discretion and are usually awarded for projects that increase airport capacity or safety

as further described below. **Table 6-6** depicts the AIP funds appropriated for FY 2015-2018 and the estimated request for FY 2019.

Table 6-6
Grants in Aid for Airports

FY 2015	FY 2016	FY 2017	FY 2018	Request FY 2019
$3.22 billion	$3.35 billion	$3.35 billion	$4.35 billion	$3.85 billion
Source: Federal Aviation Administration				

Airport Improvement Program - Entitlement Grants

The FAA uses AIP Entitlement Grants to distribute AIP grants to commercial service airports based on levels of aviation activity. One of the most common types of funding available for commercial service airports is Passenger Entitlement Grants, which are an allocation of certain AIP funds based upon an airport's total enplanements compared to total U.S. enplanements. Passenger Entitlement Grants may be carried over from one year to the next and used to pay debt service on bonds issued to finance eligible projects. The formula for calculating entitlement grants is depicted in **Table 6-7**.

Table 6-7
Passenger Entitlement Grant Levels

Passenger Level	Appropriations Less Than $3,200,000,000	Appropriations More Than $3,200,000,000
First 50,000	$7.80	$15.60
Second 50,000	$5.20	$10.40
Next 400,000	$2.60	$5.20
Next 500,000	$0.65	$1.30
Each Additional	$0.50	$1.00
Source: Federal Aviation Administration		

Future AIP Entitlements may also be included in an FAA Letter of Intent ("LOI"), which is a multi-year funding commitment from the FAA. Because the funding authority is established by Congress under its budgeting process, an LOI does not guarantee that the FAA will have the funding authority from Congress in the future years of the LOI.

Airport Improvement Program - Discretionary Grants

Discretionary Grants are awarded to airports on a discretionary basis to fund eligible projects as determined by the FAA based on a priority system. The priority system is designed to allocate the available funding using a point-value system which gives the highest priority to safety, security, reconstruction, standards and capacity in that order. As with future Passenger Entitlement Grants, future Discretionary Grants may also be included in an FAA LOI.

Status of the Airport Improvement Program

On October 12, 2018, the FAA Reauthorization Act of 2018 was passed and extends authority to the FAA's funding and authorities through September 30, 2023. A timeline of FAA authorization policies events is included in **Figure 6-2** below.

Cargo Service Entitlement Grants

While originally designed to provide a source of reliable funding for commercial service airports that provide passenger service, changes to the AIP have also resulted in entitlement set asides for cargo service airports. Certain airports are designated by the FAA as cargo service airports. According to FAA Order 5100.38D, Airport Improvement Program Handbook, a cargo service airport is any airport that, in addition to any other air transportation services that may be available, are served by aircraft providing air transportation of only cargo with a total annual landed weight of more than 100 million pounds. Landed weight includes the weight of aircraft transporting only cargo intrastate, interstate, and in foreign air transportation. An airport may be both a commercial passenger service and cargo service airport.

Based on FAA calendar year 2016 data, 117 airports transported more than 100 million pounds of air cargo and were classified as cargo service airports; however, the airport is not currently designated as a cargo service airport and does not currently receive cargo service entitlement grants. It is assumed that the airport will not receive cargo service entitlements during the five-year planning period.

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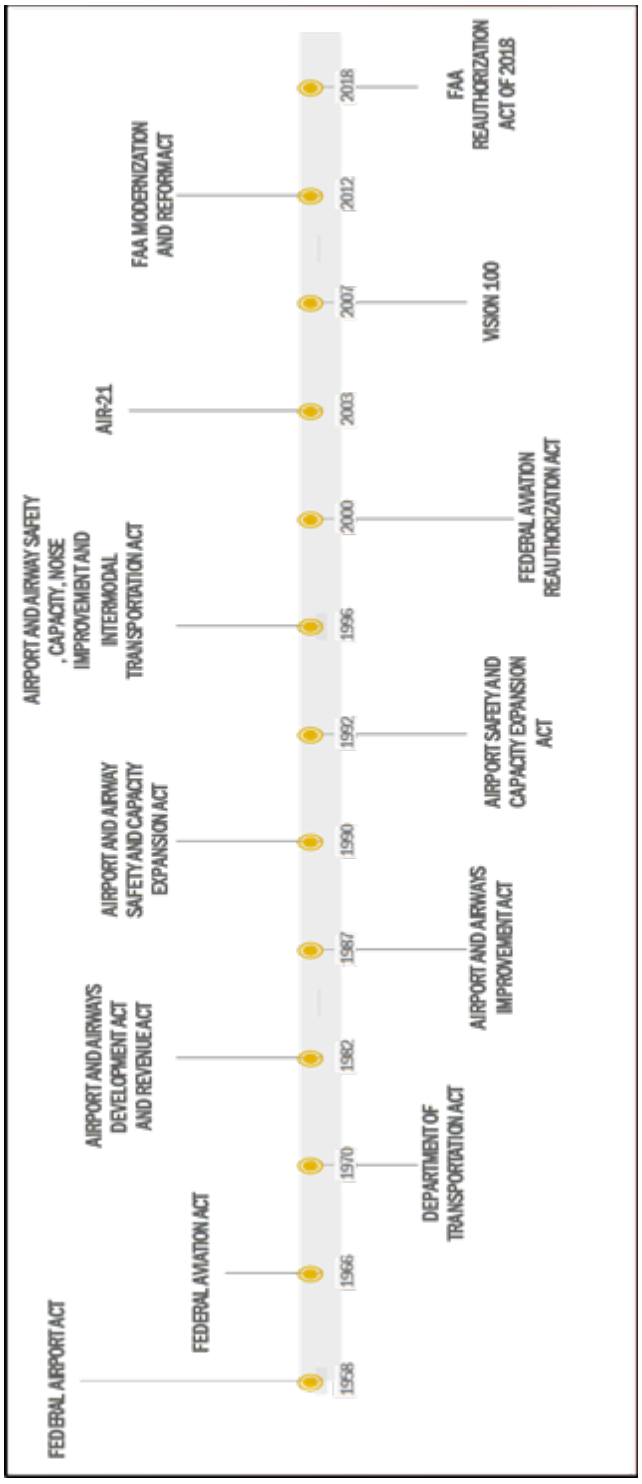
Figure 6-2
Federal Aviation Administration Authority



AIP Eligibility and Funding Assumptions

All AIP grants are subject to approval by the Secretary of Transportation and periodic appropriation by Congress. As a non-hub airport, certain project work elements may be eligible for AIP funding at the 90% level. The Airport Improvement Program Handbook sets forth project eligibility guidelines for AIP funding. **Table 6-8** presents the anticipated AIP eligibility of each of the proposed capital projects during the five-year period 2018 through 2023. As depicted, the total AIP eligibility of the recommended projects is estimated to be approximately $76,567,022, or 58% of the period's total cost.

Due to the demand for AIP grant funds and the uncertainty regarding the future of the AIP, the airport may not be able to secure AIP funding at the maximum level for each recommended project.

Table 6-8
Recommended Alternative Eligibility and Costs

Project Year	Project Description	Estimated Project Cost	Percent Eligible	Eligible Cost
2018	Rehabilitate South Apron	$7,942,269	100%	$7,942,269
2018	Terminal Modernization (2018)	$1,699,998	47%	$799,999
2018	Airfield Preservation	$200,000	100%	$200,000
2019	Rehabilitate / Reconstruct Runway 18-36	$10,270,000	100%	$10,270,000
2019	International Passenger Processing Facility	$32,710,000	70%	$22,897,000
2019	Fence and Gate Rehabilitation, Updates and Improvements	$200,000	100%	$200,000
2019	Air Traffic Control Tower Improvements	$1,250,000	100%	$1,250,000
2019	ARFF Station Improvements	$900,000	100%	$900,000
2019	Terminal Modernization (2019)	$1,000,000	50%	$500,000
2020	Terminal PLB Acquisition / Installation - Phase 1	$5,450,000	100%	$5,450,000
2020	Access and Roadway Realignment / QTA Service Facility and Parking Garage	$32,780,000	0%	$0
2020	Terminal Modernization (2020)	$2,540,000	50%	$1,270,000
2021	Taxiway A Rehabilitation	$13,930,000	100%	$13,930,000
2022	Emergency Power Improvements	$840,000	100%	$840,000
2022	Rehabilitate Facilities Building	$510,000	50%	$255,000
2022	Renovate / Upgrade Operations Center	$450,000	50%	$225,000
2022	Air Cargo Development - Phase 1	$12,130,000	70%	$8,491,000
2023	Terminal PLB Acquisition / Installation - Phase 2	$1,146,754	100%	$1,146,754
2023	Large Corporate Hangar - Phase 1	$3,560,000	0%	$0
2023	Multimodal Transportation Center	$3,480,000	0%	$0
		$132,989,021	58%	$76,567,022

Source: Michael Baker International, 2018

As depicted in **Table 6-12** below, it is estimated that approximately $10.8 million in AIP entitlements and $26 million in AIP discretionary grant funding will be used to fund the capital projects over the next five years. This funding level will provide approximately 28% of the funding for the capital projects included in the modified short-term development period. As previously discussed, if discretionary grants are not available for funding the capital projects, such projects will be postponed until such time that discretionary grants or other funding becomes available.

Facilities and Equipment Program

The FAA is funded by four primary appropriation accounts: AIP; Facilities and Equipment (F&E); Operations and Research; and Engineering and Development. The F&E Program is the principal means for modernizing and improving the air traffic control and airway facilities.

Certain projects may be eligible for funding under the F&E Program or the Air Traffic Organization Account (ATO). The City is not seeking funds from the F&E program.

State Funding: Florida Department of Transportation

The Florida Department of Transportation's (FDOT) Aviation and Spaceports Office provides financial (and other) assistance to eligible airport sponsors for the planning, design and construction of airports and aviation facilities. The Aviation Grant Program is funded by the State Department of Transportation Trust Fund, which is funded, in part, through aviation fuel taxes. FDOT may provide up to 50% of total eligible project cost when funding is not provided by the FAA. If an eligible project does have FAA funding, the FDOT may fund up to 50% of the airport's non-federal share (local share).

Table 6-9
Florida Aviation Grant Program

Type of Development	Federal Funding Available	Federal Funding Not Available
Commercial Service Airports	Department provides up to 50% of non-federal share	Department provides up to 50% of total project costs
General Aviation Airports	Department provides up to 80% of non-federal share	Department provides up to 80% of total project costs
Economic Development	Not Applicable	Department provides up to 50% of total project costs
Source: Florida Aviation Project Handbook		

As depicted in Table 6-12, it is estimated that approximately $23.6 million in state funding will be used to fund the capital projects from 2018 through 2023. This funding level will provide approximately 18% of the funding for the capital projects. As previously discussed, if these grants are not available for funding the capital projects, such projects will be postponed until such time that grants or other funding becomes available.

Transportation Security Administration

The Transportation Security Administration (TSA) was created as part of the Aviation and Transportation Security Act passed by the US Congress and signed into law by President George W. Bush on November 19, 2001. The TSA is responsible for security in all modes of transportation in the United States. The TSA provides for the security screening of passengers and baggage at the airport.

The TSA collects certain security fees to pay for the cost of providing for the capital, operating, and maintenance expenses associated with providing aviation security for the national aviation transportation system. These fees include the September 11 Security Fee and the Aviation

Security Infrastructure Fee. Certain components of the phased Terminal projects in this Master Plan may be eligible for funding from the TSA although none is contemplated or used in the funding plan.

Third Party/Tenant Financing

Funding by third parties or tenants is a viable source for certain of the proposed projects included in the long-term development period and ultimate/strategic initiative projects. This source of funding is facility related and directly reduces the amount that must be funded by the City. Third party/tenant funding is a particularly important arrangement to pay the cost of proprietary facilities that may be ineligible for FAA participation such as hangars, air cargo facilities and non-aeronautical development.

Third party/tenant funding may take many forms depending upon the particular facility to be constructed. The third party or tenant may either pay for facilities directly or pledge to pay debt service on municipal or special facility bonds issued by the sponsor to construct the proposed facilities. One option in this regard would be to request proposals for development of such facilities to determine the level of interest in the industry to pursue development opportunities. A proposal could be structured to allow non-tenant investors the opportunity to build and lease facilities which would otherwise be funded by the tenant or the owner. This would require a minimal initial capital investment from City.

It should be noted that third party or tenant facilities would likely be financed by the users. Alternatively, financing would be through the use of industrial development bonds or special facility bonds (subsequently described in a later section of this chapter). Such types of financing would likely require a long-term lease (up to 30 years) to allow for the third party or tenant's recovery of its investment in the facility. The airport would collect land rental payments and benefit from the residual value of the facility reverting to the airport upon expiration of the lease.

The funding plan assumes that third party/tenant funding will be required for three capital projects (Air Cargo Development – Phase 1, Large Corporate Hangar - Phase 1 and Multimodal Transportation Center) recommended in 2022 and 2023. These projects are expected to cost approximately $14.4 million (11% of total five-year project cost).

TLH may manage the quality and services provided in improvements funded by third party/tenants through the Minimum Standards, which establish the minimum facility and service requirements for private businesses wishing to provide commercial aeronautical services at the airport, as well as insure that those who provide commodities and services are not exposed to unfair or irresponsible competition.

Non-Traditional Funding Sources

Other potential non-traditional Federal, state and regional funding sources the TLH might consider include agencies dealing with surface transportation, soil conservation, forestry, multi-modal economic development, renewable energy or waste management. Because of the uncertain

nature of these sources of funding, the Financial Plan assumes that the TLH will not receive any such funds, although the TLH could thoroughly examine these potential sources to fund the recommended projects should the opportunity arise.

FAA Approved Passenger Facility Charges

Passenger Facility Charges (PFCs) are available to fund certain eligible and justified capital development projects at commercial passenger service airports. The Aviation Safety and Capacity Expansion Act of 1990 (ASECEA) authorized the Secretary of the Department of Transportation to grant public agencies that control commercial service airports enplaning more than 2,500 annual passengers the authority to impose a PFC for each revenue passenger boarding an aircraft (enplanement) at a given airport. The purpose of the PFC program is to preserve or enhance safety, security, capacity, competition, and mitigate the impact of aircraft noise. The ASECEA provides that PFC revenues may only be used for projects approved by the FAA including: payment of all or part of allowable project costs; for an airport's AIP matching funds; to augment AIP funded projects; and for payment of debt service or financing costs associated with eligible airport development bonds.

Under existing authorization by Congress, airport sponsors may impose a PFC at a level of up to $4.50 per revenue enplaned passenger[12]. These charges are collected by the air carriers when tickets are sold and are later remitted to the airport, less a handling fee of $0.11 per PFC collected. In FY 2018, the TLH collected $1,526,095 in PFC's.

City has received FAA approval on seven PFC applications to impose and use a PFC at the airport. Table 6-10 provides a summary of the City's existing PFC collection and use authority.

Table 6-10
PFC Summary

PFC Application Number	Approved for Collection	Approved for Use
92-01-C-05-TLH	$7,466,447	$0
93-02-U-02-TLH	$0	$7,466,447
98-03-C-04-TLH	$3,753,489	$3,753,489
02-04-C-03-TLH	$11,520,251	$11,022,239
05-05-U-01-TLH	$0	$498,012
06-06-C-00-TLH	$25,280,000	$25,280,000
16-07-C-01-TLH	$8,286,531	$8,286,531
TOTAL	$56,306,718	$56,306,718

Source: City of Tallahassee

The City is authorized to collect a PFC through July 1, 2028. Based on FY 2016 enplaned passengers and utilizing the historical growth rate (1.62%) of enplanements at TLH, it is estimated

[12] According to the Bureau of Transportation Statistics, examples of revenue enplanements include passengers traveling on publicly available tickets, passengers traveling on frequent flyer awards and passengers traveling on vouchers as compensation for denied boarding. Examples of non-revenue enplanements include passengers that are airline employees, travel agents traveling on familiarization trips and air marshals acting in their official capacities.

that the City may realize its total PFC authority by the end of FY 2026.

Customer Facility Charges

Rental car CFCs are another type of airport revenue similar to the PFC. The primary distinction between a CFC and a PFC is that a PFC must be approved by the FAA. A CFC is a charge paid by rental car customers per the number of transaction days that a vehicle has been rented. The CFC can be negotiated and implemented contractually between the airport and the rental car companies. Generally, CFC revenue is limited to funding rental car facilities and operating costs at the airport; rental car related capital expense (debt service); and rental car related operating and maintenance expenses.

The City adopted a resolution to collect a CFC in the amount of $4.50 per transaction day July 8, 2015 and the fee became effective September 1, 2015. Based on an estimate of approximately 11,248 rental days in FY 2017 and a $4.50 CFC level, the CFC shown in **Table 6-11** would generate approximately $1,540,000 in revenue each year. The City raised the CFC to $5.50 effective August 1, 2018.

Table 6-11
CFC Summary

	September 1, 2015 to March 31, 2018	Average Per Day	Estimate Per Year
Total Transaction Days	882,997	937	342,138
Estimated Collections	$3,973,487	$4,218.14	$1,539,621
Source: Estimated by Newton & Associates, Inc.			

In FY 2018 CFC revenue was $1,623,003.

Local Funding Requirement – Five-Year Development Period Capital Projects

As depicted on **Table 6-12** the City will be required to provide approximately $96.3 million in non-AIP funding to complete the five-year development period. For the purposes of this study, this could be accomplished through a combination of airport cash reserves, FDOT grants, CFC's, PFC's, third party funding and Airport Revenue Bonds (Financing Requirement).

Local Funding Requirement – 2024-2035

As depicted on **Table 6-13**, after the application of available federal AIP grants and state grants, the City's local requirement is $108.9 million. The majority of this (70%) will be paid by third party/tenant users, the issuance of bonds and cash reserves.

As with the remaining local requirement of the five-year period (2018 through 2023) the City will need to provide funding for any portion of a project that is not paid with the application of federal grants, state grants and third party/tenant financing to complete the proposed capital projects. The remaining local funding plan for these projects is presented on **Tables 6-13.** It is important to note that when the projects are ready to begin, the City's actual funding plan could vary significantly.

Table 6-12
Five-Year Development Period
2018 Through 2023
Project Funding Plan

Project #	Project	Project Cost	AIP Eligibility		AIP Entitlement	AIP Discretionary	Local Share	Local Share Funding								
			%	$				FDOT	Airport Reserves	CFC Cash	Third Party	PFC PayGo	Financing Requirement	Airport Revenue Bonds		
														PFC	Non-PFC	Total
2018 PROJECTS																
1	Rehabilitation South Apron	$7,942,269	100%	$7,942,269	$4,400,000	$2,008,578	$1,533,691	$0	$1,246,028	$0	$0	$287,663	$0	$0	$0	$0
2	Terminal Modernization (2018)	1,699,998	47%	799,999	0	0	1,699,998	799,999	100,000	0	0	799,999	0	0	0	0
3	Airfield Preservation	200,000	100%	200,000	0	0	200,000	100,000	100,000	0	0	0	0	0	0	0
	Total 2018 Projects	**$9,842,267**		**$8,942,268**	**$4,400,000**	**$2,008,578**	**$3,433,689**	**$899,999**	**$1,446,028**	**$0**	**$0**	**$1,087,662**	**$0**	**$0**	**$0**	**$0**
2019 PROJECTS																
4	Rehabilitate / Reconstruct Runway 18-36	$10,270,000	100%	$10,270,000	$0	$0	$10,270,000	$5,135,000	$0	$0	$0	$0	$5,135,000	$0	$5,135,000	$5,135,000
5	International Passenger Processing Facility	32,710,000	70%	22,897,000	5,707,416	11,373,884	15,628,700	5,500,000	1,897,922	0	0	0	8,230,778	0	8,230,778	8,230,778
6	Fence and Gate Rehabilitation, Updates and Improvements	200,000	100%	200,000	0	0	200,000	0	200,000	0	0	0	0	0	0	0
7	Air Traffic Control Tower Improvements	1,250,000	100%	1,250,000	0	0	1,250,000	625,000	625,000	0	0	0	0	0	0	0
8	ARFF Station Improvements	900,000	100%	900,000	0	0	900,000	450,000	450,000	0	0	0	0	0	0	0
9	Terminal Modernization (2019)	1,000,000	50%	500,000	0	0	1,000,000	500,000	500,000	0	0	0	0	0	0	0
	Total 2019 Projects	**$46,330,000**		**$36,017,000**	**$5,707,416**	**$11,373,884**	**29,248,700**	**12,325,000**	**$3,672,922**	**$0**	**$0**	**$0**	**$13,250,778**	**$0**	**$13,250,778**	**$13,250,778**
2020 PROJECTS																
10	Terminal PLB Acquisition / Installation - Phase 1	$5,450,000	100%	$5,450,000	$0	$0	$5,450,000	$2,050,000	$0	$0	$0	$3,400,000	$0	$0	$0	$0
11	Access and Roadway Realignment / QTA Service Facility and Parking Garage	32,780,000	0%	0	0		32,780,000	1,250,000	1,250,000	5,000,000	0	0	25,280,000	0	25,280,000	25,280,000
12	Terminal Modernization (2020)	2,540,000	50%	1,270,000	0		2,540,000	1,270,000	0	0	0	1,270,000	0	0	0	0
	Total 2020 Projects	**$40,770,000**		**$6,720,000**	**$0**	**$0**	**$40,770,000**	**$4,570,000**	**$1,250,000**	**$5,000,000**	**$0**	**$4,670,000**	**$25,280,000**	**$0**	**$25,280,000**	**$25,280,000**
2021 PROJECTS																
13	Taxiway A Rehabilitation	$13,930,000	100%	$13,930,000	$0	$12,537,000	$1,393,000	$0	$0	$0	$0	$1,393,000	$0	$0	$0	$0
	Total 2021 Projects	**$13,930,000**		**$13,930,000**	**$0**	**$12,537,000**	**$1,393,000**	**$0**	**$0**	**$0**	**$0**	**$1,393,000**	**$0**	**$0**	**$0**	**$0**
2022 PROJECTS																
14	Emergency Power Improvements	$840,000	100%	$840,000	$675,000	$0	$165,000	$82,500	$82,500	$0	$0	$0	$0	$0	$0	$0
15	Rehabilitate Facilities Building	510,000	50%	255,000	0	0	510,000	255,000	255,000	0	0	0	0	0	0	0
16	Renovate / Upgrade Operations Center	450,000	50%	225,000	0	0	450,000	225,000	225,000	0	0	0	0	0	0	0
17	Air Cargo Development - Phase 1	12,130,000	70%	8,491,000			12,130,000	3,000,000	0	0	9,130,000	0	0	0	0	0
	Total 2022 Projects	**$13,930,000**		**$9,811,000**	**$675,000**	**$0**	**$13,255,000**	**$3,562,500**	**$562,500**	**$0**	**$9,130,000**	**$0**	**$0**	**$0**	**$0**	**$0**
2023 PROJECTS																
18	Terminal PLB Acquisition / Installation - Phase 2	$1,146,754	100%	$1,146,754	$0	$0	$1,146,754	$546,754	$0	$0	$0	$600,000	$0	$0	$0	$0
19	Large Corporate Hangar - Phase 1	3,560,000	0%	0	0	0	3,560,000	0	0	0	3,560,000	0	0	0	0	0
20	Multimodal Transportation Center	3,480,000	0%	0	0	0	3,480,000	1,740,000	0	0	1,740,000	0	0	0	0	0
	Total 2023 Projects	**$8,186,754**		**$1,146,754**	**$0**	**$0**	**$8,186,754**	**$2,286,754**	**$0**	**$0**	**$5,300,000**	**$600,000**	**$0**	**$0**	**$0**	**$0**
	TOTAL 2018 THROUGH 2023 PROJECTS	**$132,989,021**		**$76,567,022**	**$10,782,416**	**$25,919,462**	**$96,287,143**	**$23,529,253**	**$6,931,450**	**$5,000,000**	**$14,430,000**	**$7,750,662**	**$38,645,778**	**$0**	**$38,645,778**	**$38,645,778**

Source: Newton & Associates, Inc.

Table 6-13
Project Funding Plan
2024 through 2035

Project #	Project	Project Year	Estimated Cost	AIP Eligibility	Eligible Project Cost	AIP Grants	State Grants	Local Share	Cash Reserves	PFC's	CFC's	Third Party	Loans/Bonds	Total Funding
21	Terminal Modernization (2024)	2024	$1,790,000	50%	$895,000	$0	$895,000	$895,000	$0	$895,000	$0	$0	$0	$1,790,000
22	Terminal Apron Improvements	2024	610,000	100%	610,000	0	305,000	305,000	0	305,000	0		0	610,000
23	Rehabilitate and Widen Taxiway B	2024	11,280,000	100%	11,280,000	9,380,000	950,000	950,000	0	950,000	0		0	11,280,000
24	Corporate Hangars - Phase 1	2024	4,290,000	0%	0	0	0	4,290,000	0	0	0	4,290,000	0	4,290,000
25	Reconstruct / Expand State of Florida Hangar	2024	10,960,000	0%	0	0	0	10,960,000	0	0	0	10,960,000	0	10,960,000
26	Rehabilitate and Widen North T-Hangar Taxilanes	2024	1,480,000	100%	1,480,000	1,332,000	0	148,000	148,000	0	0	0	0	1,480,000
27	T-Hangars - Phase 1	2024	1,990,000	0%	0	0	995,000	995,000	0	0	0	0	995,000	1,990,000
28	Rehabilitate Taxiways C and Z and Related Work	2025	7,530,000	100%	7,530,000	$6,777,000	$376,500	$376,500	0	376,500	0	0	0	7,530,000
29	Air Cargo Development - Phase 2	2026	12,930,000	0%	0	0	0	12,930,000	0	0	0	12,930,000	0	12,930,000
30	Large Corporate Hangar - Phase 2	2026	3,890,000	0%	0	0	0	3,890,000	0	0	0	3,890,000	0	3,890,000
31	Runway 18 ALSF-2	2027	3,560,000	100%	3,560,000	3,204,000	178,000	178,000	178,000	0	0	0	0	3,560,000
32	Southeastern Hangar Development	2028	14,580,000	50%	7,290,000	0	0	14,580,000	0	0	0	14,580,000	0	14,580,000
33	Terminal Apron Expansion	2029	7,670,000	100%	7,670,000	6,903,000	383,500	383,500	0	383,500	0	0	0	7,670,000
34	Corporate Hangars - Phase 2	2031	4,450,000	0%	0	0	2,225,000	2,225,000	0	0	0	2,225,000	0	4,450,000
35	Runway 9 MALSR	2032	2,100,000	100%	2,100,000	1,890,000	0	210,000	210,000	0	0	0	0	2,100,000
36	T-Hangars - Phase 2	2032	2,530,000	0%	0	0	1,265,000	1,265,000	0	0	0	1,265,000	0	2,530,000
37	Rehabilitate Central Apron	2033	2,240,000	50%	1,120,000	1,008,000	0	1,232,000	0	0	0	1,232,000	0	2,240,000
38	Central Apron Corporate Hangars	2033	4,320,000	0%	0	0	0	4,320,000	0	0	0	4,320,000	0	4,320,000
39	Air Cargo Development - Phase 3	2034	16,510,000	0%	0	0	0	16,510,000	0	0	0	16,510,000	0	16,510,000
40	Large Corporate Hangar - Phase 3	2034	4,540,000	0%	0	0	0	4,540,000	0	0	0	4,540,000	0	4,540,000
41	Terminal Concourse Expansions	2035	29,830,000	50%	14,915,000	13,423,500	0	16,406,500	0	0	0	0	16,406,500	29,830,000
42	Terminal Baggage Claim Expansion	2035	13,930,000	100%	13,930,000	6,965,000	0	6,965,000	0	0	0	0	6,965,000	13,930,000
43	Terminal Ticket Lobby Expansion	2035	11,800,000	70%	8,260,000	7,434,000	0	4,366,000	0	0	0	0	4,366,000	11,800,000
	TOTAL		**$174,810,000**		**$80,640,000**	**$58,316,500**	**$7,573,000**	**$108,920,500**	**$536,000**	**$2,910,000**	**$0**	**$76,742,000**	**$28,732,500**	**$174,810,000**

Source: Newton & Associates, Inc.

Airport Cash Flow and Reserves

Airport cash flow refers to the collection of revenues earned or received, and payment of expenses incurred during a fiscal year. The ability of the airport to use positive cash flows and unrestricted reserves as a source of funding depends on its ability to generate airport revenues in excess of the cost of operating, maintaining and improving the airport.

Surplus annual cash flows are deposited by the City into one of several unrestricted reserve accounts. The City can accumulate any such annual surpluses and any investment interest in the reserve accounts and use a portion of the available balances to pay a part of the development costs for the capital projects.

Issuance of Public (Municipal) Debt

Proceeds from the issuance of municipal bonds are a common source of funding for airport sponsors in the United States. To obtain these funds, airports seek access to the capital markets on reasonable terms for short, intermediate and long-term financing needs. The most commonly used financing instruments to fund major airport capital development programs are tax-exempt or tax-advantaged municipal debt, including General Obligation Bonds, General Airport Revenue Bonds, Industrial Development Bonds, and Special Facility Bonds. Please note that not all of these types of instruments may be suitable given City's existing financial position but may be viable funding alternatives in the future.

6.4.9 Financial Feasibility

Financing the City's Remaining Local Requirement

During the five-year period 2018 through 2023 three projects to be commenced in 2019 and 2020 are expected to have a financing requirement. The Funding Plan calls for financing the Remaining Local Requirement of these projects with Airport Revenue Bonds in the aggregate amount of $38.6 million, $25 million of which are backed by CFC's.

Allocation of Average Annual Debt Service to Project Elements

The Feasibility Analysis assumes issuance of the Airport Revenue Bonds in two Series depending upon the year bond proceeds are expected to be needed to fund project costs. All bonds are assumed to be issued in 30-year maturities at 5.5% interest. The resulting average annual debt-service is estimated to be $965 thousand (Forecast FY 2020) for the initial issuance, and $2.8 million (Forecast FY 2021 $965 thousand plus $1.8 million new money) after the second bond issuance. The debt service is to be allocated to the cost centers to which the individual projects are assigned in the first year after the year of issuance. See **Table 6-17** below.

Historical Financial Information

The Study Period for the feasibility analysis is FY 2012 through FY 2018. Historical Revenue for the Study Period is set forth on **Table 6-14**. Total Passenger Airline Revenue grew at a compound average rate (CAGR) rate of 1.78% per year during the Study Period and Total Operating Revenue

grew at a CAGR of 1.25% during this period. Historical Operating Expenses during the study period grew at a CAGR of 4.34% during this period and are set forth in **Table 6-15.**

Pro Forma Cash Flow

Historical Cash Flow (Application of Revenue) of the airport during the Study Period is set forth in **Table 6-16** and the forecast of future revenue and expense and the resulting actual and forecast cash flow assuming funding and financing the required 2018 through 2023 projects are set forth in **Table 6-17**.

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Table 6-14
Historical Revenue

	Actual FY 2012	Actual FY 2013	Actual FY 2014	Actual FY 2015	Actual FY 2016	Actual FY 2017	Actual FY 2018	CAGR[1] 2012-2017
OPERATING REVENUE								
Passenger Airline Aeronautical Revenue								
Passenger airline landing fees	$905,871	$750,183	$554,526	$537,604	$537,119	$1,190,475	$1,207,209	4.90%
Terminal arrival fees, rents, and utilities	1,862,201	1,338,653	1,217,350	1,386,049	1,295,325	1,869,692	2,084,423	1.90%
Terminal area apron charges/tiedowns	191,444	226,437	153,400	183,421	141,506	0	0	
Federal Inspection Fees	0	0	0	0	0	0	0	
Other passenger aeronautical fees	1,351,568	1,467,229	1,523,000	1,494,441	1,676,775	1,482,673	1,499,740	1.75%
TOTAL	**$4,311,084**	**$3,782,502**	**$3,448,276**	**$3,601,515**	**$3,650,725**	**$4,542,840**	**$4,791,372**	**1.78%**
Non-Passenger Aeronautical Revenue								
Landing fees from cargo	193,633	147,902	99,816	111,337	107,163	149,636	164,028	-2.73%
Landing fees from GA and military	0	0	0	0	0	0	0	
FBO revenue; contract or sponsor-operated	7,909	781	0	0	0	0	0	
Cargo and hangar rentals	310,049	306,698	318,780	337,659	364,149	377,752	384,627	3.66%
Aviation fuel tax retained for airport use	0	0	0	0	0	0	0	
Fuel sales net profit/loss or fuel flowage fees	164,147	172,845	175,138	161,935	165,516	170,408	170,933	0.68%
Security reimbursement from Fed. Government	351,362	255,500	255,500	255,500	182,730	113,150	113,150	-17.21%
Other non-passenger aeronautical revenue	0	0	0	0	0	0	0	
TOTAL	$1,027,100	$883,726	$849,234	$866,431	$819,558	$810,946	$832,738	-3.44%
Total Aeronautical Revenue	**$5,338,184**	**$4,666,228**	**$4,297,510**	**$4,467,946**	**$4,470,283**	**$5,353,786**	**$5,624,110**	**0.87%**
Non Airline Operating Revenue								
Land and non-terminal facility leases and revenues	793,580	810,463	791,329	512,223	528,440	612,502	613,709	-4.19%
Terminal-food and beverage	70,689	79,219	82,088	75,516	131,499	147,965	160,293	14.62%
Terminal-retail stores and duty free	20,128	19,420	20,420	22,859	25,777	47,391	68,183	22.55%
Terminal-services and other	65,346	74,785	70,119	74,286	67,768	89,808	85,088	4.50%
Rental cars-excludes customer facility charges	1,836,026	1,890,698	1,948,054	1,972,191	1,975,812	1,946,568	2,032,285	1.71%
Parking and ground transportation	2,526,065	2,641,626	2,768,835	2,662,363	2,712,185	2,691,250	3,051,997	3.20%
Hotel	0	0	0	0	0	0	0	
Other	246,794	39,589	211,453	386,562	346,685	94,085	104,953	-13.28%
TOTAL	$5,558,628	$5,555,800	$5,892,298	$5,706,000	$5,788,166	$5,629,569	$6,116,508	1.61%
TOTAL OPERATING REVENUE	**$10,896,812**	**$10,222,028**	**$10,189,808**	**$10,173,946**	**$10,258,449**	**$10,983,355**	**$11,740,618**	**1.25%**
NON-OPERATING REVENUE								
Interest	128,858	156,249	127,042	181,199	226,192	248,441	328,736	16.89%
Total Non-Operating Revenues	**$128,858**	**$156,249**	**$127,042**	**$181,199**	**$226,192**	**$248,441**	**$328,736**	**16.89%**
TOTAL REVENUE	**$11,025,670**	**$10,378,277**	**$10,316,850**	**$10,355,145**	**$10,484,641**	**$11,231,796**	**$12,069,354**	**1.52%**

[1]Compound Annual Growth Rate
Source: FAA Form 127, City of Tallahassee CAFR and Airport Financial Records
Compiled by: Newton & Associates. Inc.

Table 6-15
Historical Expenses

	Actual FY 2012	Actual FY 2013	Actual FY 2014	Actual FY 2015	Actual FY 2016	Actual FY 2017	Actual FY 2018	CAGR[1] 2012-2018
OPERATING EXPENSE								
Passenger Airline Aeronautical Revenue								
Personnel compensation and benefits	$2,834,853	$3,076,826	$3,212,177	$3,113,656	$3,564,008	$3,653,550	$3,740,241	4.73%
Communications and utilities	876,243	842,335	847,901	888,054	861,688	878,039	928,256	0.97%
Supplies and materials	244,634	193,730	246,528	277,127	338,283	172,181	219,898	-1.76%
Contractual services	3,779,736	3,700,921	4,304,859	4,255,151	4,484,695	4,972,774	5,091,578	5.09%
Insurance claims and settlements	197,362	485,109	492,294	507,217	295,517	302,818	255,973	4.43%
Other	0	0	0	0	0	0	0	
Total Operating Expenses	**$7,932,828**	**$8,298,921**	**$9,103,759**	**$9,041,205**	**$9,544,191**	**$9,979,362**	**$10,235,946**	4.34%
Percent Increase	-9.76%	4.61%	9.70%	-0.69%	5.56%	4.56%	2.57%	
NON-OPERATING CASH EXPENSE								
Debt service, net of PFCs and Offsets	$1,270,400	$1,275,000	$312,630	$0	$0	$0	$0	
TOTAL CASH EXPENSE	**$9,203,228**	**$9,573,921**	**$9,416,389**	**$9,041,205**	**$9,544,191**	**$9,979,362**	**$10,235,946**	-2.71%
Percent Increase		4.03%	-1.65%	-3.98%	5.56%	4.56%	2.57%	

[1]Compound Annual Growth Rate
Source: FAA Form 127, City of Tallahassee CAFR and Airport Financial Records
Compiled by: Newton & Associates. Inc.

Table 6-16
Historical Application of Revenue

	Actual FY 2012	Actual FY 2013	Actual FY 2014	Actual FY 2015	Actual FY 2016	Actual FY 2017	Actual FY 2018
OPERATING REVENUE							
Passenger Airline Aeronautical Revenue	$4,311,084	$3,782,502	$3,448,276	$3,601,515	$3,650,725	$4,542,840	$4,791,372
Non-Passenger Aeronautical Revenue	1,027,100	883,726	849,234	866,431	819,558	810,946	832,738
Non Airline Operating Revenue	5,558,628	5,555,800	5,892,298	5,706,000	5,788,166	5,629,569	6,116,508
Total Operating Revenues	10,896,812	10,222,028	10,189,808	10,173,946	10,258,449	10,983,355	11,740,618
NON-OPERATING REVENUE	$128,858	$156,249	$127,042	$181,199	$226,192	$248,441	$328,736
TOTAL REVENUE	**$11,025,670**	**$10,378,277**	**$10,316,850**	**$10,355,145**	**$10,484,641**	**$11,231,796**	**$12,069,354**
APPLICATION OF REVENUE							
Operating Expense	$7,932,828	$8,298,921	$9,103,759	$9,041,205	$9,544,191	$9,979,362	$10,235,946
Total Operating Expense	$7,932,828	$8,298,921	$9,103,759	$9,041,205	$9,544,191	$9,979,362	$10,235,946
Revenue Available for Debt Service	$3,092,842	$2,079,356	$1,213,091	$1,313,940	$940,450	$1,252,434	$1,833,408
Annual Scheduled Debt Service Payments	**$1,270,400**	**$1,275,000**	**$312,630**	**$0**	**$0**	**$0**	**$0**
Total Application of Revenue	$9,203,228	$9,573,921	$9,416,389	$9,041,205	$9,544,191	$9,979,362	$10,235,946
SURPLUS REVENUE	**$1,822,442**	**$804,356**	**$900,461**	**$1,313,940**	**$940,450**	**$1,252,434**	**$1,833,408**
DEBT SERVICE COVERAGE	**2.43**	**1.63**	**3.88**	**N/A**	**N/A**	**N/A**	**N/A**

Source: FAA Form 127, City of Tallahassee CAFR and Airport Financial Records
Compiled by: Newton & Associates. Inc.

Table 6-17
Forecast Cash Flow/Application of Revenue

	Actual FY 2018	Forecast FY 2019	Forecast FY 2020	Forecast FY 2021	Forecast FY 2022	Forecast FY 2023
OPERATING REVENUE						
Aeronautical Revenue	$5,624,110	$5,762,269	$5,992,466	$6,232,255	$6,482,045	$6,742,262
Non- Aeronautical Revenue	6,116,508	6,468,678	6,684,510	6,909,458	7,143,947	7,388,424
TOTAL OPERATING REVENUE	**$11,740,618**	**$12,230,946**	**$12,676,976**	**$13,141,713**	**$13,625,992**	**$14,130,686**
ADD: MPU Incremental Revenue Requirement	0	0	0	0	0	0
TOTAL REVENUE AVAILABLE TO MEET BOND COVERAGE	**$11,740,618**	**$12,230,946**	**$12,676,976**	**$13,141,713**	**$13,625,992**	**$14,130,686**
APPLICATION OF REVENUE						
Operating Expense	10,235,946	10,680,165	11,143,663	11,627,275	12,131,876	12,658,375
Revenue Available for Debt Service	1,504,672	1,550,781	1,533,313	1,514,438	1,494,117	1,472,312
Annual Scheduled Debt Service Payments	0	0	0	0	0	0
Projected MPU Project Debt Service						
2019 Bonds	0	0	965,619	965,619	965,619	965,619
2020 Bonds	0	0	0	1,826,370	1,826,370	1,826,370
2021 Bonds	0	0	0	0	0	0
2022 Bonds	0	0	0	0	0	0
Total Debt Service	0	0	965,619	2,791,990	2,791990	2,791,990
Less: CFC's Applied to Debt Service	0	0	0	1,826,370	1,826,370	1,826,370
Less: PFCs Applied to Debt Service	0	0	0	0	0	0
Net Debt Service	0	0	965,619	965,619	965,619	965,619
Total Application of Revenue	10,235,946	10,680,165	12,109,282	12,592,895	13,097,495	13,623,994
SURPLUS REVENUE	**$1,504,672**	**$1,550,781**	**$567,693**	**$548,818**	**$528,497**	**$506,692**
DEBT SERVICE COVERAGE	**N/A**	**N/A**	**1.59**	**1.57**	**1.55**	**1.52**

Note: FY 2018 Operating Revenue does not include $111,315 in interest earnings.

Source: FAA Form 127, City of Tallahassee CAFR and Airport Financial Records
Compiled by: Newton & Associates. Inc.

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6.5 Summary

Following is a summary of the Financial Plan including the assumptions used to fund certain projects over the five-year development period (2018 through 2023) and pro forma cash flows:

- Airport's financial structure, current leases with major tenants, and historical revenues and expenses were examined to project future operating revenues and operating expenses;
- The total estimated cost of the short-term Capital Projects is $132,989,021, as presented in **Table 6-12** above;
- The funding for the proposed capital projects during the five-year development period is as follows:
  - FAA AIP $36.7 million
  - State $23.5 million
  - PFC Funds $7.7 million
  - City Funds $6.9 million
  - CFC Funds $5.0 million
  - Third Party/Tenant $14.4 million
  - Airport Revenue Bonds $38.6 million
- The total estimated cost of the remaining Capital Projects is $174.8 million, as presented in **Tables 6-13** above;
- The funding for the proposed Capital Projects during the medium- and long-term development period is as follows:
  - FAA AIP $58.3 million
  - State $7.6 million
  - Third Party/Tenant $76.7 million
  - PFC Funds $2.9 million
  - TSA $0 million
  - City Funds $0.536 million
  - Airport Revenue Bonds $28.7 million
- Total airport operating revenues are projected to increase from $11.7 million in FY 2018 to approximately $14.1 million in FY 2023, representing an average annual growth rate of 3.68%;
- Operating expenses are projected to increase from $10.2 million in FY 2018 to $12.6 million in FY 2023, representing an average annual growth rate of 4.3%;
- Operating surplus, before the application of debt service, is expected to remain at approximately 1.5 million from FY 2018 to $1.4 million in FY 2023 based on the assumptions contained in this chapter;
- The staging of the recommended projects is flexible. The City should proactively monitor/revise these projects on an annual basis to ensure projects are not implemented before the appropriate demand levels; and

- The City should submit another PFC application to impose and use PFCs on PFC-eligible Capital Projects over the 20-year Development Period. This Financial Plan assumes that City will be authorized to pay for such eligible portion of the projects in the initial five-year development period with PFC revenue.
- It is recommended that City closely monitor the Federal AIP and the FDOT funding program for any changes that may enhance or adversely affect the assumed future funding of the recommended projects;

The long-term status of the Trust Fund used to fund the FAA, including the AIP reauthorization continues to be uncertain. Other uncertainties include the future reauthorization of the AIP and the future of the State Transportation Equity Fund. The Financial Plan assumes the City will continue to be successful in receiving AIP discretionary and state funding.

Given the assumed levels of funding provided herein, it is reasonable to expect the City can fund the 2018 through 2023 Capital Projects.

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Chapter 7

Airport Layout Plan

Master Plan Update

TALLAHASSEE
INTERNATIONAL AIRPORT

7.0 Airport Layout Plan

7.1 Introduction

The purpose of an approved Airport Layout Plan (ALP) is to serve as the blueprint for future airport development. One condition of accepting and utilizing grant funding for airport improvement projects is to maintain an updated ALP. For the Tallahassee International Airport (TLH), the updated development recommendations presented in this study are pictorially summarized in the ALP drawing set and include the preferred concepts for airfield development, landside facility development, and other reserved areas for non-aviation use. The ALP drawing set represents a scaled, graphic presentation of the airport's 20-year development program, thereby providing the airport with a feasible improvement plan that would increase the capability and safety of aircraft operations, promote compatibility with existing and proposed developments, and further upgrade the airport to effectively serve the anticipated demands of general aviation, corporate, and commercial aircraft traffic. The drawings depict the recommendations of this study with regard to aviation development for the short, intermediate, and long-term planning periods.

The dimensional information provided in the drawings demonstrates compliance with minimum airport design standards established by federal, state, and local authorities. The ALP Drawing Set was developed in accordance with the guidance outlined in Federal Aviation Administration (FAA) Advisory Circular (AC) 150/5070-6B, Airport Master Plans (Change 2), AC 150/5300-13A, Airport Design (Change 1), FAA ARP Standard Operating Procedure (SOP) 2.0, Standard Operating Procedure for FAA Review and Approval of Airport Layout Plans and other supporting circulars and orders.

The ALP drawing set includes the following individual drawing sheets:

- Title Sheet (Sheet 1)
- Airport Data Sheet (Sheet 2)
- Airport Layout Plan Drawing (Sheet 3)
- Terminal Area Drawing (Sheet 4)
- Airport Airspace Drawings (Sheets 5 and 6)
- Inner Portion of the Approach Surface Drawings (Sheets 7 through 10)
- Runway Departure Surface Drawings (Sheets 11 and 12)
- Land Use Drawing (Sheet 13)
- Exhibit "A" Airport Property Inventory Map Drawings and Supporting Data (Sheets 14 through 16)

7.2 Title Sheet (Sheet 1)

The Title Sheet serves as the introduction to the ALP drawing set. The Title Sheet includes: ALP Drawing Set publication date, airport name, airport owner (Sponsor), geographic location, Vicinity

and Location Maps, Drawing Index, FAA Airport Improvement Program and State Planning Grant Identifiers and Airport Sponsor/State Agency Approval Signature Blocks.

7.3 Airport Data Sheet (Sheet 2)

The Airport Data Sheet provides key informational and data elements reflecting current FAA-mandated airport design standards as reflected in the Existing and Future Airport Layout Plan Drawings. Tabular-listed data and information includes: geodetic coordinates and Above Mean Sea Level (MSL) elevations for the Airport Reference Point, each runway end and associated displaced threshold, runway centerline high and low elevations, runway centerline true bearing azimuths, Airport, Runway, Taxiway and Modification to Airport Design Standards Data Tables, Runway Wind Coverage Percentiles and graphical plots of All Weather and Instrument Flight Rule Wind Roses.

7.4 Airport Layout Plan Drawing (Sheet 3)

The Airport Layout Plan Drawing, also referred to as the ALP, depicts all existing facilities and proposed developments planned over the 20-year planning period at TLH. These plans are reviewed by and must be conditionally approved and retained on-file by the FAA for future federal (i.e., FAA) funding authorization and/or participation. The ALP provides clearance and dimensional information required to show conformance with applicable FAA design standards as outlined in FAA AC 150/5300-13A, Airport Design. The features of the ALP include, but are not limited to: the runways, taxiways, airfield lighting, visual and electronic navigational aids, terminal facilities, hangars, other non-aviation or support buildings, aircraft parking areas, automobile and truck parking, and airport access elements, as well as general, aerial photogrammetric mapping and geodetic survey source notes.

7.5 Terminal Area Drawing (Sheet 4)

The Terminal Area Drawing presents an enlarged view of the terminal area at TLH and therefore provides additional dimensional details such as apron areas (existing and proposed) that are not easily visible on the ALP. This drawing denotes the short and long-term developments and improvements within the vicinity of the terminal and illustrates many of the surrounding landside development recommendations. Existing and proposed automobile access and parking improvements are also included.

7.6 Airport Airspace Drawings (Sheets 5 and 6)

The Airspace Drawings depict applicable Civil Airport Imaginary Surfaces as prescribed by Title 14 of the Code of Federal Regulations (14 CFR) Part 77, Safe, Efficient Use, and Preservation of the Navigable Airspace. The drawing includes and is limited to the plan- and profile-view depiction of the airport's planned future: Primary and Approach Surfaces for each runway, Horizontal Surface, Conical Surface, Inner and Outer Transitional Surfaces. Where natural vegetation, terrain, man-made objects or structures have existing or planned future above ground top elevation heights that penetrate overlying Civil Airport Imaginary Surfaces which represent obstructions to navigable airspace, tabular-listed information and data is provided describing the type of obstruction,

surface penetrated, amount of penetration and recommended mitigation. For clarity purposes, the Airport Airspace Drawing was subdivided into two uniquely-numbered sheets depicting each respective runway end. Each Airport Airspace Drawing also includes general, base mapping, and geodetic survey source notes.

7.7 Inner Portion of the Approach Surface Drawings (Sheets 7 through 10)

The Inner Portion of the Approach Surface Drawings show both plan and profile views of the approach surfaces beyond each runway end. The purpose of these drawings is to locate and document existing objects which represent obstructions to navigable airspace within the existing and proposed approach slopes for each runway. Additionally, the drawings show the ground profile and terrain features along the extended centerline of each runway end.

Any controlling structures, such as roadways, natural ground elevations, and trees, are also shown on the Inner Portion of the Approach Surface Drawings, if applicable. Additionally, fixed objects located along the extended runway centerlines are also illustrated on the sheets to provide an indication of the relative distance to the approach surfaces. As applicable, obstructions to navigable airspace are listed in an obstruction data table along with a recommended action for each obstruction.

Key dimensional criteria for the runways was based on Runway Design Code (RDC) and shown in Table 7-1. The RDC and other runway approach factors are used to determine the physical characteristics of the runways (e.g., length, width, and strength), taxiway widths, and dimensions for the Runway Safety Area (RSA), Runway Object Free Area (ROFA), Building Restriction Line (BRL), clearance areas around navigational aids, etc.

Table 7-1
Future Runway Design Code

Runway	RDC
9	C-IV-2400
27	C-IV-1800
18	C-IV-4000
36	C-IV-1800

Source: Michael Baker International, Inc., 2018

7.8 Runway Departure Surface Drawings (Sheets 11 and 12)

The Runway Departure Surfaces Drawings consist of large-scale plan views of departure surfaces for all runway ends at TLH. The Departure Surfaces Drawings depict the ground contour along the extended runway centerline plus any significant natural or non-natural objects located along the extended runway centerline and provide a top elevation for those objects. Commonly shown objects include buildings, roads, ditches, and trees. Surface penetration and disposition information is included in the associated obstruction data tables.

7.9 Land Use Drawing (Sheet 13)

The Land Use Drawing designates various sectors of the property for specific uses and also shows an aerial view of the land surrounding TLH. Additionally, the 2015 and 2035 noise contours developed as a component of this study have been superimposed on the drawing to ensure that appropriate aviation-compatible zoning is maintained. The FAA has established national guidelines for land use compatibility related to airport-generated noise impacts. In most cases, noise sensitive land uses are considered incompatible if they are exposed to Day-Night Average Sound Levels (DNL) of 65 decibels or higher, unless noise mitigation measures are undertaken.

7.10 Exhibit "A" Property Inventory Map and Supporting Data (Sheets 14 through 16)

In order to comply with FAA grant requirements, airport owners must demonstrate that they hold "good title, satisfactory to the Secretary, to the landing area of the airport or site thereof, or will give assurance satisfactory to the Secretary that good title will be acquired." To meet the FAA's grant assurances, a sponsors' title must be free and clear of any reversionary interest, lien, easement, lease, or other encumbrance that would create undue risk that might deprive the sponsor of control or possession, interfere with its use for public airport purposes, or make it impossible for the sponsor to carry out the obligations and covenants in the grant agreement. Per Appendix 4 of AC 150/5100-17, satisfactory evidence of title is demonstrated through the development of an Exhibit "A" Airport Property Inventory Map which is accompanied by an attorney's title opinion which is often referred to as the Exhibit "C".

For this effort, the airport's existing Exhibit "A" was updated by integrating newly acquired title search data. The updated drawing and accompanying support data comply with the FAA's most recent guidance – Standard Operating Procedure (SOP) for FAA Review of Exhibit "A" Airport Property Inventory Maps (ARP SOP 3.00).

The purpose of the drawing and associated tables is to identify how property and easements have been acquired in the past as well as to illustrate properties and easements that should be obtained in the future as necessary to accommodate the proposed development plan.

7.11 Summary

The ALP Drawing Set is intended to depict TLH's capital development program in graphical form. Prior to incorporating the developments herein, preliminary plans were presented to the City of Tallahassee, the Technical Advisory Committee, and to the public for their review and approval. Thus, this Airport Layout Plan Drawing Set accurately reflects the goals and intentions of airport management and the adjacent community throughout the 20-year planning period.